

MISSISSIPPI
ACADEMY OF SCIENCES



SEVENTY-FOURTH ANNUAL MEETING

February 11-12, 2010

**Lake Terrace Convention Center
Hattiesburg, MS**

Supported by
University of Southern Mississippi
Mississippi State University

Journal of the Mississippi Academy of Sciences

Volume 55

January 2010

Number 1



Contents

Editor

Michelle Tucci
University of Mississippi Medical Center

Associate Editor

Edwin Swiatlo
University of Mississippi Medical Center

Editorial Board

Gregorio Begonia
Jackson State University

Maria Begonia
Jackson State University

Ibrahim O. Farah
Jackson State University

Robin Rockhold
University of Mississippi Medical Center

Program Editor

Ann Marie Kinnell
University of Southern Mississippi

Abstracts Editor

John Boyle
Mississippi State University

The Journal of the Mississippi Academy of Sciences (ISSN 0076-9436) is published in January (annual meeting abstracts), April, July, and October, by the Mississippi Academy of Sciences. Members of the Academy receive the journal as part of their regular (nonstudent) membership. Inquiries regarding subscriptions, availability of back issues, and address changes should be addressed to - The Mississippi Academy of Sciences, Post Office Box 55709, Jackson, MS 39296-5709, telephone 601-977-0627, or email msacademyofscience@comcast.net.

3	ACADEMY OFFICERS & DIVISION CHAIRS 2009–2010
4	GENERAL SCHEDULE
5	DIRECTIONS TO CONFERENCE CENTER
6	CONFERENCE CENTER FLOOR PLAN
6	SUSTAINING MEMBERS
7	LIFE MEMBERS
8	EXHIBITORS
9	DODGEN LECTURE
10	SPECIAL PRESENTATIONS
12	OVERVIEW OF DIVISIONAL PROGRAMS
	ABSTRACTS
31	Agriculture and Plant Science
39	Cellular, Molecular and Developmental Biology
53	Chemistry and Chemical Engineering
69	Ecology and Evolutionary Biology
74	Geology and Geography
79	Health Sciences
99	History and Philosophy of Science
103	Marine and Atmospheric Sciences
109	Mathematics, Computer Science and Statistics
117	Physics and Engineering
127	Psychology and Social Sciences
138	Science Education
145	Zoology and Entomology
151	AUTHOR INDEX



OFFICERS OF THE MISSISSIPPI ACADEMY OF SCIENCES

President
President-Elect
Immediate Past-President
Executive Officer
Journal Editor
Directors

Shane Burgess
Mohamed Elasri
Rodney Baker
Hamed A. Benghuzzi
Michelle Tucci
Ann Marie Kinnell
Ibrahim Farah
Stanley Smith
Cynthia Huff

Administrative Assistant

Division Chairs 2009–2010

AGRICULTURE AND PLANT SCIENCE

Taejo Kim, Mississippi State University

CELLULAR, MOLECULAR AND DEVELOP. BIOL.

Tim McLean, University of Southern Mississippi

CHEMISTRY AND CHEMICAL ENGINEERING

Karl Wallace, University of Southern Mississippi

ECOLOGY AND EVOLUTIONARY BIOLOGY

Mac H. Alford, University of Southern Mississippi

GEOLOGY AND GEOGRAPHY

Jonathon McMillin, HACH Company

HEALTH SCIENCES

Fazlay Faruque, Univ. of Mississippi Medical Center

Ibrahim Farah, Jackson State University

HISTORY AND PHILOSOPHY OF SCIENCE

Andrew Harrell, U.S. Army Corp of Engineers

MARINE AND ATMOSPHERIC SCIENCES

David Rosenfield, University of Southern Mississippi

MATHEMATICS, COMPUTER SCI. AND STATISTICS

Paul Ruth, Univ. of Mississippi

PHYSICS AND ENGINEERING

Michael Vera, University of Southern Mississippi

PSYCHOLOGY AND SOCIAL SCIENCE

Sheree Watson, University of Southern Mississippi

SCIENCE EDUCATION

Johnny Mattox, Blue Mountain College

ZOOLOGY AND ENTOMOLOGY

Julius Ikenga, MS Valley State University



GENERAL SCHEDULE

**MISSISSIPPI ACADEMY OF SCIENCE
Seventy-Fourth Annual Meeting
February 10-12, 2009**

GENERAL SCHEDULE

WEDNESDAY, FEBRUARY 10, 2010

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
5:00 PM to 7:00 PM	Board of Directors Meeting	TBA

THURSDAY, FEBRUARY 11, 2010

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:30 AM to 5:00 PM	Registration	Lobby
8:00 AM to 5:00 PM	Exhibits	Lobby and Prefunction areas
8:00 AM to 4:00 PM	Divisional Programs	See program for rooms
Noon to 1:00 PM	Special Presentation	Exhibit Hall A
5:15 PM to 6:00 PM	2010 Dodgen Lecture & Presentation of Awards	Exhibit Hall A
6:00 PM to 7:00 PM	Reception and Poster Session	Exhibit Halls A&C

FRIDAY, FEBRUARY 12, 2010

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:15 AM to 8:15 AM	Past-Presidents' Breakfast	To Be Announced
8:00 AM to 8:45 AM	MAS Business Meeting	Exhibit Hall A
8:00 AM to 2:00 PM	Registration	Lobby
8:00 AM to 2:00 PM	Exhibits	Lobby and Prefunction areas
8:00 AM to 5:00 PM	Divisional Programs	See program for rooms
9:00 AM to 10:30 AM	Health Fair	Exhibit Hall B
Noon to 1:00 PM	Special Presentation	Exhibit Hall A

Lake Terrace Convention Center, Hattiesburg, MS



DRIVING DIRECTIONS

If Coming from the South on I-59:

Take Exit 67A
At bottom of ramp turn right
At first traffic light turn left

If Coming from the North on I-59:

Take Exit 67A
At bottom of ramp merge into Hwy 49 South
At first traffic light turn left

If Coming from the South on Highway 49:

Take Highway 49 North to Hattiesburg
Continue on Hwy 49 through Hattiesburg
Just before Intersection of I-59 and Hwy 49 there will be a traffic light
Turn right at traffic light

If Coming from the North on Highway 49:

Take Highway 49 South to Hattiesburg
Pass the intersection of I-59 and Hwy 49
Turn left at first traffic light past intersection

If Coming from the East on Highway 98:

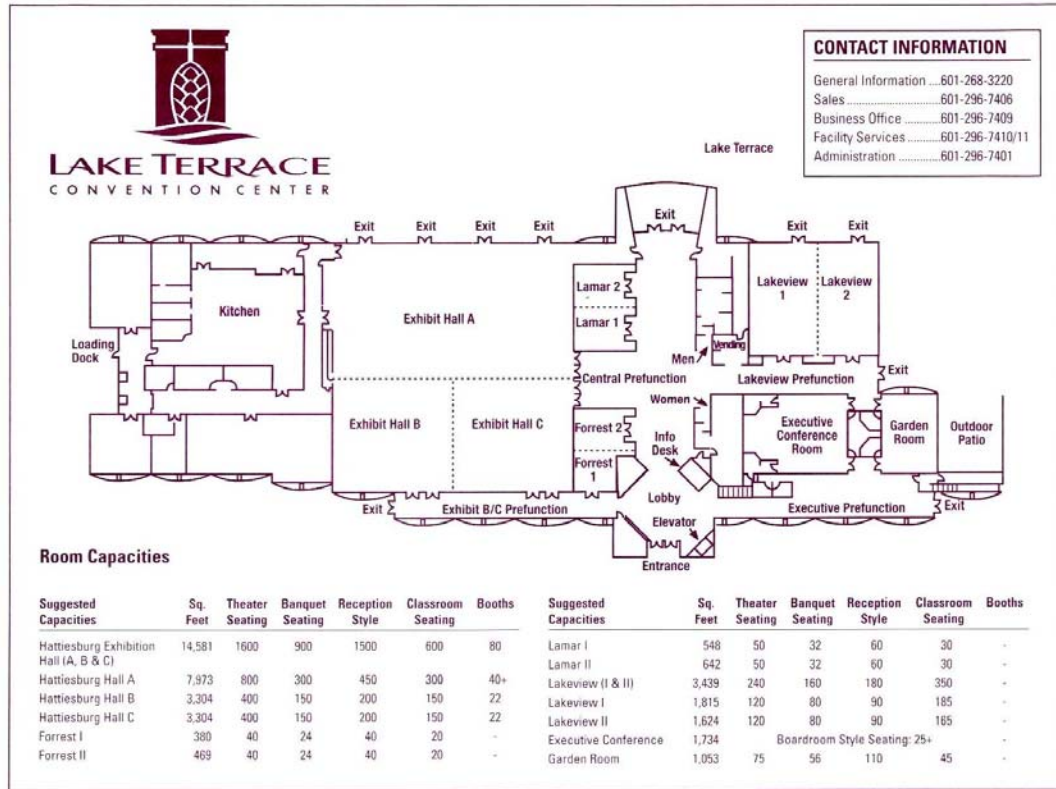
Take Highway 98 to I-59
Take I-59 North to exit 67A
Take Hwy 49 south to first traffic light
Take left at first traffic light

If Coming from the West on Highway 98:

Take Highway 98 to I-59
Take I-59 North to Exit 67A
Take Hwy 49 south to first traffic light
Take left at first traffic light

<http://www.laketerrace.com/index.php?page=DIRECTIONS>

Lake Terrace Convention Center Floor Plan



Sustaining Members

Alcorn State University
Belhaven College
East Central Community College
Holmes Community College
Itawamba Community College
Jackson State University
Mississippi Gulf Coast Community College
Mississippi Museum of Natural Sciences

Mississippi State University
Mississippi Valley State University
Northwest Mississippi Community College
Pearl River Community College
University of Mississippi
University of Mississippi Medical Center
University of Southern Mississippi
William Carey University



LIFE MEMBERS

Junius G. Adams, III, Gaithersburg, MD
 Charles C. Alexander, University, MS
 Alex D. W. Acholonu, Alcorn State, MS
 Vernon L. Asper, Stennis Space Center, MS
 Robert Bateman, Hattiesburg, MS
 John D. Bower, Jackson, MS
 Carolyn R. Boyle, Starkville, MS
 John A. Boyle, Starkville, MS
 Joseph Brown, Starkville, MS
 Charles T. Bryson, Stoneville, MS
 C. Eugene Cain, Jackson, MS
 Joseph A. Cameron, Jackson, MS
 Gordan Cannon, Hattiesburg, MS
 C. T. Carley, Starkville, MS
 Steven T. Case, Jackson, MS
 Alfred P. Chestnut, Jackson, MS
 Prentiss S. Cox, Clinton, MS
 Crayton M. Crawford, Mississippi State, MS
 David Creed, Hattiesburg, MS
 Roy A. Crochet, Stennis Space Center, MS
 W. Lawrence Croft, Mississippi State, MS
 Asok K. Dasmahapatra, University, MS
 Ralph Didalake, Jackson, MS
 Alice L. Douglas, Jackson, MS
 Ben H. Douglas, Jackson, MS
 Nell Douglas, Ridgeland, MS
 B.H. Douglas, Ridgeland, MS
 Roy J. Duhe, Jackson, MS
 Stephen Ekunwe, Clinton, MS
 Stella D. Elakovich, Purvis, MS
 Mohamed Elsari, Hattiesburg, MS
 Atef Elsherbeni, University, MS
 Peter Fleischer, Stennis Space Center, MS
 Dionne Fortenberry, Columbus, MS
 D.J. Grimes, Ocean Springs, MS
 Mary Lou Gutierrez-Mohamed, Jackson, MS
 Gordon Gunter, Ocean Springs, MS
 Portia Harris, Stennis Space Center, MS
 Margot Hall, Hattiesburg, MS
 Burnette Hamil, Mississippi State, MS
 Robert G. Hamilton, Clinton, MS
 Andrew W. Harrell, Vicksburg, MS
 Thomas J. Herrin, Jackson, MS
 Sabine Heinhorst, Hattiesburg, MS
 Huey-Min Hwang, Jackson, MS
 Rajamohan Kaluru, Jackson, MS
 Jerome A. Jackson, Mississippi State, MS
 Phillip Kelly, Madison, MS
 Paul K. Lago, University, MS
 Mary C. Landin, Utica, MS
 Paul Lago, University, MS
 Mary Collins Landon, Utica, MS
 Ken Lee, Jackson, MS
 Jerzy Leszczynski, Jackson, MS
 Tim Lockley, Gulfport, MS
 Julia S. Lytle, Ocean Springs, MS
 Thomas F. Lytle, Ocean Springs, MS
 David H. Magers, Clinton, MS
 Lyman Magee, University, MS
 Harihara M. Mehendale, Jackson, MS
 L. Hollis Melton, Ocean Springs, MS
 Joan Messer, Sumrall, MS
 Jean Pierre Montani, Fribourg, Switzerland
 Lyle E. Nelson, Starkville, MS
 Clifford Ochs, Oxford, MS
 Ervin G. Otvos, Ocean Springs, MS
 Robin M. Overstreet, Ocean Springs, MS
 Babu Partolla, Alcorn State, MS
 Dudley F. Peeler, Jackson, MS
 A. Louise Perkins, Bay St. Louis, MS
 John A. Pojman, Hattiesburg, MS
 Aaron D. Puckett, Jackson, MS
 Zahir Qureshi, Memphis, TN
 Dero S. Ramsey, Starkville, MS
 James Rawlins, Hattiesburg, MS
 Edward Rigdin, Jackson, MS
 Robin W. Rockhold, Jackson, MS
 Bennie Rohr, Pascagoula, MS
 James Rucker, Austin, TX
 Edgar Saltsman, Santa Ana, CA
 Balwant Sekhon, Richmond, VA
 Muhammad I. Shafi, Holly Springs, MS
 Sandra L. Sharp, Ocean Springs, MS
 Troy J. Stewart, Sr., Lorman, MS
 Richard Sullivan, Jackson, MS
 Charles Swann, Oxford, MS
 David Swanson, Riverside, CA
 Mary Tan, Canton, MS
 Robert D. Taylor, Houston, TX
 Elizabeth Taylor, Verona, MS
 Shelby F. Thames, Hattiesburg, MS
 Joyce Titus, Madison, MS
 Salil C. Tiwari, Fayette, MS
 Suresh C. Tiwari, Fayette, MS
 Warren E. Traub, Diamondhead, MS
 Gregory S. Tschumper, University, MS
 Suresh Tyagi, Louisville, KY
 S. Kant Vajpayee, Hattiesburg, MS
 Rosa Lea Walker, Jackson, MS
 W. Lamar Weems, Jackson, MS
 Denis A. Wiesenburg, Stennis Space Center, MS
 John S. Williamson, Oxford, MS
 C. A. Wilson, Mississippi State, MS
 Hongtao Yu, Madison, MS
 M.S. Zaman, Alcorn State, MS
 Jeffrey D. Zubkowski, Brandon, MS



Exhibitors, 2010 Annual Meeting **Supporters of the Mississippi Academy of Sciences**

DIAMOND BOOTH

1. Mississippi Center for Supercomputing
2. Mapping and GIS, Navigation Electronics IncBase Pair, UMMC
3. School of Health Related Professions, UMMC
4. Department of Chemistry, JSU
5. AGEM Earnest

GOLDEN BOOTH

1. Nikon Instruments Inc.
2. Mississippi Functional Genomics Network

STANDARD BOOTH

1. School of Graduate Studies in the Health Sciences, ➔. UMMC
2. Millipore-Labwater
3. Gulf Coast Research Laboratory
4. PerkinElmer Life and Analytical Science, Inc

STANDARD BOOTH

5. Forestry Suppliers, Inc.
6. Department of Chemistry and Biochemistry, USM
7. Fisher Scientific
8. Solaris
9. MSU College of Veterinary Medicine

UMC, Base Pairs Program*

UMC, Biomedical Materials Science Dept.*

UMC, School of Graduate Studies*

UMC, School of Health Related Professions*

USM, Dept. of Chemistry and Biochemistry*

USM, Gulf Coast Research Laboratory

USM, School of Polymers & High Performance Materials

Dr. Cecil Burge, Vice President for Research at University of Southern Mississippi Sponsored the Board Dinner



**MISSISSIPPI CENTER
FOR SUPERCOMPUTING RESEARCH**

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>.

<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>.

2010 Dodgen Lecture

5:15 pm Thursday
February 11, 2010

The Big Shift: From a Fossil-based to a Bio-based Society

given by

Jim Lane, Editor and Publisher of Biofuels Digest



Jim Lane is the Editor & Publisher of the Biofuels Digest, which is part of Ascension Publishing Inc. and comprises the BiofuelsDigest.com news website, the Daily Biofuels News Digest e-newsletter, and the Biofuels Digest Newswire. The Digest covers producer news, research, policy, policymakers, conferences, fleets and financial news. It is home to the Biofuels Digest Index™, a benchmark basket of biofuels stocks, and the “50 Hottest Companies in Bioenergy” list. The Daily Biofuels News Digest is the most widely-read biofuels daily in the world (sources: Alexa, Quantcast). 62 percent of subscribers call it “the best online biofuels media”. The Digest has more than 240,000 references in Google and readers in 200+ countries. BiofuelsDigest.com has over 34,200 monthly unique visitors (source: Quantcast) and the Biofuels Digest daily e-newsletter has more than 12,900 subscribers at more than 7,000 companies worldwide

Special Presentation

Noon, Thursday, February 11, 2010



FROM INVENTION TO INNOVATION

SPEAKER: Dr. Gary D. Butler, President and CEO of Camgian Microsystems Corporation

Dr. Gary D. Butler is the founder, president and chief executive officer of Camgian Microsystems Corporation, an advanced semiconductor research and development company, and one of Mississippi's fastest growing technology firms. Since its formation in 2006, Dr. Butler has led the development and execution of the company's business strategy, which has included two major acquisitions. These include fabless semiconductor company Theseus Logic, a global leader in advanced asynchronous integrated circuit technologies, and an engineering division and design facility of Cypress Semiconductor. He has also established strategic relationships with a number of large corporate partners, including Camgian's selection as a protégé company to DRS Technologies, one of the world's largest suppliers of advanced military electronic systems.

Today, Camgian has corporate offices in three states, annual multi-million dollar revenues and major product development efforts in areas related to advanced embedded networking technologies and ultra-low power integrated circuits supported by organizations such as the Pentagon's Defense Advanced Research Projects Agency (DARPA). Camgian's current intellectual property portfolio boasts more than twenty patents in the area of advanced low-power semiconductor technologies and ongoing licensing agreements with major corporations such as Honeywell and Medtronic. In 2009, Camgian received the Governor's Cup Award from the Mississippi Development Authority, was named as one of Mississippi's Companies to Watch by the Mississippi Technology Alliance and the Edwin Lowe Foundation and was listed as one of Mississippi's top 100 private companies by the Mississippi Business Journal.

Prior to founding Camgian, Dr. Butler was a senior staff member in the Washington, DC office of Internet pioneer BBN Technologies where he led major technology development programs in the areas of advanced networks, ultra-wideband communications and radar, and signal processing technologies. At BBN, Dr. Butler was elected for membership in the company's senior science organization, a rank representing approximately the top 10% of the research and development staff, received BBN's annual best DARPA revenue award, and was elected as a senior member of the Institute of Electrical and Electronics Engineers. Over his career, he has captured and led research programs totaling more than \$25M in funding, co-authored publications on the application of wavelets to signal analysis and has been awarded patents related to the application of genetic algorithms to signal classification and multi-static ultra-wideband radar signal processing.

Dr. Butler received his PhD from Cambridge University where he studied engineering and was a member of Churchill College. He received the Executive Certificate in Strategy and Innovation from the Massachusetts Institute of Technology Sloan School of Management, an MS degree from Vanderbilt University and a BS degree in mechanical engineering from Tulane University. At Tulane, Dr. Butler was a scholarship athlete, a four-time varsity football letterman, and named a National Collegiate Athletic Association and Entergy Corporation Winning for Life Scholar Athlete. Dr. Butler also serves part-time as Assistant Vice President for Research and Technology Development at Mississippi State University and is an adjunct professor in the University's Electrical and Computer Engineering Department.

Special Presentation

Noon, Friday
February 12, 2010



MISSISSIPPI - THE HOTBED FOR ENERGY INNOVATORS AND ENTREPRENEURS

SPEAKER: Mr. Sumesh Arora, Director of
Strategic Biomass SolutionsTM.

Sumesh Arora is the Director of Strategic Biomass Solutions™ (SBS) that is focused on commercializing biomass conversion technologies. SBS is managed by the Mississippi Technology Alliance, a non-profit organization dedicated to economic development through innovation and technology. SBS is a public-private partnership and 15 projects valued at \$3.5 million are presently funded through this program. These include enhancements to biodiesel and cellulosic ethanol processes, anaerobic digesters, and biomass combustion. As a member of the entrepreneurial development team at MTA, Sumesh provides strategic business guidance to researchers, entrepreneurs, economic developers, communities and investors who are seeking to develop renewable energy projects.

His 19 years of commercial experience includes working as a project development engineer for the Mississippi Alternative Energy Enterprise and the State Energy Office, as well as a research project leader for a large chemical fertilizer manufacturer. He was named to the “Top 40 Under 40” by the Mississippi Business Journal in 2005 and has been appointed by Governor Haley Barbour to represent Mississippi on the Governors’ Biofuels Coalition (previously known as the Governors’ Ethanol Coalition). He serves on the advisory board of two renewable energy startup companies and a New Market Tax Credits investment firm with an allocation of \$100 million. He has served as president and vice-president of the Mississippi Biomass and Renewable Energy Council and provided leadership to other regional organizations. Sumesh has authored several publications for national and international conferences, including a book chapter on energy security and terrorism. He currently has a patent pending on poultry litter-based anaerobic methane gas generation system.

Sumesh is currently a PhD candidate in the International Development program at the University of Southern Mississippi with research focused on renewable energy technology adoption and the biotechnology industry in India. He graduated with a MS in materials engineering and BS in electrical engineering from the University of Central Florida. Sumesh attended high schools in Thailand and India and currently resides in Madison, Mississippi with his wife and two children.



GENERAL SYMPOSIUMS

Thursday, February 11

Location: Exhibit Hall

12:00p FROM INVENTION TO INNOVATION

Thursday Evening

LOCATION: Exhibit Hall

5:00p THE DODGEN LECTURE: The Big Shift: From a Fossil-based to a Bio-based Society

6:00p Dodgen Reception and Divisional Poster Sessions

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

Friday, February 12

Location: Grand Ballroom

12:00p MISSISSIPPI - THE HOTBED FOR ENERGY INNOVATORS AND ENTREPRENEURS

OVERVIEW OF DIVISIONAL PROGRAMS

AGRICULTURE AND PLANT SCIENCE

Thursday, February 11

THURSDAY MORNING

GARDEN ROOM

- 9:00 CASH FOR CONSERVATION: POTENTIALLY INCREASING SMALL LANDOWNER INCOME VIA WILDLIFE AND NATIVE GRASS ENVIRONMENTAL STEWARDSHIP**
- 9:15 THE IN-OVO INJECTION OF 25 HYDROXYCHOLECALCIFEROL FACILITATES EMBRYOGENESIS IN BROILER HATCHING EGGS INCUBATED UNDER SUBOPTIMAL TEMPERATURES**
- 9:30 SELECTED SANITIZING TREATMENTS FOR BLUEBERRIES DESTINED FOR THE FROZEN/PROCESSING MARKET**
- 9:45 SCREENING STRAWBERRY CLONES FOR ANTHRACNOSE DISEASE RESISTANCE USING TRADITIONAL TECHNIQUES AND MOLECULAR MARKERS**
- 10:00 PREVALENCE OF LISTERIA MONOCYTOGENES AND LISTERIA SPP. IN CATFISH AND PROCESS ENVIRONMENT AND EQUIPMENT BY MOLECULAR TYPING METHODS**
- 10:15 RESPONSE OF RABBIT EYE BLUEBERRIES TO CHEMICAL THINNING AGENTS**
- 10:30 Break**
- 10:45 ANTIOXIDANT EFFECT OF HEAT MODIFIED CHEDDAR WHEY USED IN FINAL EDIBLE COATING DIPS FOR TENDERIZED BEEF STEAK**
- 11:00 ANTIBIOTIC RESISTANCE IN LISTERIA SPECIES ISOLATED FROM CATFISH FILLETS AND PROCESSING SURFACES**
- 11:15 EFFECT OF AGRONOMY PRACTICES ON PEANUT YIELD POTENTIAL**
- 11:30 MEDICINAL PLANT GROWTH AND QUALITY IN SOUTHWEST MISSISSIPPI**
- 11:45 EMBRYONIC AND POST HATCH PHYSIOLOGICAL RELATIONSHIP BETWEEN EGG INTERNAL TEMPERATURE AND INCUBATION LENGTH IN BROILER HATCHING EGGS**



**THURSDAY AFTERNOON
GARDEN ROOM**

- 1:30 DEVELOPMENT OF PLANTS FOR FUTURE USE IN RESTORATION PROJECTS
1:45 ANTIMICROBIAL EFFECT AND SENSORY CHARACTERISTICS OF HEAT MODIFIED CHEDDAR WHEY USED IN EDIBLE COATING DIPS FOR CURBED BEEF STEAK
2:00 AGRONOMIC EVALUATION OF NEWLY DEVELOPED SWEET CORN IN SOUTHWEST MISSISSIPPI
2:15 PROCESS FOR THE PRODUCTION OF GALLIC ACID, PYROGALLOL AND PURPUGALLIN FROM TANNIC ACID
2:30 COMPARISON OF TREATMENTS FOR ACORN GERMINATION OF THE SAWTOOTH OAK
2:45 NO-TILL AND CONVENTIONAL FARMING SYSTEMS OF HORTICULTURAL CROPS ON BUILDUP OF PLANT NUTRIENTS AND CARBON.

3:00 Divisional Business Meeting

**THURSDAY EVENING
GRAND BALLROOM**

- 6:00 Dodgen Reception and Poster Session
Please set up your poster between 4:00 and 4:30p
1. A BACTERIAL ARTIFICIAL CHROMOSOME (BAC) LIBRARY OF AN ABNORMAL CHROMOSOME 10 MAIZE GENOME
 2. CADMIUM UPTAKE BY CABBAGE AND INDIAN MUSTARD PLANTS FROM CONTAMINATED SOILS
 3. ENHANCING TANNIC ACID ANTIMICROBIAL ACTIVITY AND ANTIOXIDANT CAPACITY BY INCREASING AMOUNTS OF HYDROLYZABLE PRODUCTS
 4. EVALUATION OF THE ANTIMICROBIAL CAPACITY AND ACTIVE COMPOUNDS OF EXTRACTS FROM DIFFERENT SECTIONS OF VARIOUS MUSCADINE CULTIVARS
 5. LOW RESOLUTION RADIATION HYBRID MAPPING OF CHROMOSOME 1D OF WHEAT
 6. VALIDATION OF DELETION STOCKS IN WHEAT FOR CHROMOSOME 4D-7D
 7. ENHANCING THE EFFICACY OF ISOLATION PROCEDURES FOR SALMONELLA SPP. IN FRESH AND FROZEN AQUACULTURE FOODS
 8. FIELD MONITORING OF SOIL HYDROLOGY FOR WETLAND MITIGATION IN THE BLACKLAND PRAIRIE MAJOR LAND RESOURCE AREA

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Thursday, February 11

**THURSDAY MORNING
EXHIBIT HALL A**

- 8:30 GENERATION OF AN EXPRESSION CONSTRUCT FOR GENE #0827 OF THE HALOTHIOBACILLUS NEAPOLITANUS GENOME
8:45 GENERATION OF MUTANTS TO IDENTIFY PROTEIN INTERACTIONS WITHIN THE CARBOXYSOMAL SHELL OF HALOTHIOBACILLUS NEAPOLITANUS.
9:00 A DELETION OF THE *nhaB* GENE SIGNIFICANTLY REDUCES THE EXPRESSION OF *icsA* ON A POST-TRANSCRIPTIONAL LEVEL
9:15 EXPRESSION OF YIN, A PUTATIVE OLIGOPEPTIDE TRANSPORTER, IN THE REPRODUCTIVE TRACT OF DROSOPHILA MELANOGASTER
9:30 MOLECULAR CHARACTERIZATION OF THE JAPANESE BEETLE (POPILLIA JAPONICA) LARVAL MIDGUT SERINE PROTEASE
9:45 CELLULAR LOCALIZATION OF MSA IN STAPHYLOCOCCUS AUREUS

10:00 BREAK



- 10:15 ANALYSIS OF SULFUR METABOLISM GENES CD01, GSH1 AND GSH2 IN THE DIMORPHIC PATHOGENIC FUNGUS HISTOPLASMA CAPSULATUM
10:30 MOUSE EMBRYONIC STEM CELLS' RESPONSE TO H₂O₂ INDUCED OXIDATIVE STRESS
10:45 MSA IS REQUIRED FOR METHICILLIN RESTANCE EXPRESSION BY STAPHYLOCOCCUS AUREUS
11:00 INTERVENING DIRECTLY INTO BRAINS TO AFFECT SOCIAL COGNITION
11:15 ANALYSIS OF RECEPTOR-TARGETED SIRNA DELIVERY TO CANCER CELLS

**THURSDAY AFTERNOON
EXHIBIT HALL A**

- 1:30 IS THE JANUS KINASE REDOX SENSOR SWITCH A RELEVANT REGULATOR OF CELL PHYSIOLOGY?
1:45 THE INVESTIGATION OF SINGLE NUCLEOTIDE POLYMORPHISMS AND EXPRESSION LEVELS IN CANDIDATE GENES FROM THE ALFALFA LIGNIN BIOSYNTHESIS PATHWAY
2:00 DETECTION OF TARGET BACTERIA USING A QCM-BASED DETECTOR AND SINGLE CHAIN FV ANTIBODY
2:15 EXPRESSION OF AN USUSUAL BACTERIAL MICROCOMPARTMENT GENE FROM SALMONELLA TYPHIMURIUM THYHI (2)

2:30 BREAK

Special Session: Adapting Molecular Tools and Techniques for Use in Marine Science

- 2:45 DEVELOPMENT OF A NEW RNA EXTRACTION METHOD FOR DETECTING NOROVIRUS IN OYSTERS
3:00 VALIDATION OF LINEAR SINGLE CELL RNA AMPLIFICATION AMONG KARENIA BREVIS GENES AND IMPLICATIONS TO SINGLE CELL MICROARRAY ANALYSIS
3:15 IDENTIFICATION OF NON-CODING RNAs IN KARENIA BREVIA
3:30 TRACKING THE SOURCES OF FECAL POLLUTION IN COASTAL WATER USING LIBRARY-INDEPENDENT METHODS
3:45 DETECTION OF SALMONELLA spp. FROM MISSISSIPPI COASTAL WATERS AND SEDIMENT
4:00 DETECTION OF N₂FIXING CYANOBACTERIA WITH MOLECULAR TOOLS

Friday, February 12

**FRIDAY MORNING
EXHIBITION HALL C**

9:30-11:30- Authors should be available with their posters to answer questions 10:15-11:30

1. CHARACTERIZATION AND FUNCTIONAL ANALYSIS OF A COTTON RING-TYPE UBIQUITIN LIGASE (E3) GENE
2. CONSTRUCTION AND OVEREXPRESSION VECTOR FOR GSH1 AND GSH2 IN THE PATHOGENIC FUNGUS, HISTOPLASMA CAPSULATUM
3. A PLASMID CONSTRUCT FOR THE GENERATION OF A GREEN FLUORESCENT PROTEIN-TAGGED CARBOXYSOME MUTANT OF HALOTHIOBACILLUS NEAPOLITANUS
4. DETECTION OF EHRICHIA CHAFFEENSIS IN THE MIGRATORY BIRDS
5. MOLECULAR CHARACTERIZATION OF TICK SALIVARY SYNTAXIN AND VTI PROTEINS
6. NYMPH SEX DIMORPHISM IN AMBYLOMMA AMERICANUM AND IXODES SCAPULARIS
7. CLONING AND EXPRESSION OF A POTENTIAL CARBOXYSOME SHELL PROTEIN FROM HALOTHIOBACILLUS NEAPOLITANUS
8. EFFECT OF BLEACH ON PLASMID DNA AND EXTRACTION OF DNA FROM HUMAN CHEEK CELLS
9. DYNAMIC LIGHT SCATTERING ASSAY FOR ULTRA-SENSITIVE DETECTION OF SALMONELLA IN



10. WATER SAMPLES USING GOLD NANOROD
A GENETIC MODIFIER SCREEN TO IDENTIFY REGULATORS OF THE NEURONAL FATE DETERMINANT MIDLINE IN THE EMBRYONIC CENTRAL NERVOUS SYSTEM OF DROSPHILA MELANOGASTER
11. THE IDENTIFICATION OF A NOVEL GENE THAT REGULATES AXON GUIDANCE IN THE EMBRYONIC CNS OF DROSOPHILA MELANOGASTER
12. PLACENTAL ISCHEMIA TRIGGERS IMMUNE ACTIVATION AS LEUKOCYTE OVERPRODUCTION OF SFLT-1: A STEP IN THE PATHOGENESIS OF PRECLAMPSIA?
13. PROLIFERATION OF UTERINE FIBROIDS FROM HYPERTENSIVE PATIENTS IS ASSOCIATED WITH INCREASED ENDOTHELIN-1
14. THE IDENTIFICATION OF HOMOLOG OF THE EXTRACELLULAR MATRIX PROTEIN Hlamp 1 IN 24-HR-72HR ZEBRAFISH EMBRYO
15. PATHOGENESIS OF STREPTOCOCCUS SANGUINIS KERATITIS IN RABBIT MODEL
16. CULTURAL AND PHYSIOLOGICAL CHARACTERISTICS OF CARYOPHANON LATUM, A FILAMENTOUS BACTERIUM

**FRIDAY AFTERNOON
EXHIBIT HALL A**

- 1:30 EFFECT OF ENVIRONMENTAL FACTORS ON REGULATION OF BIOFILMS BY MSA IN STAPHYLOCOCCUS AUREUS
- 1:45 ROLE OF MSA IN ANTIBIOTIC RESISTANCE IN STAPHYLOCOCCUS AUREUS
- 2:00 REGULATION OF CYCLOOXYGENASE-2 BY P38 MAP KINASE IN MOUSE EMBRYONIC STEM CELLS
- 2:15 THE [URE3] PRION OF BAKER'S YEAST IS DISADVANTAGEOUS WHEN PRION CONTAINING YEAST ARE IN DIRECT COMPETITION WITH PRION-FREE YEAST
- 2:30 RECOMBINANT EXPRESSION OF THE SMALL SUBUNIT OF RIBULOSE 1,5-BISPHOSPHONATE CARBOXYLASE/OXYGENASE
- 2:45 CHARACTERIZATION OF TRANSCRIPTIONFACTORS THAT BIND TO THE MOLD SPECIFIC GENE, M46, IN THE DIMORPHIC PATHOGENIC FUNGUS HISTOPLASMA CAPSULATUM
- 3:00 BREAK
- 3:15 DIVISIONAL BUSINESS MEETING

CHEMISTRY AND CHEMICAL ENGINEERING

Thursday, February 11

**THURSDAY MORNING
LAKEVIEW 2**

- 8:50 INTRODUCTION AND WELCOME
- 9:00 A NEW ELECTROGENERATED CHEMILUMINESCENT IMMUNOSENSING SYSTEM FOR DETECTION OF C-REACTIVE PROTEIN
- 9:20 DETERMINATION OF HEAVY METALS IN WATER SAMPLES BY ICP-AES USING YEAST (*Yamadazyma spartinae*) IMMONBILIZED ON AL₂O₃ NANOPARTICLES
- 9:40 ELECTRONIC PROPERTIES OF SQUARINE DYES
- 10:00 FUNDAMENTAL THERMOCHEMICAL PROPERTIES OF AMINO ACIDS: GAS PHASE HEATS OF FORMATION AND ACIDITIES
- 10:20 SELECTIVE DETECTION OF TRIACETONE TRIPEROXIDE USING ELECTROGENERATED CHEMILUMINESCENCE
- 10:40 BREAK
- 10:50 SYNTHESIS, CHARACTERIZATION, AND ELECTROCATALYTIC ACTIVITY OF NOVEL RUTHENIUM (II)-CONTAINING HYDROGEN PRODUCING PHOTOCATALYSTS



- 11:10 SPECIATION OF MERCURY IN FISH OTOLITHS BY COLD VAPOR GENERATION ATOMIC ABSORPTION SPECTROSCOPY
- 11:30 N-SUBSTITUTED 1,8-NAPHTHALIMIDES AS FLUORESCENCE PROBES
- 11:50 LUNCH

THURSDAY AFTERNOON
LAKEVIEW 2

SYMPOSIUM: CHEMICALS IN THE ENVIRONMENT, SENSING AND REMEDIATION

- 1:30 BINDING AND SELECTIVITY ASPECTS OF ANIONS WITH SYNTHETIC RECEPTORS
- 2:15 DEVELOPMENT OF A NEXT GENERATION SENSOR FOR MEASURING BIOLOGICALLY AVAILABLE IRON IN SEAWATER
- 3:00 BREAK
- 3:15 MOLECULAR GOLD NANOCCLUSERS: ATOM BY ATOM DESIGN
- 4:00 MEMS CHEMICAPACITIVE CHEMICAL SENSOR SYSTEMS
- 4:45 CLOSING REMARKS

THURSDAY EVENING
POSTER SESSION
EXHIBIT HALL C

1. XFR ANALYSIS OF RUBBER PIGMENT ASH USING COMPTON SCATTER MATRIX ABSORPTION CORRECTIONS
2. EXPRESSION AND CHARACTERIZATION OF RECOMBINANT HUMAN GRANULIN-A (hGrn A) AND ITS POTENTIAL INTERACTIONS WITH AMYLOID- β (Ab) PEPTIDE IN ALZHEIMER'S DISEASE
3. PREPARATION OF UNNATURAL AMINO ACIDS USING B-LACTONE INTERMEDIATES
4. SYNTHESIS AND CHARACTERIZATION OF 2-HYDROXY BENZALDEHYDE N-4, 4'-DIMETHYL-3-THIOSEMICARBAZONE AND ITS COPPER (II) COMPLEX
5. SYNTHESIS AND STRUCTURAL CHARACTERIZATION OF CYCLOPENTANONE THIOSEMICARBAZONES
6. EFFECTS OF FATTY ACIDS AND PHOSPHOLIPIDS ON AMYLOID B (AB) PEPTIDE AGGREGATION
7. TRAPPING OF METHANOL BY POLYAZA CRYPTAND
8. SYNTHESIS OF HEXAZAMACRYOCYCLE FOR ANION BINDING
9. RATIONAL DESIGN OF ANION SENSORS: SYNTHESIS AND BINDING OF INORGANIC ANIONS IN LIPOPHILIC SOLVENTS
10. TRIPODAL BASED HOSTS FOR ANION BINDING
11. SELECTIVE COLORIMETRIC AND HIGHLY SENSITIVE DYNAMIC LIGHT SCATTERING ASSAY FOR ARSENIC DETECTION USING GOLD NANOPARTICLES
12. SOLID PHASE PRECONCENTRATION ON ACTIVATED ALUMINA WITH EDTA FOR DETERMINATION OF TRACE ELEMENTS IN FISH OTOLITHS BY ICP-AES
13. SOLID PHASE PRECONCENTRATION OF ARSENIC AND ANTIMONY FOR DETERMINATION BY HYDRIDE GENERATION ICP-AES
14. MEASUREMENT OF IONIC CADMIUM BY UCP-AES FROM LIVER AND KIDNEY SAMPLES OF RATS EXPOSED TO CDSE NANOPARTICLES
15. TRACE METAL PRECONCENTRATION WITH DIPHENYLCARBAZONE IMMOBILIZED ON NANO-TiO₂ SOLID SUPPORT FOR DETERMINATION BY ICP-AES
16. THE ANALYTICAL METHOD OF MASS SPECTROMETRY AND ITS APPLICATION TO BIOLOGY AND POLYMER SCIENCE
17. SYNTHESIS OF A LIBRARY OF BIFUNCTIONAL DNA CLEAVING REAGENTS
18. DECARBOXYLATIVE PHOTOCYCLIZATION OF CATIONIC PHTHALIMIDE AND QUINOLINE/ISOQUINOLINE CARBOXYLIC ACID
19. SYNTHESIS AND CHARACTERIZATION OF Au₁₄₄ AND Au₂₅ MIXED MONOLAYER NANOPARTICLES
20. BIFUNCTIONAL DNA CLEAVING REAGENTS BASED ON A LIGHT INDUCED HOMOLYTICAL NITROGEN OXYGEN BOND CLEAVAGE
21. NANOCCLUSER SIZE EVOLUTION STUDIED BY MASS SPECTROMETRY IN ROOM TEMPERATURE



- AU₂₅(SR)₁₈ SYNTHESIS**
22. **SYNTHESIS AND CHARACTERIZATION OF AU₃₈ NANOPARTICLES**
23. **REAL TIME FEEDBACK CONTROL OF BIOMASS GASIFICATION**
24. **GAS CHROMATOGRAPH IN ACADEMIC CHEMISTRY LABORATORIES**
25. **CHARACTERIZATION OF LABORATORY GRADED AEROSOLS GENERATED FROM METERED DOSE AEROSOL GENERATORS**

Friday, February 12

**FRIDAY MORNING
LAKEVIEW 2**

- 9:00 **DIELECTRIC PROPERTIES OF NOVEL FULLERENE CONTAINING POLYURETHANED**
9:20 **OLEFIN METATHESIS CATALYSTS BEARING pH RESPONSIVE NHC LIGANDS**
9:40 **PERFORMANCE OF HYDRIDE GENERATION FOR SIMULTANEOUS DETERMINATION OF BISMUTH, LEAD, AND TIN BY ICP-AES**
10:00 **SYNTHESIS OF SEVERAL ANALOGUES OF UNNATURAL LYSINE FROM A COMMON SYNTHETIC INTERMEDIATE: FOR INCORPORATION IN SST14**
10:20 **THEORETICAL CALCULATION OF THE N-H STRETCH IN AMMONIA**
10:40 **BREAK**
10:50 **DECIPHERING STRUCTURAL AND FUNCTIONAL FINGERPRINTS FOR PROTEINS**
11:10 **PHOTODEGRADATION OF NITROFLUORENES**
11:30 **EXTERNAL ACTIVITY CONTROL OF HEXACOORDINATE RU-ALLENYLIDENE AND IDENYLINDENE COMPLEXES**
11:50 **TRANSFORMATION OF TRICLSOAN FACILITATED BY FE(III) SATURATED MONTMORILLONITE**
12:10 **AN INDICATOR DISPLACEMENT ASSAY FOR SENSING FE³⁺**
12:30 **ELECTROCHEMICAL AND ELECTROGENERATED CHEMILUMINESCENT STUDIES OF A RUTHENIUM (II) COMPLEX (Ru(ptb)₂(dpp)(PF₆)₂)**
12:50 **CLOSING REMARKS**

ECOLOGY AND EVOLUTIONARY BIOLOGY

Thursday, February 11

**THURSDAY MORNING
EXHIBIT HALL C
DIVISIONAL POSTER SESSION**

- EFFECT OF CHICKEN ANTIBODY ON INFLUENZA A VIRUS EVOLUTION IN VITRO**
- POTENTIAL EFFECTS OF SUDDEN OAK DEATH ON LITTER COMPOSITION AND SOIL TEMPERATURE, MOISTURE, AND RESPIRATION OF A MESIC OAK FOREST IN THE SOUTHERN APPALACHIANS**
- ENUMERATION OF VIBRIO PARAHAEMOLYTICUS IN THE VIABLE BUT NONCULTURABLE STATE USING DIRECT VIABLE COUNTS AND RECOGNITION OF INDIVIDUAL GENE FLUORESCENT IN SITU HYBRIDIZATION**
- DISTRIBUTION OF TYPE THREE SECRETION SYSTEM IN VIBRIO PARAHAEMOLYTICUS ISOLATED FROM THE NORTHERN GULF OF MEXICO**
- THE PRESENCE OF UREASE IN VIBRIO PARAHAEMOLYTICUS**
- FEMALE ORNAMENTATION AND INTRASEXUAL AGGRESSION IN NORTHERN CARDINALS,**



CARDINALIS CARDINALIS

**THURSDAY AFTERNOON
CONFERENCE ROOM**

- 1:30 A TAXONIC REVISION OF THE 'SINGULUARES' GROUP OF CASERIA SECT. CASEARIA (SAMYDACEAE)
1:45 THE TRANTULA APHONOPELMA MOJAVE: SEPARATE POPULATIONS OR SEPARATE SPECIES
2:00 EXPRESSION OF YIN, A PUTATIVE OLIGOPEPTIDE TRANSPORTER, IN THE REPRODUCTIVE TRACT OF DROSOPHILIA MELANOGASTER
2:15 PATTERNS OF OVIPOSITION FOR CULEX MOSQUITOES IN RESPONSE TO AEDES ALBOPICTUS LARVAE
2:30 BREAK
2:45 PREDACIOUS DIVING BEETLES (COLEOPTERA: DYSCIDAE) OF SOUTHERN MISSISSIPPI: EFFECTS OF ENVIRONMENTAL PARAMETERS ON ABUNDANCE AND SPECIES RICHNESS AMONG THREE HABITAT TYPES
3:00 INFLUENCE OF DETRITUS, MICROORGANISMS, AND HABITAT PARAMETERS ON LARVAL MOSQUITO (DIPTERA: CULICIDAE) COMMUNITIES IN TREE HOLES AND DISCARDED AUTOMOBILE TIRES IN HATTIESBURG
3:15 THE CAROLINA BAYS: AN INVESTIGATION OF NORTH AMERICA'S POST LAST GLACIAL MAXIMUM ENVIRONMENT (LGM)
3:30 DIVISIONAL BUSINESS MEETING

GEOLOGY AND GEOGRAPHY

Thursday, February 11

**THURSDAY MORNING
FORREST 2**

- 8:30 INTRODUCTION
8:40 A REVIEW OF TERRESTRIAL AND FRESHWATER VERTEBRATES FROM MARINE CRETACEOUS DEPOSITS IN MISSISSIPPI
9:00 SCALING RELATIONSHIP BETWEEN SOCIO-PHYSICAL VULNERABILITY AND FINANCIAL LOSS
9:20 COMPANION-AGE (75.4 MILLION YEAR OLD) BIOTITE ASH FALLS FROM VOLCANIC ERUPTIONS AT MISSISSIPPI
9:40 BREAK
9:45 THE BLUE SPRINGS FOSSIL DECAPOD HORIZON IN THE COON CREEK TONGUE OF THE RIPLEY FORMATION IN UNION COUNTY, MISSISSIPPI
10:00 THE TATUM LIMESTONE MEMBER OF THE CATAHOULA FORMATION IN COVINGTON COUNTY
10:20 THREE DIMENSIONAL RECONSTRUCTION OF MARINE CLAY AT THE NANOMETER LEVEL
10:40 HEAVY MINERALS IN NEARSHORE BEACH SANDS ASSOCIATED WITH THE HIGHSTAND REGRESSIVE PHASE OF SEQUENCE CYLCE TP1.4

**THURSDAY AFTERNOON
FORREST 2**

- 1:00 SEAGRASS COVERAGE ASSOCIATED WITH BARRIER ISLAND DYNAMICS SINCE 1940 FOR PETIT BOIS ISLAND, NORTHERN GULF OF MEXICO
1:20 A STUDY CORRELATING ALLUVIAL FAN STRATIGRAPHY AND GEOPHYSICAL TECHNIQUES ON AN ALLUVIAL FAN IN PANOLA COUNTY



- 1:40 EFFECTS OF HURRICANE HUGO ON VEGETATION CONDITIONS IN SOUTH CAROLINA
- 2:00 Break
- 2:20 LAND COVER, REMOTE SENSING, AND BIOGEOGRAPHY
- 2:40 A DISTINCTIVE LITHOPACIES BETWEEN THE PRAIRIE BLUFF AND OWL CREEK FORMATIONS (UPPER CRETACEOUS) OF NORTH MISSISSIPPI AND ITS CHARACTERISTIC FAUNAL CONTENT
- 3:00 EVALUATING LIQUEFACTION POTENTIAL USING CONE PENETRATION TEST AND MICROMORPHOLOGICAL ZONING CRITERION: APPLICATION TO NORTHWEST MISSISSIPPI
- 3:15 Division Business Meeting

**THURSDAY EVENING
DIVISIONAL POSTER SESSION
EXHIBIT HALL C**

1. THE GEOGRAPHY OF RECOVERY: MAPPING RECOVERY IN SOUTHERN MISSISSIPPI POST KATRINA

HEALTH SCIENCES

Thursday, February 11

**THURSDAY MORNING
LAMAR 2**

PUBLIC HEALTH MINI SYMPOSIUM

- 8:30 OPENING PRESENTATION
- 9:30 CONTROL OF APPETITE, OXYGEN CONSUMPTION, AND ENERGY EXPENDITURE BY THE CENTRAL LEPTIN SIGNALING PATHWAYS DURING ALTERATIONS IN AMBIENT TEMPERATURE
- 9:45 DISPARITIES IN THE UNDERSERVED AND MINORITY CANCER POPULATION
- 10:00 THE PURPOSE OF CLINICAL INTERVENTIONS PERFORMED BY PHARMACISTS AND THEIR EFFECTIVENESS IN A HOSPITAL SETTING
- 10:15 MEDICATION ADHERENCE IN A HYPERTENSION REFERRAL CLINIC
- 10:30 PREDICTIVE VALIDITY AND RELIABILITY OF THE SOCIAL ATTACHMENT SCALE FOR ADULTS (SATS-A)
- 10:45 DOES SEASONAL INFLUENZA VACCINATION INDUCE CROSS REACTIVE ANTIBODIES THAT INHIBIT THE NEURAMINIDASE (NA) ACTIVITY OF PANDEMIC H₁N₁, 2009 VIRUS?
- 11:00 ASSOCIATION OF WEST NILE VIRUS INFECTION IN HUMANS AND HORSES
- 11:15 CLOSING PRESENTATION

**THURSDAY AFTERNOON
POSTER SESSION 1**

PUBLIC HEALTH THEMED POSTERS

1. PATIENTS PERCEPTIONS, FEELINGS, AND BEHAVIORS REGARDING ESTHETIC DENTAL TREATMENT AT THE UNIVERSITY OF MISSISSIPPI SCHOOL OF DENTISTRY
2. SPECTRAL MEASURES OF HEART RATE VARIABILITY IN PATIENTS WITH DRUG NAÏVE MAJOR DEPRESSION COMPARED TO AGE AND GENDER MATCHED HEALTHY CONTROLS
3. HEMATOLOGICAL CHANGES IN ASYMPTOMATIC VITAMIN B₁₂ DEFICIENT ELDERLY HUMAN SUBJECTS
4. PREDICTORS OF PULSE, PRESSURE, AND CHANGES IN PULSE PRESSURE WITH AGE IN THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY
5. BLOOD PRESSURE CONTROL AMONG PERSONS WITH AND WITHOUT CHRONIC KIDNEY DISEASE OR



- DIABETES IN A HYPERTENSION REFERRAL CLINIC**
6. **INTRODUCING FLAVORS TO CHILDREN TO ENHANCE FOOD ACCEPTABILITY**
 7. **ANTHROPOMETRIC MEASUREMENTS USED TO ASSESS ADIPOSITY IN AFRICAN AMERICAN ELEMENTARY SCHOOL CHILDREN**
 8. **CARDIOVASCULAR RESPONSE TO TWO AND FOUR MINUTES WALKS USING STANDARD WALKER AND/OR PLATFORM WALKER WITH WHEELS IN NON WEIGHT BEARING INDIVIDUALS**
 9. **A COMPARISON OF URINE AND SERUM PSA LEVELS IN VARIOUS AGE GROUPS**
 10. **DETERMING IF OBESITY IS A RISK FACTOR FOR CERVICAL CANCER**
 11. **COMPASSION FATIGUE AMONG CRITICAL CARE NURSES: A PILOT STUDY**

GENERAL HEALTH POSTERS

12. **AN IN VITRO CORROSION STUDY OF CONTEMPORARY AMALGAM PAIRED WITH TYPE III GOLD**
13. **THE EFFECTS OF GENDER AND HORMONES ON RESORPTION OF ALVEOLAR BONE IN RATS WITH PERIAPICAL ABSCESES**
14. **THE EFFECTS OF ELLAGIC ACID, BETA-GLUCAN AND VINBLASTINE IN VARIOUS COMBINATION ON RATS INFECTED WITH TRYPAOSOMA LEWISI**
15. **MODULATION ON TISSUE FACTOR INITIATED EXTRINIC HYPERCOAGULATION: REVELANCE TO ANTIINFLAMMATION**
16. **THE EFFECTS OF ESTROGEN, PARATHYROID HORMONED AND TESTOSTERONE ON ACTIVATED RAW CELLS**
17. **VERONIA AMYGDALINA, PACLITAXEL AND HUMAN CARCINOMA CELL GROWTH INHIBITION**
18. **THE EFFECTS OF PNEUMOLYSIN ON THE CORNEA**
19. **DIFFERENTIAL ANALYSIS OF METAL CONTENT AND DISTRIBUTION IN TUMORS AND NORMAL HUMAN TISSUES**
20. **THE INHIBITORY EFFECT OF DANDELION LEAF AND GREEN TEA ON ENTEROCOCCUS AND VRE**
21. **THE INHIBITORY EFFECTS OF BUCHU LEAF AND GREEN TEAN ON ENTEROCOCCU AND VRE**
22. **THE EVALUATION OF CONVENTIONALLY DELIVERED DANDELION IN RMKEC**
23. **THE EFFECTS OF TRAUMA ON KIDNEY FUNCTION AND STRUCTURE**
24. **THE EFFECTS OF TRAUMA ON THE ADRENAL GLAND IN OBESE AND LEAN ZUCKER RATS**
25. **RETINOIDS AND CITRAL MODULATED CELL VIABILITY, METABOLIC STABILITY, CELL CYCLE PROGRESSION AND DISTRIBUTION IN THE A549 LUNG CARCINOMA CELL LINE**
26. **IN VITRO METABOLOMICS OF THE BREASTCANCER DRUG TAMOXIFEN**
27. **PROBING CYTOCHROME P450S: INSIGHTS INTO CONFORMATIONAL DYAMICS USING LASER FLASH PHOTOLYSIS**
28. **MORPHOMETRIC ANAALYSIS OF THE KIDNEY FOLLOWING SUSTAINED DELIVERY OF GROWTH FACTORS**
29. **THE EVALUATION OF CONVENTIONALLY DELIVERED BUCHU TEA IN RMKEC IN VITRO**
30. **THE ROLE OF EPIGALLOCATECHIN-3-GALLATE AND THYMOQUINONE ON LPS STIMULATED MACROPHAGES**
31. **ACADEMIC PERFORMANCE OF COMMUNITY COLLEGE STUDENTS ENROLLED INTO UNIVERSITY HEALTH REALED PROFESSION PROGRAMS**

THURSDAY AFTERNOON
EXHIBIT HALL C
DODGEN POSTER SESSION
6:00-7:00 PM

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

32. **COMPARISON OF MEASURES OF HEART RATE VARIABILITY USING SIMPLE PORTABLE TELE-DEVICE (CLUE MEDICAL) WITH STAND MEASURE- A PILOT STUDEY IN HEALTHY HUMAN SUBJECTS**
33. **INVESTIGATION OF MECHANISM UNDERLYING ANTINOCICEPTIVE SYNERGISTIC EFFECT OF**



34. **TRAMADOL AND GARAPENTIN IN MICE TAIL-FLICK TEST**
35. **THIOAMIDE DERIVATIVE MODULATES ANNEXIN V EXPRESSION IN HUMAN LIVER CARCINOMA (HEPG₂) CELLS**
36. **THIOAMIDE DERIVATIVE- INDUCED CYTOTOXIC EFFECTS IN HUMAN LIVER CARCINOMA (HEPG₂) CELLS**
37. **THE EFFECTS OF ESTROGEN, PARATHYROID HORMONE, AND TESTOSTERONE ON RAW CELLS**
38. **INFLUENCE OF NICARDIPINE ON PHARMACODYNAMICS AND PHARMACOKINETICS OF METFORMIN IN RATS/RABBITS**
39. **LEAD INDUCED STRESS IN DIFFERENT REGIONS OF THE BRAIN AMELIORATIVE EFFECTS OF BACOPA MONNIERI (BRAHM)**
40. **PROTECTIVE ACTIVITY OF AQUEOUS EXTRACT OF LEAF OF COMMICARPUS CHINESIS IN PARACETAMOL INDUCED LIVER INJURY IN RATS**
41. **SINGLE INJECTION METHOD FOR DETERMINATION OF RENAL HEMODYNAMIC PARAMETERS IN RODENTS**
42. **FRIBROBLAST RESPONSE TO INCREASING EGCG CONCENTRATIONS BY EVALUATION OF CELLULAR VIABILITY AND CELLULAR MORPHOLOGY**
43. **THE TIME COURSE OF TRANSCRIPTIONAL REGULATION IN ANOXIC FIBROBLASTS: IMPLICATIONS FOR CARPAL TUNNEL SYNDROME**
44. **COMPARISON OF FIBROBLAST RESPONSE TO INCREASING CONCENTRATIONS OF FRUCTOSE 1.6 BISPHTHONATE AND MANNOSE-6 PHOSPHATE**
45. **THE EFFECTS OF GREEN TEA ON CELLULAR VIABILITY AND FUNCTION OF VIRAL TRANSFORMED AND PRIMARY FIBROBLAST CELL LINES**
46. **AN EVALUATION OF GROWTH AND VIABILITY OF THE A549 AND MRC5 CELL LINES UPON EXPOSURE TO SELECTIVE ORGANIC INHIBITORS OF GLYCOLYSIS**
47. **THE EFFECTS OF THYMOQUINONE AND GREEN TEA EXTRACT ON LDL MODIFICATION IN FIBROBLAST CELLS**

Friday, February 12

**FRIDAY MORNING
EXHIBIT HALL B**

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

**FRIDAY MORNING
LAMAR 2**

DRUG DELIVERY MINI SYMPOSIUM

- 9:00 RECENT DEVELOPMENTS IN DRUG DELIVERY SYSTEMS**
- 10:00 ALTERATIONS OF THE MORPHOLOGY OF THE LIVER AND ADRENAL BY STATIN RELEASED BY MEANS OF TRICALCIUM PHOSPHATE LYSINE DELVIERY SYSTEM IN A DEFECT FEMORAL INJURY IN AN ANIMAL MODEL**
- 10:15 EVALUATION OF CARILAGE GROWTH FACTORS IN SIMULATED DEGENERATED DISCS OF RATS**
- 10:30 EFFECTS OF SUSTAINED DELIVERY OF EPIGALLOCATECHIN-3-GALLATE (EGCG), SELENIUM (SEL), AND THYMOQUINONE (TQ) ON ES-2 CELLS**
- 11:00 DIVISIONAL BUSINESS MEETING**



HISTORY AND PHILOSOPHY OF SCIENCE

Thursday, February 11

**THURSDAY AFTERNOON
FORREST 1**

9:00 WHAT IS A NATURAL KIND, REALLY?

9:20 BIOLOGICAL INDIVIDUALS

9:40 Break

10:00 WHAT IS THE ONTOLOGICAL STATUS OF A LAW OF NATURE?

10:20 A SHORT HISTORY OF LOGIC DIAGRAMMS, 500BC-1900 AD (HOW DID THEY TURN INTO LOGICAL MACHINES)?

10:40 CAN A SCIENCE OF PHILOSOPHY GIVE US HAPPINESS?

**THURSDAY AFTERNOON
FORREST 1**

1:40 HOW DO YOU DEFINE THE NUMBER ONE?

2:00 A FOURTEENTH CENTURY LOGICAL DEBATE OVER COMPLEX TERMS IN CATEGORICAL PROPOSITIONS

2:20 DIVISION BUSINESS MEETING

Friday, February 12

**FRIDAY MORNING
FORREST 1**

9:15 CONSIDERING THE SPECIES CONCEPT IN A HIERACHICAL FRAMEWORK

9:35 THE LEGAL TRIALS AND TRAVAILS ASSOCIATED WITH SOCIAL DARWINISM, EUGENICS, AND PHRENOLOGY

10:00 BREAK

10:20 IS BIOLOGY A VANISHING SCIENCE?

10:40 LIFE: BIOLOGIST'S MOST ENIFMATIC CONCEPT

MARINE AND ATMOSPHERIC SCIENCES

Thursday, February 11

**THURSDAY AFTERNOON
EXHIBIT HALL A**

JOINT SESSION WITH CELLULAR AND MOLECULAR AND DEVELOPMENTAL BIOLOGY

2:45 DEVELOPMENT OF A NEW RNA EXTRACTION METHOD FOR DETECTING NOROVIRUS IN OYSTERS



- 3:00** VALIDATION OF LINEAR SINGLE CELL RNA AMPLIFICATION AMONG KARENIA BREVIS GENES AND IMPLICATIONS TO SINGLE CELL MICROARRAY ANALYSIS
- 3:15** IDENTIFICATION OF NON-CODING RNAs IN KARENIA BREVIS
- 3:30** TRACKING THE SOURCES OF FECAL POLLUTION IN COASTAL WATER USING LIBRARY-INDEPENDENT METHODS
- 3:45** DETECTION OF SALMONELLA spp. FROM MISSISSIPPI COASTAL WATERS AND SEDIMENT
- 4:00** DETECTION OF N₂FIXING CYANOBACTERIA WITH MOLECULAR TOOLS

Friday, February 12

**FRIDAY MORNING
LAKEVIEW 1**

- 8:40** DIVISION BUSINESS MEETING
- 9:00** A HISTOLOGICAL STUDY OF GAMETOGENESIS IN CAPTIVE RED SNAPPER (LUTJANUS CAMPECHANUS)
- 9:20** SUCCESS OF POM-BASED INDONESIAN SEAS REGIONAL MODEL: COMPARISON WITH 3 YEARS OF INSITU DATA
- 9:40** PROFILING MERCURY DISTRIBUTIONS IN NATIONAL ESTUARINE RESEARCH RESERVE (NERR) BY COLD VAPOR GENERATION AAS: PRELIMINARY RESULTS FROM WATER, SEDIMENT, AND FISH SAMPLES

- 10:00** BREAK

- 10:20** APPLICATION OF A 3 DIMENSIONAL VARIATIONAL DATA ASSIMILATION SYSTEM IN THE MONTEREY BAY
- 10:40** DISTRIBUTION OF TRACE ELEMENTS IN LOUISIANA SHELF WATERS

- 11:00** BREAK

- 11:20** SEASONAL VARIATION OF DISSOLVED TRACE METALS IN THE EAST PEARL RIVER
- 11:40** MODELING THE CIRCULATION IN THE SOUTHERN BERING SEA

**FRIDAY AFTERNOON
EXHIBIT HALL C**

1:30-2:30 POSTER SESSION

- 1.** FISH FOOD FROM BEER WASTE
- 2.** INOCULATION AND COLONIZATION OF THREE SALT MARSH PLANT SPECIES WITH ARBUSCULAR MYCORRHIZAL FUNGI
- 3.** COMPARING POPULATIONS OF GULF COAST AND EAST COAST GRAY TRIGGERFISH UTILIZING MITOCHONDRIAL DNA GENES
- 4.** AN ANALYSIS OF SEA TURTLES STRANDINGS IN LOUISIANA
- 5.** THE EFFECTS OF NANOCOPPER ON THE SHEEPSHEAD (CYPRINODON VARIEGATUS) MINNOW
- 6.** THE TOXICITY OF NANONICKLE IN THE SHEEPSHEAD (CYPRINODON VARIEGATUS) MINNOW
- 7.** THE EFFECTIVENESS OF BRUSHING IN THE REMOVAL OF LUNAR SIMULANT DUST FROM THERMAL CONTROL SURFACES IN A SIMULATED LUNAR ENVIRONMENT
- 8.** DYNAMICS OF PHOSPHORUS IN THE BAY OF ST. LOUIS ESTUARY
- 9.** REGIONAL CLIMATE VARIABILITY LONG-TERM TRENDS IN SOUTHERN CENTRAL STATES OF USA



MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Thursday, February 11

THURSDAY MORNING

LAMAR 1

- 8:20 FRACTAL SURFACE INTERPOLATION, PART II
8:40 STABILITY AND LIMIT CYCLE FOR A NEW COURNOT'S DUOPOLY GAME
9:00 AMYLOID-BETA (AB) AGGREGATION IN ALZHEIMER'S DISEASE

9:20 BREAK

9:40 THE KOPEL MODEL OF COURNOT DUOPOLY WITH DELAY
10:00 VALIDATION OF CURRENTS PREDICTIONS FROM A NUMERICAL OCEAN MODEL
10:20 CREATION OF GDL OBJECTS WITH EMBEDDED LEED INFORMATION

10:40 BREAK

11:00 REVITALIZING COMPUTER SCIENCE EDUCATION BY USING NONTRADITIONAL METHODS TO TEACH TRADITIONAL TOPICS: A SURVEY TOOL
11:20 IMPROVE STUDENT LEARNING OUTCOME AND REDUCE INSTRUCTIONAL COST USING INFORMATION TECHNOLOGY- A CASE STUDY IN COLLEGE ALGEBRA
11:40 USING VRML TO VISUALIZE 3D OBJECTS IN ANALYTIC GEOMETRY

THURSDAY AFTERNOON

LAMAR 1

- 1:20 VISUALIZATION OF THE CRESIS GREENLAND DATA SETS
1:40 REFINING THE DIGITAL FORENSICS HIERARCHY
2:00 ACTIVE CYBER FORENSICS USING SPLUNK AND ATTACK GRAPHS

2:20 BREAK

2:40 ON THE PROBABILITY OF K-CONNECTIVITY IN MOBILE AND HOC NETWORKS UNDER DIFFERENT MOBILITY MODELS
3:00 A STUDY OF THE LEACH PROTOCOL AND ITS EXTENSION TO A GRID BASED NETWORK
3:20 DEVELOPMENT OF THE MULTICAST FLOW ORIENTED ROUTING PROTOCOL FOR MOBILE HOC NETWORKS

Friday, February 12

FRIDAY MORNING

EXHIBIT HALL C

1. IMAGE SEQUENCE FUSION USING WAVELET TRANSFORMATION
2. REDESIGNING COLLEGE ALGEBRA AT JACKSON STATE UNIVERSITY: A FIRST YEAR EXPERIENCE
3. PROMOTER PREDICTION IN *HALOTHIOBACILLUS NEAPOLITANUS* C2 BASED ON STRESS INDUCED DNA COMPLEX DESTABILIZATION
4. INTEGRATION OF DIYA OUTPUT WITH GMOD STANDARDS
5. COMPARATIVE STUDY OF BHAKSHALI SQUARE ROOT ALGORITHM AND NEWTON'S METHOD FOR FINDING SQUARE ROOTS OF ARBITRARILY LARGE INTEGERS
6. ARES RISK AND KNOWLEDGE MANAGEMENT



- 7. WIRELESS AVIONICS TECHNOLOGY EVALUATION
- 8. ESTIMATING THE DISTRIBUTION OF CO₂ PARAMETERS IN SURFACE WATER OF THE INDIAN OCEAN FROM TEMPERATURE AND SALINITY

FRIDAY MORNING

LAMAR 1

- 10:00 PERFORMANCE STUDY OF FUNCTION MODULES AND WEB SERVICES IN SAP
- 10:20 A COMBINATION OF NEURAL NETWORKS AND GATING NETWORKS FOR HANDWRITTEN RECOGNITION
- 10:40 CUSTOMER TESTING FOR AUTOMATED CLEARING HOUSE NETWORK
- 11:00 BREAK
- 11:15 HOW I SELECT THE CORRECT STATISTICAL TEST FOR MY EXPERIMENT?

FRIDAY AFTERNOON

LAMAR 1

- 1:00 MSRC ADVISORY BOARD MEETING
- 1:45 Divisional Business Meeting

PHYSICS AND ENGINEERING

Thursday, February 11

THURSDAY MORNING

EXHIBIT HALL B

- 8:00 APPLICATIONS OF EQUIVALENT FLUID REPRESENTATIONS OF AN ELASTIC SEAFLOOR IN SIMULATING OCEAN ACOUSTIC PROPAGATION
- 8:15 PRACTICAL CONSIDERATIONS CONCERNING THE ENERGY CONTENT OF IMPULSIVE SIGNALS IN THE PRESENCE OF NOISE
- 8:30 TWO-DIMENSIONAL SIMULATIONS OF FLUID FLOW WITH AN ARBITRARY OBSTACLE
- 8:45 RADIAL OSCILLATION OF A GAS BUBBLE VIA CANONICAL PERTURBATION THEORY
- 9:00 DISCRETIZING CONTINUOUS PROCESSES
- 9:15 OPTICAL PROPAGATION THROUGH ATMOSPHERIC TURBULENCE USING PHASE SCREENS
- 9:30 MESON MASS SPECTRA PHENOMENOLOGY IN THE CONTEXT OF QUARK-ANTIQUARK BOUND STATES
- 9:45 USING THE SUCHER EQUATION FOR CHARMONIUM AND BOTTOMONIUM MESON SPECTRA
- 10:00 BREAK
- 10:15 MEASUREMENT OF ALPHA-INDUCED AIR FLUORESCENCE
- 10:30 DESIGN AND IMPLEMENTATION OF A SYSTEM CAPABLE OF DETECTING CHEMICAL PRODUCTS BY AN ALPHA SOURCE
- 10:45 PHOTOIONIZATION CROSS-SECTION MEASUREMENTS OF THE 5P_{3/2} STATE OF LASER-COOLED RUBIDIUM
- 11:00 SIMULATION OF SPIN DEPENDANT REACTION BETWEEN ULTRA-COLD NEUTRONS AND POLARIZED ³He
- 11:15 THE NUCLEAR STRUCTURE OF THE EVEN MASS ISOTOPES OF GERANIUM
- 11:30 MULTIPLE EXCITED BANDS IN ¹⁵⁴Dy
- 11:45 SPIN ASYMMETRIES OF THE NUCLEON EXPERIMENT (JEFFERSON LAB E07-003)

THURSDAY AFTERNOON



EXHIBIT HALL B

- 1:15 BAYESIAN NETWORK STRUCTURE DESIGN PROCEDURE FOR MEDICAL DECISION SUPPORT
1:30 MYSTERIOUS DARK NINETY SIX PERCENT OF THE UNIVERSE
1:45 A NEW QUANTITATIVE CLASSIFICATION OF SPIRAL GALAXIES
2:00 SEARCH FOR THE MYSTERIOUS DARK NINETY SIX PERCENT OF THE UNIVERSE
2:15 ELECTRONIC VIBRATIONAL AND NMR STUDIES OF HYDROGENATED AMORPHOUS SILICON
2:30 FUNCTIONAL RECONSTRUCTION AS A CLASSICAL MOMENT PROBLEM: A MAXIMUM ENTROPY APPROACH
2:45 COMPUTER MODELING OF AMORPHOUS CARBON: A MONTE CARLO STUDY

3:00 BREAK

3:15 FIBER LOOP RING-DOWN CHEMICAL CORROSION SENSORS
3:30 MEASUREMENT OF HYDROGEN IN HELIUM FLOW
3:45 GR03263- TOOLS FOR ENHANCED MAPPING AND MANAGING POST DISASTER DEBRIS
4:00 TEMPERATURE DEPENDENCE OF THE CURRENT-VOLTAGE CHARACTERISTICS OF Sn/PANI/p-Si/Al HETEROJUNCTIONS
4:15 BEHIND GREEN
4:30 GM ON DEATH BED! IT'S NOT PHYSICS! IS IT ENGINEERING? OR SOMETHING ELSE

4:45 DIVISION BUSINESS MEETING

**THURSDAY EVENING
EXHIBIT HALL C**

- 6:00 Dodgen Reception and Poster Session
Please set up your poster between 4:00 and 4:30p
1. HAND HELD ELECTRONIC DEVICE TO MEASURE HEART RATE BASED ON PHOTOPULSE PLETHESMOGRAPHIC (PPG) PRINCIPLE
 2. MOLECULAR DYNAMIC SIMULATION OF ESTROGEN RECEPTOR (ER) AND ER-LIGAND COMPLEXES TO OBTAIN SUITABLE CONFORMATIONS FOR BINDING WITH CALCIUM BINDING PROTEINS
 3. CHARACTERIZATION OF LABORATORY GRADED AEROSOLS GENERATED FROM METERED DOSE AEROSOL GENERATORS
 4. ADAPTIVE ELASTIC FUZZY LOGIC CONTROLLER
 5. THE EFFECTIVENESS OF BRUSHING IN THE REMOVAL OF LUNAR DUST FROM THERMAL CONTROL SURFACES IN A SIMULATED LUNAR ENVIRONMENT

PSYCHOLOGY AND SOCIAL SCIENCES

Thursday, February 11

**THURSDAY AFTERNOON
EXHIBIT HALL C**

**Poster Session
8:30-11:30**

1. GROUP DELIVERATION AND WITNESS INVOLVEMENT IN THE CRIME AFFECT JUROR DECISIONS IN A MOCK SEXUAL ABUSE TRIAL
2. DEFENDANT RACE AND JURY RACIAL COMPOSITION AFFECT DECISIONS IN A MOCK HOMICIDE TRIAL
3. SEVERE WEATHER PHOBIA IN YOUNG ADULTS
4. ADOLESCENT OFFENDERS AND COLLEGE STUDENTS WITH AND WITHOUT INCARCERATED PARENTS



6. THE REALTION OF THE NEO PI-R NEUROTICISM SCALE TO THE MMPI-2 RESTRUCTURED CLINICAL AND PSY-5 SCALES
11. NEO-PI-R FACET SCALE CORRELATES OF THE SNAP HISTORIONIC PERSONALITY DISORDER SCALE
12. NEO-PI-R FACET SCALE CORRELATES OF THE SNAP BORDERLINE PERSONALITY DISORDER SCALE
13. UNDERSTANDING THE COMPLEX INTERRELATION OF PARENTAL SATISFACTION AND EFFICACY
14. ATTENTION DEFICIT/HYPERACTIVITY DISORDER AND ACADEMIC UNDERACHIEVEMENT: AN EXAMINATION OF PARENT AND TEACHER REPORT OF SYMPTOMS
- 15.
16. HOW RECOGNITION IS AFFECTED BY VOICE TYPE AND ATTENTION LEVEL
17. COGNITIVE PROCESSING OF FOOD AND PERSONALITY TRAITS LINKED TO OVEREATING IN OBESE AND NORMAL POPULATIONS
18. QUE' HEY EN UN NOMBRE? FURTHER INVESTIGATION OF NAME STEREOTYPES
20. NEO-PI-R FACET SCALE CORRELATES OF THE SNAP OBSESSIVE COMPULSIVE PERSONALITY DISORDER SCALE
21. THE EFFECTS OF ETHNICITY ON THE PERCEPTION OF BODY WEIGHT
22. DOMESTIC VIOLENCE: THE EXAMINATION OF CULTUREAL DEMOGRAPHICS ON TOLERANCE OF ABUSE

**THURSDAY AFTERNOON
LAMAR 2**

- 1:30 A TALE OF TWO CITIES: THE NEOGTIATION OF COMMUNITY, ETHNIC IDENTITY AND MIGRATION HISTORY OF TWO GULF COAST VIETNAMESE ENCLAVES IN RESPONSE TO HURRICANE KATERINA
- 1:45 WALKING THE SUBTLE PATHS OF ETHNOGENIC CHANGE
- 2:00 RESEARCH THAT BUILDS TEACHERS' CAPACITY TO DECREASE THE ACHIEVEMENT GAP IN MATHEMATICS
- 2:15 BREAK
- 2:30 HAND REACH EFFICIENCY FOR PREY CAPTURE IN GARNETT'S BUSH BABY (OTOLEMUR GARNETTII)
- 2:45 FORELIMB ASYMMETRIES DURING FOOD RETRIEVAL IN BUSHBABIES (OTOLEMUR GARNETTII): A CASE STUDY
- 3:00 INTIMATE PARTNER ACCEPTANCE REMEMBERED PARENTAL ACCEPTANCE, AND PSYCHOLOGICAL ADJUSTMENT IN ONGOING ATTACHMENT RELATIONSHIPS
- 3:15 DIVISION BUSINESS MEETING

Friday, February 12

**FRIDAY MORNING
GARDEN ROOM**

SYMPOSIUM: RESEARCH IN RESCONSTRUCTING MISSISSIPPI PAST

- 9:00 MUSCULOSKELETAL MARKERS AND DEGENERATIVE JOINT DISEASE AS INDICATORS OF OCCUPATIONAL STRESS IN THREE SKELETAL SAMPLES AND THE DIFFERENCE SHOWN IN THOSE SAMPLES
- 9:15 RECONSTRUCTION OF YELLOW FEVER MORTALITY RATES IN NINETEENTH CENTURY NATCHEZ: A CASE STUDY
- 9:30 THE MORAN SITE (22HR511) TEMPORAL EVOLUTION OF SITE FUNCTION FROM CEMETERY TO RESIDENTIAL OCCUPATION
- 9:45 REASSESSING DENTAL PATHOLOGIES OF THE HUMBER SITE IN COAHOMA COUNTY
- 10:00 LITHIC DEBITAGE ANALYSIS OF THE CLARKE LAKE SITE A SMALL SCALE MIDDLE WOODLAND SETTLEMENT
- 10:15 BREAK



SYMPOSIUM OF FORENSICS

- 10:30 SKELETONS BELOW THE AUDITORIUM AN EXAMINATION OF COMMINGLED REMAINS FROM MEMPHIS TENNESSEE**
- 10:45 EFFECTS OF CREMATIONON ANALYSIS OF CRANIAL GUNSHOT WOUNDS**
- 11:00 FATAL FIRE MODELING: REPLICATING ENVIRONMENTAL AND HUMAN FACTORS ASSOCIATED WITH THE RECOVERY AND ANALYSIS OF BURNED HUMAN REMAINS**
- 11:15 DIFFERENTIATING PERI- AND POST MORTEM FRACTURES IN BURNED POSTCRANIAL REMAINS**
- 11:30 BREAK**
- 11:45 FROM “IN THE FIELD” TO IN THE MORGUE- A STUDY PERSPECTIVE OF FORENSIC ANTHROPOLOGY**
- 12:00 SILENCED VOICES AND FORGOTTEN CASES: THE MISSING AND UNIDENTIFIED CASE SITUATION IN MISSISSIPPI**
- 12:15 THE STUDY OF MULTIPLE DIFFERENTIAL DNA EXTRACTIONS WITH LOW DNA QUANTITIES**
- 12:30 THE SIGNIFICANCE OF WHOLE GENOME AMPLIFICATION IN FORENSIC SCIENCE**

SCIENCE EDUCATION

Thursday, February 11

THURSDAY MORNING LAKEVIEW 1

- 8:00 THE COMPUTATIONAL STUDY OF IONIZATION EFFECTS ON URACIL DERIVATIVES**
- 8:20 THE EFFECTS OF OVER THE COUNTER PAIN REMEDIES ON THE HEART RATE OF DAPHNIA MAGNA AND ITS IMPLICATIONS TO HUMAN CARDIOLOGY**
- 8:40 ENHANCEMENT OF ACHIEVEMENT IN COLLEGE BIOLOGY THROUGH PARTICIPATION IN STUDY GROUPS**
- 9:00 A TEXT CONTENT ANALYSIS OF THE NEW EARTH SCIENCE LITERACY PRINCIPLES: IMPLICATIONS FOR GEOSCIENCE INSTRUCTION**
- 9:20 HISTORY OF GEOLOGY AND DISTINCTIVE TRACE FOSSILS: “A COPROLITIC VISION’ FOR SCIENCE EDUCATION**
- 9:40 COASTAL HABITATS: MISSISSIPPI’S NATURAL TREASURES, A GULF OF MEXICO ALLIANCE FUNDED PROJECT FOR UNDERREPRESENTED AND UNDERSERVED POPULATIONS**
- 10:00 THE BEGINNING OF A FIELD GUIDE: FLORA OF THE NATURAL HABITATS OF THE MISSISSIPPI GULF COAST COMMUNITY COLLEGE COUNTY CAMPUS GAUTIER**
- 10:20 Break**
- 10:40 DISTRIBUTION OF TEACHING AIDS ON THE RESPIRATORY, DIGESTIVE, REPRODUCTIVE SYSTEMS AND GENETICS**
- 11:00 CREATING A THIRD GRADE SCIENCE LESSON THAT TEACHES APPLICABLE LESSONS THROUGH HANDS ON LEARNING AND CUSTOM CONSTRUCTED**
- 11:20 IMPORTANT PREREQUISTES FOR FUTURE NURSING STUDENTS**

11:40 Divisional Business Meeting

THURSDAY AFTERNOON LAKEVIEW 1

- 1:00 SAFETY AND ENERGY DISCUSSIONS WITH OCEAN SPRINGS SCHOOL DISTRICT, TACONI ELEMENTARY SCHOOL STUDENTS**
- 1:20 COOPERATIVE LEARNING ONLINE AND TRADITIONAL CLASSROOM**



- 1:40 EDUCATING SECONDARY SCHOOL STUDENTS IN RECOGNITION OF VENOMOUS SNAKES NATIVE TO NORTHEAST MISSISSIPPI
2:00 USING THE MINI-SESSION COURSE FORMAT TO TRAIN STUDENTS IN THE USE OF MODERN MASS SPECTROMETRY TECHNIQUES
2:20 THEME-BASED INSTRUCTION: MAKING CONCEPTUAL TIES WITH SICKLE CELL STORY
2:40 SUMMER INSTITUTE FOR K-12 TEACHERS EMPHASIZING TECHNOLOGY ASSIMILATION IN SCIENCE CLASSROOM

**THURSDAY EVENING
EXHIBIT HALL C**

3:00-4:00 DIVISION POSTER SESSION

1. DR. ERVIN G. OTVOS AND THE HISTORY OF GEOLOGICAL RESEARCH AT THE GULF COAST RESEARCH LABORATORY
2. PROCEDURES TO COMPLETE PHASE TWO IN TE-ESTABLISHMENT OF NOAA SCIENTIFIC LIBRARY AT THE NATIONAL MARINE FISHERIES SERVICE IN PASCAGOULA
3. INFORMING THIRD GRADE STUDENTS OF ENVIRONMENTAL ISSUES FOCUSING ON RECYCLING AND POLLUTION
4. CHEMICAL FUN: INSTRUCTED OF GIFTED STUDENTS AT OAK PARK ELEMENTARY SCHOOL
5. DELTA STATE UNIVERSITY PROFESSORS HELP BOLIVAR COUNTY 4-HERS CONSTRUCT A BUTTERFLY/BEE GARDEN
6. REBELS IN PHYSICS CLASS
7. INFORMATION TECHNOLOGY EXPERIENCES FOR STUDENTS AND TEACHERS USING CATFISH AND THEIR ENVIRONMENT AS A MODEL

ZOOLOGY AND ENTOMOLOGY

Thursday, February 11

**THURSDAY MORNING
CONFERENCE ROOM**

MALARIA IN AFRICA SYMPOSIUM

- 9:00 TRENDS ON THE PREVALENCE OF MALARIA IN NIGERIA
9:15 TRENDS ON THE PREVALENCE OF MALARIA IN KENYA
9:30 SYMPOSIUM ON MALARIA IN AFRICA: TRENDS ON THE PREVALENCE OF MALARIA IN GHANA
9:45 TRENDS ON THE PREVALENCE OF MALARIA IN ZAMBIA
- 10:00 BREAK
- 10:15 OBSERVATIONS ON THE DIGENEAN PARASITES (PLATYHEMENTHES) UTILIZING AMINICOLA LIMOSA AND LITTORINDINOPS PALUSTRUS (GASTROPODA: HYDROBIIDAE) AS INTERMEDIATE HOSTS IN TIDAL OLIGOHANE AND FRESHWATER HABITATS OF THE LOWE PASCAGOULA RIVER SYSTEM
10:30 ASSESSMENT OF POLLUTANTS IN THE LOWER MISSISSIPPI RIVER IN THE AREA OF PORT GIBSON
10:45 ASSESSMENT OF WATER SAMPLES COLLECTED FROM THE DEEP WATERS OF THE MISSISSIPPI RIVER IN THE AREA OF VICKSBURG
- 11:00 BREAK
- 11:15 SEASONAL DISTRIBUTION OF CONTAMINENTS IN THE YAZOO RIVER IN YAZOO CITY
11:30 A REVIEW OF THE VERTEBRATE FOSSIL RECORD FROM LATE PLEISTOCENE (ICE AGE) DEPOSITS IN MISSISSIPPI
- 11:45 DIVISIONAL BUSINESS MEETING



Friday, February 12

FRIDAY AFTERNOON

LAMAR 2

TICK AND TICKBORNE DISEASE SYMPOSIUM

- 1:00 INTRODUCTION**
- 1:05 TARGETING DISEASE VECTOR IN POST-GENOMIC ERA**
- 1:30 EVIDENCE OF TICK-BORNE DISEASE AGENTS IN TICKS AND (OTHER) ANIMALS FROM MISSISSIPPI**
- 1:55 FROM FOOTNOTE TO FOREFRONT: THE RECOGNITION OF RICKETTSIA PARKERI RICKETTSIOSIS IN THE WESTERN HEMISPHERE**
- 2:20 DETERMINANTS FOR TICK TRANSMISSION OF RICKETTSIA**
- 2:45 BREAK**
- 3:00 TICK-BORNE DISEASE IN MISSISSIPPI**
- 3:25 INFLAMMATION IN LYME DISEASE**
- 3:50 DISTRIBUTION OF RICKETTSIA PARKERI IN SELECT TISSUES OF EXPERIMENTALLY-INFECTED AND FIELD COLLECTED GULF COAST TICKS (AMBLIOMMA MACULATUM)**
- 4:05 MOLECULAR CHARACTERIZATION OF THE GULF COAST TICK, AMBLIOMMA MACULATUM (ACARI:IXODIDAE) SALIVARY SECRETORY GENES**
- 4:20 THE ROLE OF SMALL ANIMALS IN THE NATURAL HISTORY OF RICKETTSIA PARKERI**
- 4:35 DETECTION OF RICKETTSIA PARKERI IN THE GULF COAST TICK, AMBLIOMMA MACULATUM KOCH, IN MISSISSIPPI**
- 4:50 CONCLUDING REMARKS**

AGRICULTURE AND PLANT SCIENCE

Chair: Taejo Kim, Mississippi State University
Vice-chair: Golria Miller, Jackson State University

**THURSDAY MORNING
GARDEN ROOM**
01.01
**9:00 CASH FOR
CONSERVATION: POTENTIALLY
INCREASING SMALL LANDOWNER INCOME
VIA WILDLIFE AND NATIVE GRASS
ENVIRONMENTAL STEWARDSHIP**

LaShunda Anderson¹, Dalton McAfee¹, Adell Brown²,
Robert Cole³

¹*Alcorn State University*, ²*Southern University, Baton Rouge, LA*, ³*East Arkansas Enterprise Community, Forrest City, AR*

Technological and economical challenges in the Mississippi Delta Region (Mississippi, Louisiana, and Arkansas) production agriculture have created difficulty for small-scale farmers/ landowners (SSFL) to produce income. An alternative scenario is increasing income through federally funded environmental stewardship incentive programs or participation in quail /native grass production processes. The economic demand for quail has made game bird production a multi-million dollar industry. Sales of native grass seeds have increased due to new requirements for native grass implementation for conservation reserve programs and biofuels production. Currently, there are no native grass seed producers in the Mississippi Delta Region. Therefore, this presents an open economic market opportunity for SSFL. The objectives of this project are (1) to increase Mississippi Delta Region SSFL awareness about potential income-increasing activities associated with quail and native grass conservation and production and (2) to evaluate the growth of non-vicinity native grasses in the Mississippi Delta Region. Effectiveness of the project in increasing the awareness of these activities was evaluated by a survey completed by quail/native grass SSFL event attendees. 90.9% SSFL small farmers/landowners said they gained new skills and knowledge about wildlife production and they planned to implement these new skills on their farms. Therefore, SSFL quail and native grass production awareness was increased. A preliminary native grass establishment study was conducted using Hobo® Temp/Light data loggers. There is a significant

correlation between climatic temperature/light intensity conditions and the establishment of non-vicinity native grasses in the Lower Mississippi Delta Region.

01.02
9:15 THE IN-OVO INJECTION OF 25-HYDROXYCHOLECALCIFEROL FACILITATES EMBRYOGENESIS IN BROILER HATCHING EGGS INCUBATED UNDER SUBOPTIMAL TEMPERATURES

Anberitha Matthews, Radhakrishna Pulikanti, Edgar Peebles

Mississippi State University

Effects of the in ovo injection of 25-hydroxycholecalciferol (D₃) on embryogenesis in broiler hatching eggs subjected to a suboptimal incubation temperature regimen were determined. Mortality, relative eggshell water vapor conductance (RG), and the proportional weights and moisture contents of the embryo, yolk sac, liver, and pipping muscle were determined. Ross 308 broiler hatching eggs were incubated under standard commercial conditions except on d 12 to 16, in which the dry bulb temperature was lowered to 36.5°C. The following injection treatments were tested: non-injected, dry perforation, commercial diluent, 48 IU of D₃ added to diluent (1.4 µg/100 µl), and 96 IU of D₃ added to diluent (2.8 µg/100 µl). An automated single egg injector with a blunt needle penetrated the large end of the egg at a depth of 2.49 cm, targeting the amnion for solution delivery on d 16 of incubation. The injection procedure increased RG, and mortality was decreased and the proportional weights of the liver and pipping muscle were increased by D₃ at either level. The in ovo injection of D₃ at 48 or 96 IU at d 16 of incubation facilitated broiler embryogenesis in eggs subjected to a suboptimal incubation regimen.

01.03
9:30 SELECTED SANITIZING TREATMENTS FOR BLUEBERRIES DESTINED FOR THE FROZEN/PROCESSING MARKET

Melody Corbitt, Taejo Kim, Juan Silva
Mississippi State University

Blueberries for frozen and processing markets are usually washed/sanitized prior to packing. The purpose of this study was to compare the effectiveness of selected postharvest sanitation treatments on microbial load of blueberries prepared for the processing market. Fresh blueberries were treated with hot water along with the oxidizing agent (Boxyl®) using the response surface method (RSM). The RSM was used to evaluate the effect of temperature (60 -

90°C), contact time (10 - 30s), and Boxyl® concentration (0 - 0.1%) on aerobic (APC) and yeast and mold (YMC) reduction, wax/bloom removal, and color removal on the surface of blueberries. Solution temperature used to dip the berries was the only effective ($p < 0.05$) factor affecting microbial reduction and product quality. The ridge analysis of the response surface indicated that maximum APC and YMC microbial reduction increases with an increase in temperature; whereas wax/bloom and color removal decreased as temperature decreased. It was found that holding berries at 75°C for 20s (without antimicrobial) resulted in a reduction of 3.56 to 1.78 log CFU/g APC; and 4.58 to 1.60 log CFU/g YMC. Furthermore, this treatment showed no detrimental effect on the berries as determined by sensory results.

O1.04

9:45 SCREENING STRAWBERRY CLONES FOR ANTHRACNOSE DISEASE RESISTANCE USING TRADITIONAL TECHNIQUES AND MOLECULAR MARKERS

Melinda Miller-Butler, Brian Krieser, Kenneth J. Curry, Barbara J. Smith

University of Southern Mississippi

Anthrachnose is a destructive disease of commercially grown strawberry, *Fragaria x ananassa*, that may cause fruit rot, leaf spot, petiole lesions, crown rot, and eventually, death of plants. Three *Colletotrichum* species, *C. fragariae*, *C. gloeosporioides*, or *C. acutatum*, may be the causal agents of anthrachnose. Identifying cultivars of *Fragaria* sp. that are resistant to this disease is an important goal of researchers and commercial growers. Our work approaches this question using two methods. First, the resistance or susceptibility of strawberry germplasm to anthrachnose was determined by a traditional disease screening method, i.e., inoculating whole plants or detached leaves with conidial suspensions of several *Colletotrichum* isolates. Detached leaves of 73 strawberry clones were inoculated with two *C. fragariae* isolates and one *C. gloeosporioides* isolate and whole plants were inoculated with two isolates of *C. acutatum* and one *C. gloeosporioides* isolate. Molecular tools have been developed to identify genes that are associated with resistance to a plant pathogen. Other researchers have identified two markers apparently linked to a gene (*Rca2*) conveying resistance to *C. acutatum*. We are currently using these two markers to screen the 73 clones for the presence/absence of the anthrachnose resistance gene. Correlation of the presence/absence of the *Rca2* gene markers with the resistance or susceptibility to anthrachnose caused by any of the three *Colletotrichum* species will significantly decrease the time it takes for breeders to

identify viable disease resistant plants to be released as new cultivars.

O1.05

10:00 PREVALENCE OF LISTERIA MONOCYTOGENES AND LISTERIA SPP. IN CATFISH AND PROCESS ENVIRONMENT AND EQUIPMENT BY MOLECULAR TYPING METHODS

Bang-Yuan Chen, Rajkumar Pyla, Taejo Kim, Yean-Sung Jung, Juan Silva

Mississippi State University

Incidence of *Listeria monocytogenes* and *Listeria* spp. in channel catfish (*Ictalurus punctatus*), was conducted. Sampling was done of whole catfish skin, intestines (viscera), and fresh fillets; processing surfaces, water and environmental sites at different production stages. Multiplex PCR, repetitive element sequence-based PCR (rep-PCR), enterobacterial repetitive intergenic consensus PCR (ERIC PCR) and pulsed-field gel electrophoresis (PFGE), were used to identify and to track the possible contamination sources of fish fillets. Prevalence of *L. monocytogenes*, *L. innocua* and a group of *L. seeligeri*-*L. welshimeri*-*L. ivanovii* were 20.6, 12.6 and 28.3%, respectively, in catfish and processing plants. No *L. grayi* was detected in this survey. None of the *L. monocytogenes* detected were isolated from catfish skins or intestines. *Listeria monocytogenes* was found with a frequency of 43.3% in the fillets prior to chilling increasing to 70.0% in the chilled fresh catfish fillets. *Listeria monocytogenes* and *Listeria* spp. were also found in fish contact surfaces and in the ice holding tray and bulk-hold containers. However, these *Listeria* species were not isolated from the samples of plants outside. The clusters of *L. monocytogenes* subtypes indicated that chilling water was the major contaminating (cross-contamination) source for the fresh fillets. Among the *L. monocytogenes*, serotypes 1/2b (47.0%), 3b (16.0%) and 4c (14%) were predominant isolates on the catfish and its processing environment.

O1.06

10:15 RESPONSE OF RABBITEYE BLUEBERRIES TO CHEMICAL THINNING AGENTS

Frank Matta¹, Jose Cartagena¹, James Spiers²

¹*Mississippi State University*, ²*USDA/ARS Small Fruits Research Station*

The thinning potential of various chemicals sprayed on 'Tifblue' rabbiteye blueberry was examined under field conditions for two years. Chemicals used were 7-benzylamino purine (BA), gibberellic acid (GA₃), 2-naphthaleneacetic acid (NAA), and 1-naphthyl

N-methylcarbamate (carbaryl). BA at 75 mg/L and the combination of carbaryl at 400 mg/L and BA at 25 mg/L reduced fruit set both years. Combinations of carbaryl and GA₃ reduced fruit set, but the response depended on GA₃ concentration and varied from year to year. GA₃, NAA, and carbaryl also reduced fruit set, but results were inconsistent. The first year, greater thinning occurred when treatments were sprayed 10 days after corolla drop (ACD). BA at 25 mg/L increased fruit diameter at first harvest the first year, and carbaryl at 400 mg/L increased fruit diameter both years. Fruit diameter was increased in the presence and absence of thinning, depending on year and application time. Yield and return bloom were not influenced by any of the treatments.

10:30 Break

01.07

10:45 ANTIOXIDATIVE EFFECT OF HEAT MODIFIED CHEDDAR WHEY USED IN FINAL EDIBLE COATING DIPS FOR TENDERIZED BEEF STEAK

Sushie Weerasinghe, Byron Williams, Benjy Mikel, Zee Haque

Mississippi State University

The objective of this study was to investigate the efficacy of heat modified (thermized) Cheddar whey in providing antioxidative protection against protein oxidative damage of tenderized beef steak (semimembranosus). Fresh Cheddar whey was skimmed, pasteurized and batch heated at 70°C for 0, 5, 10, and 15 min. In order to mimic the common whey protein concentrate (WPC) manufacturing practice in the U.S., the resulting batches were concentrated by vacuum evaporation (between 68-72°C) to about 30% solids, lactose seeded and stored at 7°C for 16 h to allow lactose crystallization, and spray dried. Coating dips were made by dissolving 5% (w/v) WPC, 2.5% (w/v) sorbitol (plasticizer), 0.125% (w/v) CaCl₂, with and without an additional 0.25% (w/v) whey hydrolyzates in distilled water. Solutions were degassed, heated at 90°C for 30 min., homogenized, filtered, cooled to room temperature and the pH adjusted to 6.5 using 1N HCl, or 1N NaOH. Tenderized steak samples, obtained from the MSU Meat Laboratory, were cut into 1 cm cubes, briefly rinsed in distilled water, coated with the dip, drained, air dried and refrigerated (4°C) until analyses. Control samples were prepared without dipping in coating solutions. Protein oxidation was measured by measuring the carbonyl content and the decrease in sulfhydryl groups. Thermization and/or addition of whey hydrolyzates

significantly reduced the formation of carbonyls. Sulfhydryl content was also significantly protected during storage indicating reduced oxidative degradation. Data show a clear antioxidative protective action of the inexpensive and natural whey based edible coating.

01.08

11:00 ANTIBIOTIC RESISTANCE IN LISTERIA SPECIES ISOLATED FROM CATFISH FILLETS AND PROCESSING SURFACES

Bang-Yuan Chen, Rajkumar Pyla, Taejo Kim, Juan Silva, Yean-Sung Jung

Mississippi State University

A total of 221 *Listeria* isolates (86 *L. monocytogenes*, 41 *L. innocua* and 94 *L. seeligeri*-*L. welshimeri*-*L. ivanovii*) from catfish fillets and processing plants was analyzed by disc diffusion assay for their resistance to a panel of 15 therapeutic drugs. All isolates were strongly or intermediately resistant to cefotaxime but were susceptible to ampicillin, cephalothin, chloramphenicol, erythromycin, gentamycin, kanamycin, rifampin, streptomycin, sulfamethoxazole/trimethoprim and vancomycin. All isolates also showed strong or intermediate resistance to clindamycin. Unlike *L. monocytogenes* and *L. seeligeri*-*L. welshimeri*-*L. ivanovii*, isolates that were all sensitive to tetracycline and oxytetracycline, 22% of *L. innocua* isolates displayed tetracycline/oxytetracycline resistance due to the presence of tet(M) gene in their chromosome. This tet(M) gene, however, was not associated with integrase gene of Tn1545. The tet(O), tet(K), tet(S) and tet(L) genes were not detected in the chromosomal and plasmid DNAs of tet(M)-positive isolates. ERIC-PCR and REP-PCR revealed that the tet(M)-positive isolates showed diverse DNA fingerprint patterns, indicating no genotype specific tetracycline resistance. Although catfish processing environments are currently free of *L. monocytogenes* resistant to the drugs commonly used in human listeriosis treatment, the presence of tet(M) gene in some *L. innocua* isolates cannot exclude the possibility possible present or future tetracycline/oxytetracycline-resistant *L. monocytogenes* in those environments.

01.09

11:15 EFFECT OF AGRONOMY PRACTICES ON PEANUT YIELD POTENTIAL

Marcus Shorter, Patrick Igbokwe

Alcorn State University

The Peanut, (*Arachis hypogaea*), belongs to the legume family (Leguminosae) which are economically important flowering plants. Its relatives include many species of economic importance as soybean, cowpea, alfalfa, and clover (Ochse et al., 1970). It is an annual herbaceous plant growing to 30 to 50 centimeters (1 to 1 ½ ft) tall. The leaves are opposite of each other and pinnate (feather-like) with four leaflets. It has a relatively deep tap root system, which has a central upright stem with many lateral branches. Although a nut in the culinary sense, in the botanical sense the fruit of the peanut plant is a legume and not a nut. The word pea describes the edible seeds of many other legumes in the Fabaceae family, and, in that sense, a peanut is a kind of pea. Peanuts are also known as earthnuts, goobers, goober peas, pindas, jack nuts, pinders, manila nuts and monkey nuts. Although the peanut is tolerant to a wide range of climatic and soil conditions, the most favorable are high solar radiation and 30.48 cm spacing. "Alcorn pat" peanut cultivar is being recommended for production in southwest Mississippi because of its high yield potential compared to 'Florigiant', 'NC-7', and 'GK3' now grown by farmers. The field experiment showed that 'Alcorn Pat' peanut cultivar used would grow well in southwest Mississippi regardless of the seeding methods.

01.10

11:30 MEDICINAL PLANT GROWTH AND QUALITY IN SOUTHWEST MISSISSIPPI

Patrick Igbokwe, Antonio Gibson, Arkon Burks

Alcorn State University

Two field experiments were used to determine the effect of three cropping systems (Conventional, Transitional, and Organic), and three row preparation methods (Heap, Bed, and Flat) on purple coneflower (*Echinacea purpurea*) survival, growth potential and quality. The studies were conducted on a Memphis silt loam soil in southwest Mississippi during the 2005 and 2006 planting seasons. A split plot arrangement in a randomized complete block (RCB) experiment design was used, with the cropping systems as the main plots, and row preparation methods replicated four times as the sub-plots. Transplanting at a within-row spacing of 0.61m, on 6.1m long and 1.2m wide were similar for all cropping systems. However, other field preparation, fertilization and pest management varied with the cropping system. Findings indicate that the cropping system (Transitional) and row preparation method (bed

row) with lowest plant survival rate and canopy height had the highest quality (root volatile oil content) for both study periods. The interaction between cropping systems and row preparation methods were significant except for root length (2005) and root volatile oil (2006).

01.11

11:45 EMBRYONIC AND POST-HATCH PHYSIOLOGICAL RESPONSES ASSOCIATED WITH THE FUNCTIONAL RELATIONSHIP BETWEEN EGG INTERNAL TEMPERATURE AND INCUBATION LENGTH IN BROILER HATCHING EGGS

Radhakrishna Pulikanti, Edgar Peebles, Abiodun

Bello, Chinwendu Obi, Sharon Womack

Mississippi State University

Broiler hatching eggs obtained from a 30-week-old breeder flock were incubated until hatch. Between 10.5 and 18.5 days of incubation the internal (IT) and external (ET) egg temperatures were monitored twice daily using temperature transponders. Beginning on Day 18.5, the eggs were individually monitored for hatch every 12 hours. The average IT and ET along with the 10.5 to 18.5 day percentage incubational egg weight loss (PEWL) were used to calculate the eggshell water vapor conductance (G), G adjusted to 100 g set egg weight (RG), and eggshell water vapor conductance constant (C). The chicks were then grown out for 3 days in a battery brooder. On Day 3 post-hatch, at least 2 live chicks per cage were necropsied to collect their carcass, yolk sac, liver, and pipping muscle, which were further analyzed to determine their relative weights and moisture concentrations. Yolk sac moisture concentration (YSM) and its relative weight as a percent of live chick weight (YW) were positively correlated with IT. The RG was positively correlated with chick carcass moisture concentration and its relative weight as a percent of set egg weight, and was negatively correlated with YW. The positive functional relationship between IT and incubation length is mediated via their common positive relationships to YSM. The results also suggest that within physiological limits, a higher RG results in increased growth and yolk sac absorption in broiler chicks through 3 days post-hatch.

**THURSDAY AFTERNOON
GARDEN ROOM**

01.12

1:30 DEVELOPMENT OF PLANTS FOR FUTURE USE IN RESTORATION PROJECTS

Trevor Johnson¹, Patrick Biber², Scott R. Caldwell²
¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier;* ²*Gulf Coast Research Laboratory, Department of Coastal Sciences of Southern Mississippi;* ³*The National Aeronautics and Space Administration, Stennis Space Center*

The purpose of this project was to restore vegetation to the eroding coastline of the Mississippi Gulf Coast. A study was conducted to determine the role of human intervention and the best methods of implementation. Seed collections of five species were taken; salt marsh cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), salt meadow cordgrass (*Spartina patens*), sea eye (*Borrichia frutescens*), and sea oats (*Uniola paniculata*). The seeds were collected for development of new plants with future use in restoration projects. Seeds from the five species were placed in petri dishes and were germinated with periods of 12 hours of light and 12 hours of darkness at 25°C (77°F). Two of the species, *S. patens* and *U. paniculata*, had a second sample separated for cold stratification before attempting the germination process. A continuous relocation of mature plants, as well as observations on the relocated plants was also ongoing.

01.13

1:45 ANTIMICROBIAL EFFECT AND SENSORY CHARACTERISTICS OF HEAT MODIFIED CHEDDAR WHEY USED IN EDIBLE COATING DIPS FOR CUBED BEEF STEAK

Byron Williams, Emily Bradley, Sashie Weerasinghe, Zee Haque
Mississippi State University

The objective of this study was to investigate the efficacy of heat modified (thermized) Cheddar whey as an antimicrobial agent and its effects on sensory characteristics of cooked cubed beef steak (semimembranosus). Fresh Cheddar whey was skimmed, pasteurized and batch heated at 70°C for 0, 5, 10, and 15 min. Resulting batches were vacuum evaporated and spray dried. Coating dips containing 5% (w/v) WPC, 2.5% (w/v) sorbitol (plasticizer), and 0.125% (w/v) CaCl₂, were dispersed in distilled water (pH 6.5), with and without 0.25% (w/v) whey hydrolyzates. Fresh cubed (tenderized) beef steaks (3-4oz) were coated with the dip Styrofoam tray overwrap

packaged and refrigerated (4°C) until analyses. Control samples were not dipped. Microbial analyses involved plating samples in duplicate of each of the eight treatments for both total plate count and *E. coli* initial screening and continued monitoring the TPC every 48 hrs. for eight days. Sensory analysis involved utilizing a trained panel of experts to evaluate the treatments at days 0, 2, 4 and 7 from the time of coating. Thermization and/or addition of whey hydrolyzates significantly reduced the TPC. Initial sensory analyses indicate no significant impact on general sensory characteristics or overall acceptability of the treated product at least for the first 4 days in the retail package. Data show a positive impact upon the shelf life with no significantly negative influence on consumer acceptability of the treated cubed beef steaks with this inexpensive and natural whey based edible coating.

01.14

2:00 AGRONOMIC EVALUATION OF NEWLY DEVELOPED SWEET CORN IN SOUTHWEST MISSISSIPPI

Rilondricks Beeman, Patrick Igboke
Alcorn State University

Sweet Corn (*Zea Mays* L.) is a popular vegetable crop which is consumed in many parts of the world. It belongs to the graminea (grass) family. Therefore, many agronomic research studies have been done to improve its production and quality. The objective of this study was to evaluate the impact of production practices on yield potentials of newly developed sweet corn varieties grown in Southwest Mississippi. A field experiment was conducted for 2 years (2007 and 2008) at the Alcorn State University Experiment Station in southwest Mississippi. The soil type in this area is Memphis silt loam. The plot arrangement was a randomized complete block (RCB) experiment design. Seeds were planted 1 ft. apart in five, 20 ft. blocks. Field preparation, fertilization, and pest management varied with method of sweet corn production. The varieties used in this experiment were 'Devotion', 'Obsession', and 'Passion'. Each variety was evaluated for germination; survival; tassel number; cob initiation; insect infestation; lodging; tiller formation; silk count; and flag count. Other traits investigated include shank measurement; ear shape; tip fill; eating quality; and market yield. Results showed that each variety can be profitably grown in Southwest Mississippi.

01.15

2:15 PROCESS FOR THE PRODUCTION OF GALLIC ACID, PYROGALLOL AND PURPUGALLIN FROM TANNIC ACID

Taejo Kim, Juan Silva, Yean-Sung Jung

Mississippi State University

Tannic acid, a type of tannin, is a complex, long molecule made up mainly of glucose esters of gallic acid. It possesses many useful qualities in the chemical and food industries. However, hydrolyzed tannic acid compounds may have better functionality and thus usefulness in some applications. High temperature and pressure reactors are used to "naturally" hydrolyze or breakdown complex compounds such as tannic acid into smaller, more active compounds. The objective of this study was to investigate reaction conditions (temperature and pressure, product load) needed to hydrolyze tannic acid into gallic acid, pyrogallol and purpugallin. Heat processing of fresh tannic acid was carried out at four different temperatures 65 (26kPa), 100 (101 kPa), 150 (480 kPa) and 200°C (1560 kPa) in a batch, closed reactor system. Temperatures at 150 and 200°C dramatically elevated pressures in the reactor up to 1.3 and 4.8 MPa, respectively. Chromatographic (HPLC) analysis of the products showed that there was no significant production of gallic acid at 65°C. At temperatures above 100°C (101 MPa), gallic acid and pyrogallol production was higher ($p \leq 0.05$) than the control (no reaction). Temperatures above 150°C resulted in larger conversion to pyrogallol reaching 4.6 mg/mL at 200°C. While pyrogallol was not oxidized to purpugallin at pH 2.8, purpugallin was immediately produced at increased pH 4.0 at room temperature. Gallic acid, pyrogallol and purpugallin could be eco-friendly obtained by simple thermal processing of hydrolysable tannic acid.

01.16

2:30 COMPARISON OF TREATMENTS FOR ACORN GERMINATION OF THE SAWTOOTH OAK

Eileen Bates, Margret Collins, Joan Weatherford

Jones County Junior College

The sawtooth oak tree is not endogenous to this region; it is from China. It is desirable by wildlife because it is highly productive of acorns. The objective of this research is to determine the best germination method of these acorns. Several different germination methods were explored. Including scarification-the chipping of seed coats to prevent dormancy; osmoconditioning-incubating the seeds in a specific acid for certain amounts of time; and leaching-running the seeds through vigorous amounts of water. Other variables in this experiment were treatment with

gibberellic acid, polyethylene glycol, and sulfuric acid. Successful germination rates were compared include scarification and gibberellic acid treatment.

01.17

2:45 NO-TILL AND CONVENTIONAL FARMING SYSTEMS OF HORTICULTURAL CROPS ON BUILDUP OF PLANT NUTRIENTS AND CARBON

Girish Panicker, Franklin Chukwuma, Patrick Igbokwe

Alcorn State University

Conservation tillage (CT) has become an accepted cultural practice for many agronomic crops, but horticultural crops have not been studied as thoroughly as agronomic crops in CT research programs. Residue management has become an integral part of CT systems because surface residues help reduce erosion, improve run-off water quality, influence microbial processes, and benefit crop production. The effect of no-till (NT) and conventional system (CS), and crop residue management was tested to evaluate the build-up of plant nutrients and carbon on a horticultural crop rotation program with Memphis silt loam soil. The cropping system included a rotation of spring sweet corn (*Zea mays* var. Merit), summer watermelon (*Citrullus lanatus* var. Crimson sweet), and winter hairy vetch (*Vicia villosa* Roth). Conventional and no-till plots received inorganic fertilizers equally, but the former received traditional cultural practices. The parameters for analysis included biomass development and soil physic-chemical changes including percent canopy cover, stem diameter, crop residue, organic carbon, yield, macro and microelements, and soil compaction, moisture, and temperature. Biomass development, and buildup of micro and micronutrients and organic carbon were significantly higher for all crops of no-till plots than crops of conventional plots.

3:00 Division Business Meeting

DIVISIONAL POSTER SESSION

EXHIBIT HALL C

Thursday Afternoon, 3:30-4:30p

Posters may be set up starting at 1:30p

P1.01

A BACTERIAL ARTIFICIAL CHROMOSOME (BAC) LIBRARY OF AN ABNORMAL CHROMOSOME 10 MAIZE GENOME

Melanie Hill¹, Lisa Kanizay², Lisa Kanizay³, Xueyan Shan², Daniel Peterson²

¹Tougaloo College, ²Mississippi State University,

³University of Georgia

Bacterial Artificial Chromosome (BAC) libraries are often used to study genome content and structures. One purpose of a BAC library is to discover an organism's DNA sequence and to compare it to other genomes. We generated a BAC library for a Zea mays (maize) line with an abnormal chromosome 10 possessing a terminal block of chromatin of uncertain origin. Research was conducted on this maize genome because the abnormal chromosome 10 is associated with meiotic drive, but the specific genes involved in this process are unknown. In order to make a BAC library for sequencing, nuclei were extracted from the maize seedlings. DNA was then cut with a restriction enzyme (HindIII) and ligated into the pIndigo vector so that it could be transformed into Escherichia coli (E. coli). The key in making a BAC library is to clone large inserts of the genomic DNA which can be a challenge. The completed maize library consisted of 90, 960 clones representing 4X coverage of the maize genome. The average insert size is 112 kilo base (kb) pairs. This library was gridded onto 5 membranes and screened with Abnormal 10 specific sequences. Making a BAC library is challenging but once it is completed it can be utilized to make many discoveries.

P1.02

CADMIUM UPTAKE BY CABBAGE AND INDIAN MUSTARD PLANTS FROM CONTAMINATED SOILS

Md S. Zaman, Cynthia Addae

Alcorn State University

Studies in our laboratory and by other investigators indicated that *Brassica juncea* (Indian mustard) and *Brassica oleracea* (cabbage) plants can tolerate high concentrations of heavy metals in soil. In this study, we investigated the tolerance of *Brassica juncea* and *Brassica oleracea* plant species to soil cadmium (Cd), and bioaccumulation of Cd in plant tissues. Plants were grown in the laboratory; under color corrected lights; in Memphis silt loam soil;

containing 0, 250, 500, and 1000 ppm Cd. Plants were harvested on day 30 of the experiment. Harvested plant materials were dried in an incubator at 70-degree C for 7 days, and then acid digested for tissue Cd analysis. Tissue Cd analysis was performed using an atomic absorption spectrophotometer. Results indicated that both *Brassica juncea* and *Brassica oleracea* could tolerate high levels of Cd in soils, and accumulate considerable amounts of Cd in plant tissues. The metal uptake by plants was dose related. Therefore, these two plant species are of great interest in the study of phytoremediation of metal contaminated soils, and should be further investigated to explore their potential to remediate Cd contaminations.

P1.03

ENHANCING TANNIC ACID ANTIMICROBIAL ACTIVITY AND ANTIOXIDANT CAPACITY BY INCREASING AMOUNT OF HYDROLYZABLE PRODUCTS

Taejo Kim, Juan Silva, Yean-Sung Jung

Mississippi State University

Tannic acid, a type of tannin, is a complex, long molecule made up mainly of glucose esters of gallic acid. It possesses antimicrobial and antioxidant capacity, making very useful in the chemical and food industries. However, hydrolyzed tannic acid compounds may have better functionality and thus usefulness in some applications. The objective of this study was to investigate the antioxidant capacity and antimicrobial activity of newly formed compounds from tannic acid. Antioxidant capacity was conducted by Rancimat test. Of the compounds hydrolyzed from tannic acid and tested, pyrogallol was the major active compound. Antimicrobial activity was conducted by the disc test on major foodborne pathogens. Gram positive strains (*Staphylococcus aureus* and *Listeria monocytogenes*) showed higher sensitivity (40 ~ 51 mm) on processed tannic acid than tested Gram negative pathogens (*Salmonella*, *Escherichia coli* O157:H7) with 22.8 ~ 26.8 mm. After 3 month storage, pyrogallol was not oxidized to purpurogallin, the oxidation product of pyrogallol. However, purpurogallin was immediately produced at room temperature in 24 h after pH was increased from 2.8 to 4. Even though purpurogallin was not formed during heat processing, a slight increase in pH could accelerate purpurogallin formation. The simple thermal processing of hydrolysable tannic acid could produce gallic acid, pyrogallol and purpurogallin, enhancing its antioxidant and antimicrobial capacity.

P1.04

EVALUATION OF THE ANTIMICROBIAL CAPACITY AND ACTIVE COMPOUNDS OF EXTRACTS FROM DIFFERENT SECTIONS OF VARIOUS MUSCADINE CULTIVARS

Weiwei Chen¹, Taejo Kim¹, Donna Marshall¹,
Stephen Stringer¹, Frank Matta¹, Juan Silva¹

¹Mississippi State University, ²USDA-ARS,
Poplarville Small Fruits Station

Muscadine (*Vitis rotundifolia* Michx.) grapes are rich in phenolics and other bioactive compounds. These compounds possess antioxidant and antimicrobial properties. The objectives of this research were to determine which cultivars and what parts of the grape (concentrating on skin and seeds, the richest in antioxidants) were higher in phenolics acids and had higher antimicrobial activity. Hot water-soluble muscadine extracts from skin and seed sections of each muscadine cultivar were prepared for investigation. Phenolic and polar compounds of each of the extracts was determined by HPLC. A cocktail of three stains of *Escherichia coli* O157:H7 were used to discern the antimicrobial capacity of each sample by the disc diffusion test. For the skin part, the samples from some varieties had strong antimicrobial activities, which can reduce an initial population (~5log CFU/ml) of the cocktail to non-detectable levels (< 10 CFU/ml). However, regardless of other factors, the samples from some other varieties had no significant antimicrobial capacity (<0.06 log Reduction). The concentrations of main active organic compounds were different among cultivars, correlating to results in the antimicrobial tests. Tartaric acid concentration in skins, for example, was 9645.2 ppm (Nesbit), which also showed a high log reduction of 4.92, and was low in 'Sweet Jenny' 3764.2 ppm which showed no antimicrobial activity. Similar results were seen with the seed sections. The results revealed that different amounts of bioactive compounds existed differently in different sections of various cultivars which were suggested to be interrelated to their different antimicrobial results.

P1.05

"LOW RESOLUTION RADIATION HYBRID MAPPING OF CHROMOSOME 1D OF WHEAT"

Chiquita Lee¹, Anne Denton², Shahryar Kianian²
¹Mississippi Valley State University, ²North Dakota State University

Radiation hybrid mapping provides a tool by which to bridge the gap between bin mapping and genome sequencing. This study focuses on the radiation hybrid (RH) mapping of hexaploid bread wheat chromosome 1D in a tetraploid durum wheat

background. Chromosome 1D of bread wheat was substituted into a durum wheat population in the place of chromosome 1A. Durum 1D(1A) wheat population was irradiated with gamma rays and crossed with a normal durum population to produce the RH population. The objective was to develop a low resolution RH map of chromosome 1D using CarthaGene software. CarthaGene analysis was performed on a 15Krad 1D (1A) population of 94 lines with six 1D-specific markers, three single nucleotide polymorphism (SNP) and three retrotransposons junction (RET) markers. Marker scores were loaded; marker information was compiled; and markers were group using various commands of the software. The markers were ordered in terms of relative position. The LOD score of 3.0 was used to ensure the accuracy of the map. The final map resulted in 72.5 cR. To produce a RH map with a higher resolution, more markers are needed.

P1.06

VALIDATION OF DELETION STOCKS IN WHEAT FOR CHROMOSOMES 4D-7D

Antia Cain², S. Kianian¹, Justin Hedgar¹
¹North Dakota State University, ²Mississippi Valley State University

DNA was extracted from cytogenetic stocks of Chinese Spring hexaploid wheat. Polymerase Chain Reaction (PCR) screening was used to amplify markers for specific loci on chromosomes 4D, 5D, 6D, and 7D. The objective of this screening was to validate the genetic identity of the deletion stocks in question. Six Expressed Sequence Tag markers were screened on aneuploid lines. Fragment elucidation was accomplished by Polyacrylamide Gel Electrophoresis. Images were archived on a Digital Gel Documentation System. This project was developed for the purpose of validating chromosome deletion lines. This purpose is part of a larger effort directed toward mapping small deletion fragments on specific chromosomes. Other STEM interns are addressing those objectives. Methods used were: DNA Extraction procedure used to collect DNA, DNA Quality Check- Examine DNA collected confirming proper collection, PCR Program- used to amplify a single or a few copies of pieces of DNA across several magnitude generating millions of more copies of a DNA sequence, Reaction Conditions- making sure when using these techniques the expected outcome is consistent, Acrylamide Gel Electrophoresis- A technique used for the separation of DNA using an electric current applied to a gel matrix, Data Collection- Collecting the data from fragment analysis, Data Analysis- Analyzing the DNA that has been modified in physical view reading DNA sequence and deleted lines.

Concluded, two markers, while the other markers were ambiguous, were in fact, informative to screening the deletion lines of specific chromosomes. Further work will validate ambiguous results.

P1.07

ENHANCING THE EFFICACY OF ISOLATION PROCEDURE FOR SALMONELLA SPP. IN FRESH AND FROZEN AQUACULTURE FOODS

Norman Arroyo, Taejo Kim, Juan Silva
Mississippi State University

Salmonella is a pathogenic microorganism of great concern in the food industry. There is an estimated of 1.3 million illness, 16,430 hospitalizations and 553 deaths caused by foodborne Salmonellosis (non-typhoidal) in the United States each year. Salmonella can cause Salmonellosis to the host by ingested contaminated food (fecal/oral transmission). Salmonella spp. is not usually associated with seafood but this pathogen can be widely distributed in nature as well in the intestine of animals and humans. The objective of this study was to identify the incidence of Salmonella spp. on fresh and frozen aquaculture foods using a modified method to reduce false-positive results associated with the use of conventional media. The antimicrobial novobiocin was added to the agar media to reduce the growth of swarming bacteria that can interfere by producing similar presumptive colonies of Salmonella spp. confounding the results. The addition of novobiocin to the agar media reduced significantly the presence of false-positive bacteria increasing isolation and identification of Salmonella spp. from fresh and frozen aquaculture seafood. Presumptive colonies of Salmonella spp. were identified and confirmed by polymerase chain reaction resulting in a 14% incidence down from an 80% incidence previously identified from plates without novobiocin.

P1.08

FIELD MONITORING OF SOIL HYDROLOGY FOR WETLAND MITIGATION IN THE BLACKLAND PRAIRIE MAJOR LAND RESOURCE AREA

Dane DeWeese¹, Billy Kingery¹, Steve DePew²,
Murphree Evans³

¹Mississippi State University, ²Natural Resource and Conservation Service, Tupelo, ³Black Swamp Mitigation Bank, Aberdeen

EPA defines a mitigation bank as an aquatic resource area, e.g., wetland or stream that has been restored, established, or enhanced as compensation for impacts to aquatic resources permitted under federal,

state or local wetland regulation. For an area to be a wetland three features must be present during some portion of the growing season: vegetation that commonly occurs in standing water; soils possessing characteristics of hydric conditions; and, hydrology such that water is present at or near the soil surface. A mitigation bank of prior converted wetland, i.e., the hydrology was altered in 1985 to accommodate agriculture, is being established in the James Creek watershed near Aberdeen. The goal is to establish conditions similar to those prior to the 1985 conversion. Central to this goal is ascertaining a baseline by which to assess progress. Field monitoring during this initial phase involves bi-monthly evaluation to determine changes in soil hydrology. Aspects of the mitigation bank project and monitoring results will be presented.

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Chair: Tim McLean,

University of Southern Mississippi

Vice-chair: Sandra Leal

University of Southern Mississippi

THURSDAY MORNING

Exhibit Hall A

02.01

8:30 GENERATION OF AN EXPRESSION CONSTRUCT FOR GENE #0827 OF THE HALOTHIOBACILLUS NEAPOLITANUS GENOME

Daniel Hinton, Sabine Heinhorst, Gordon C. Cannon
University of Southern Mississippi

Halothiobacillus neapolitanus is an aerobic sulfur bacterium that fixes CO₂ and uses sulfur as its source of energy. Carboxysomes, organelle-like structures composed of a protein shell that surrounds RubisCO, are responsible for the first reaction in the CO₂ fixation pathway. As part of the recent sequencing of the *H. neapolitanus* genome by the United States Department of Energy, a gene that is of interest to carboxysome research was discovered. Gene 0827 encodes a protein that is related to a subunit of NADH dehydrogenase. This protein may be involved in inorganic carbon transport and may therefore be relevant to carboxysome function(s). As a first step towards establishing the function of this protein, its coding sequence was PCR-amplified and inserted into the vector pCR-BluntII-TOPO. The insert was then ligated into the pPROEX HTb expression vector and

subjected to small-scale induction trials.

O2.02

8:45 GENERATION OF MUTANTS TO IDENTIFY PROTEIN INTERACTIONS WITHIN THE CARBOXYSOMAL SHELL OF HALOTHIOBACILLUS NEAPOLITANUS

Jenifer Milam, Balaraj Menon, Sabine Heinhorst, Gordon Cannon

University of Southern Mississippi

The carboxysome is a specialized polyhedral microcompartment found in all cyanobacteria and some chemoautotrophs, such as the sulfur bacterium *Halothiobacillus neapolitanus*. Enclosure of the CO₂ fixing enzyme, ribulose 1, 5-bisphosphate carboxylase/oxygenase (RubisCO) in the thin protein shell of the carboxysome enhances the catalytic efficiency of the enzyme and allows carboxysome-containing bacteria to grow in ambient CO₂. To identify which of the eight polypeptides of the polyhedral carboxysome shell interact, *H. neapolitanus* mutants are being constructed in which one of the abundant paralogous shell proteins, CsoS1A, CsoS1B and CsoS1C, is fused to a hexa-histidine tag. The growth characteristics and ability to produce carboxysomes have been assessed for the mutant that carries a his-tagged csoS1A gene. The protein complexes formed by the tagged carboxysome components are being analyzed by affinity pull-down assays and mass spectrometry.

O2.03

9:00 A DELETION OF THE *nhaB* GENE SIGNIFICANTLY REDUCES THE EXPRESSION OF *icsA* ON A POST-TRANSCRIPTIONAL LEVEL

Erika Harmon-Pratte, Lauren Brandon

Mississippi University for Women

Shigella is an obligate intracellular pathogen that causes dysentery. Pathogenicity by *Shigella* is mediated in part by the outer membrane protein IcsA. IcsA recruits actin filaments in colonic epithelial cells; this allows for the directional movement of *Shigella* and its intercellular dissemination. IcsA expression is mediated by a number of environmental signals that include but may not be limited to pH, osmolarity and temperature. We have shown through Western blot analysis and alkaline phosphatase assays that a deletion of the *nhaB* gene-whose product encodes the sodium-proton antiporter--significantly reduces the expression of *icsA*. Furthermore, we have shown through reverse transcriptase-real time pcr that such a reduction occurs on a post-transcriptional level. Such findings are likely to aid in our understanding of how *Shigella* responds to

environmental signals such as osmolarity and to lead to the discovery of therapeutic agents that reduce the expression of *icsA* by deleteriously affecting the expression of the *nhaB* gene.

O2.04

9:15 EXPRESSION OF YIN, A PUTATIVE OLIGOPEPTIDE TRANSPORTER, IN THE REPRODUCTIVE TRACT OF DROSOPHILA MELANOGASTER

Kathy Butler¹, Yael Heifetz², Paul Mack¹

¹Mississippi University for Women, ²Hebrew University of Jerusalem, Rehovot, Israel

The biology of gamete formation results in a dynamic that makes females a scarce resource for males. Thus, males compete for access to females for reproduction, in turn, driving the evolution of male-male competition both before and after mating. In the latter case - sperm competition - overlapping ejaculates of separate males vie for the opportunity to fertilize a female's eggs. This complicated interaction can drive the evolution of exploitation and manipulation in both sexes, frequently via the inclusion of additional peptides in the ejaculate. In the fruit fly, *Drosophila melanogaster*, sperm and sperm-associated proteins have various effects on females ranging from increased ovulation to increased mortality rates. To date, few studies have addressed how females might respond to these associated proteins. From a set of previously identified candidate genes sharply up-regulated after mating, we identified one gene, *yin*, which may be involved in the transport of sperm-associated proteins or their metabolites into the epithelium of the female reproductive tract. We sought to verify initial microarray data that suggested the general up-regulation of *yin* in mated vs. unmated females. We specifically examined *yin* expression in the uterus (UT), rectum (RP), seminal receptacle (SR), and spermathecae (SP) in both unmated and mated 3-day old females at various post-mating times. Our results suggest that *yin* expression increases significantly in both UT and SR and possibly also the SP. Our data also indicate expression of *yin* increases even more dramatically in mated females over the subsequent 24 hours relative to unmated females.

O2.05**9:30 MOLECULAR CHARACTERIZATION OF THE JAPANESE BEETLE (*POPILLIA JAPONICA*) LARVAL MIDGUT SERINE PROTEASE**Nasser Syed¹, Steve Alm², Shahid Karim¹¹University of Southern Mississippi, ²University of Rhode Island

The Japanese beetle, *Popillia japonica* (family Scarabaeidae), has become a widespread insect pest damaging over 300 species of agriculturally important plants in the eastern United States. An estimated \$460 million is lost each year for direct control costs in the United States. Despite many efforts on controlling *P. japonica*, it still is a major threat as an invasive species. Therefore new and innovative tools are required to identify potential targets for control. We cloned and expressed a grub midgut serine protease in the bacterial expression system. A 34 kDa recombinant Serine protease was purified by using Ni-column and protease activity was confirmed by an enzymatic assay. Polyclonal antibodies were generated using the purified protein in mice for further confirmation of endogenous protein expression. Confocal microscopy revealed endogenous expression of serine protease in the grub midgut. We further silenced Serine Protease gene by RNA interference in the 3rd instar grub larvae. Results of reverse genetics experiments will be high-lighted in this presentation.

O2.06**9:45 CELLULAR LOCALIZATION OF MSA IN STAPHYLOCOCCUS AUREUS**

Maria Basco, Mohamed O Elasri

University of Southern Mississippi

Staphylococcus aureus is an opportunistic pathogen that causes a variety of life threatening diseases ranging from superficial skin infections to deeper, systemic infections like osteomyelitis and endocarditis. *S. aureus* has numerous virulence factors that are under the control of global regulators like accessory gene regulator (*agr*), staphylococcal accessory regulator (*sarA*), etc. We have characterized a novel gene called the modulator of *sarA* (*msa*) that is essential for full expression of *sarA*. The *msa* gene also plays a role in regulating other genes associated with virulence and biofilm formation. Computational analysis of Msa predicts this protein to be a 15 kDa membrane protein, which has three transmembrane regions with internal and external phosphorylation sites that are possible sites of signal transduction. This study aims to experimentally verify the cellular localization of

Msa with the help of antibodies raised against Msa. Cellular fractionations of the *S. aureus*, will be tested by Western Blot using anti-Msa antibodies. A pull-down assay conducted with Msa protein should also give us an idea of the molecules Msa interacts with. Studying the Msa protein, will help understand the role of Msa as a putative signal transducer that regulates virulence in *S. aureus*.

10:00 Break**O2.07****10:15 ANALYSIS OF SULFUR METABOLISM GENES *CDO1*, *GSH1*, AND *GSH2* IN THE DIMORPHIC PATHOGENIC FUNGUS *HISTOPLASMA CAPSULATUM***

Melissa Adams, Glen Shearer

University of Southern Mississippi

The dimorphic fungus, *Histoplasma capsulatum* (*Hc*) causes histoplasmosis, a respiratory disease in man. *Histoplasma* can be found in the soil as a saprophytic multicellular mold. In the lungs of an infected host, a shift to the unicellular parasitic yeast occurs. The mold to yeast shift is required for the progression of the disease. Sulfur metabolism plays a critical role in the dimorphic process. Sulfhydryl groups, especially cysteine, are a necessary nutrient for the transition to the yeast state. Cysteine dioxygenase (*CDO1*), Gamma-glutamyl cysteine synthetase (*GSH1*), and Glutathione synthetase (*GSH2*) are involved in the cysteine metabolic pathway. In order to evaluate their role in the dimorphism, *CDO1*, *GSH1*, and *GSH2* expression levels were studied. The expression level of each gene in both the yeast and mold morphotypes of four *Hc* strains was examined by northern blotting and real-time PCR. *CDO1* is expressed in both the mold and yeast phases of the organism while *GSH1* and *GSH2* are expressed in only the yeast phase. *CDO1* activity was reported by Kumar et al. to be yeast specific (Biochemistry, 1983: 762-768), but our analysis shows *CDO1* transcript and enzyme activity to be in both the mold and yeast morphotypes. A western blot of *CDO1* using a flag tag fusion identified the protein size to be approximately 24 kDa. Experiments are underway to determine if *GSH1* and *GSH2* enzyme levels correlate with transcript levels. Knockouts of these genes are being attempted to evaluate the loss of function on the yeast/mold dimorphism.

O2.08

10:30 MOUSE EMBRYONIC STEM CELLS' RESPONSE TO H₂O₂ INDUCED OXIDATIVE STRESS

Yan-Lin Guo, Samujjwal Chakraborty, Suja Rajan
University of Southern Mississippi

Embryonic Stem Cells (ESCs) have gained huge popularity and attention because of its potential applications in cell therapy but very little is known about how they respond to oxidative stress. Oxidative stress irrespective of being intracellular or extracellular, causes many cellular disturbances and damages. In this study we demonstrate how H₂O₂ induced oxidative stress affects the activities of mouse ESCs. ESCs, like other differentiated cells are sensitive to H₂O₂ induced toxicity above 50μM. But unlike other differentiated cell types, which enter senescence when exposed continuously to a low concentration of H₂O₂, mouse ESCs do not show any signs of senescence. However, there is a temporary growth arrest in mouse ESCs with exposure to H₂O₂ but they resume normal proliferation with out losing stem cell self renewal and pluripotency. Among the cyclins, only CyclinD1 shows a temporary decrease in its expression level with response to the H₂O₂ treatment, which also retracts to normal with time. The decrease in cell count and cyclinD1 expression level might be the causes leading to the apoptosis of mESCs in response to H₂O₂ treatment. In conclusion, according to our data, mESCs are sensitive to H₂O₂ induced oxidative stress but have different and unique mechanisms to overcome senescence.

O2.09

10:45 MSA IS REQUIRED FOR METHICILLIN RESISTANCE EXPRESSION BY STAPHYLOCOCCUS AUREUS.

Antony Schwartz, Vijayaraj Nagarajan, Mohamed Elasri

University of Southern Mississippi

Antibiotic resistance in *Staphylococcus aureus* has become an urgent national medical issue as the rate of MRSA (Methicillin-Resistant *Staphylococcus aureus*) cases have steadily increased over the last decade. *S. aureus* is the causative agent of a variety of infections ranging from superficial skin abscesses to the life-threatening disease such as endocarditis and osteomyelitis. Antibiotic resistance has been associated with penicillin-binding proteins (PBP) and global regulators of virulence such as sarA (Staphylococcal accessory regulator A). Further analysis of resistance mechanisms in MRSA, have now been expanded to include fem and aux-family of genes. The fem (factors essential in methicillin-resistance) and aux (provisionally named as auxiliary genes involved in methicillin-resistance) together comprise more than 35

genes that are involved in methicillin resistance. While the functions of some of these gene products are still unknown, a majority of these genes are involved in cell wall or cell-wall precursor synthesis. The modulator of sarA (msa) gene controls the expression of various genes either independently or via sarA. In this study, we show that mutation of the msa gene leads to increased susceptibility (MIC 3 μg/ml) to methicillin and oxacillin in comparison to wild type strain COL (MIC 1600 μg/ml). In order to define the role msa in antibiotic resistance, we analyzed the expression pattern of several fem & aux genes that are affected by mutation of msa using real time quantitative-PCR and DNA microarrays.

O2.10

11:00 INTERVENING DIRECTLY INTO BRAINS TO AFFECT SOCIAL COGNITION

John Bickle

Mississippi State University

Virus vectors engineered to contain genetic materials known to be involved with long-term memory consolidation are the latest experimental techniques for intervening directly into mammalian brains to affect behavior directly. I describe an experiment using these methods that holds promise of affecting social behavior involving interacting conspecifics. These methods have already been used successfully to affect amygdala-dependent fear conditioning, and nothing in principle precludes their application to areas of the ventral hippocampus known to be involved in social recognition memory. Previous work has shown that social isolation of mice prior to social recognition memory training negatively affects consolidation. The hypothesis of this study is that viral vector interventions containing the gene for cyclic AMP response-element binding protein, or CREB, a gene transcription enhancer that has been shown experimentally to be a key step in the intraneuronal signalling pathways inducing late long-term potentiation, into ventral hippocampus will recover normal social recognition memory, even in socially isolated animals. This result will have significant negative implications for currently popular "extended cognition" approaches.

O2.11

11:15 ANALYSIS OF RECEPTOR-TARGETED SIRNA DELIVERY TO CANCER CELLS

Yilin Zhang, Adam York, Charles McCormick, Yanlin Guo, Faqing Huang

University of Southern Mississippi

Therapeutic agents (e.g. siRNAs, ribozymes, and antisense oligos) can selectively target cancer cells and dramatically reduce severe side effects, if they are conjugated to high-affinity ligands that bind to cell

surface receptors. We have synthesized a series of folate (FA) conjugated copolymers as siRNA carriers possessing the following desired properties: i) water solubility and stability; ii) small size (~15 nm); iii) entry of the cell via folate receptor mediated endocytosis; iv) complexation and protection siRNA; v) the capability of uploading siRNA in endosome/lysosome. Fluorescent microscopy and flow cytometry have been used to study the internalization of siRNA/copolymer complexes qualitatively and quantitatively. Real-time PCR and luminescence assay have illustrated the effective RNAi effects (> 60% reduction) in both mRNA and protein levels. Several experimental controls, including: i) FA unconjugated copolymer, ii) Folate receptor negative cell line, iii) free folate competition, have demonstrated cancer cell-specific delivery of siRNA. Our results have also confirmed the applicability of our siRNA delivery system in several cancer cells. In addition, negligible cytotoxicity from the copolymer is found under the conditions studied. In the meantime, siRNA carriers with different formulation and siRNA against essential genes are under investigation in our laboratory to improve siRNA delivery efficiency and RNAi effects. In summary we have demonstrated a carrier that is capable of cancer cell-specific siRNA delivery and significant gene inhibition with low cytotoxicity. Our system does not display some problems of conventional transfection reagents, and may have potential applications in cancer therapy.

THURSDAY AFTERNOON
Exhibit Hall A

O2.13

1:30 IS THE JANUS KINASE REDOX-SENSOR SWITCH A RELEVANT REGULATOR OF CELL PHYSIOLOGY?

Chetan Patil, Jin Zhang, Barak Gunter, George Booz, Roy Duhe

University of Mississippi Medical Center

Our lab has identified a "redox-sensor switch" in the catalytic domain of the protein-tyrosine kinase, Janus Kinase 2 (JAK2). Recombinant JAK2 proteins lose autokinase activity when pre-treated with the oxidant ortho-iodosobenzoate (o-IBZ), and restored back by retreatment with the reductant dithiothreitol (DTT). Simultaneous mutation of cysteines at positions 866 and 917 to alanines converted JAK2 to an redox refractive enzyme. We hypothesize that these conserved cysteine residues in JAK1 and JAK2 serve a physiological role to regulate JAK activity according to the redox state of the cell. To test this hypothesis, we

propose the following. 1) We will verify that converting the critical cysteines to alanines will "disable" the redox-sensor switch in the full length forms of JAK1 and JAK2 using the baculoviral expression system and in vitro autokinase assays. This verification is important because the original discovery involved truncated JAK2 variants which lacked receptor-binding and autoinhibitory domains. 2) We will use a non-recombinant approach to show that signal transduction by the endogenous JAK in mammalian cells is impaired by oxidative stresses associated with diseases such as type II diabetes. 3) We will restore oxidatively-impaired signal transduction in mammalian cells via lentiviral expression of recombinant JAK containing a disabled redox-sensor switch. Taken together, the data from the above experiments should provide persuasive evidence for a physiologically-relevant regulatory mechanism which directly couples the cellular redox state to JAK-mediated signal transduction, and improve our understanding of diseases associated with chronic oxidative stress.

O2.14

1:45 THE INVESTIGATION OF SINGLE NUCLEOTIDE POLYMORPHISMS AND EXPRESSION LEVELS IN CANDIDATE GENES FROM THE ALFALFA LIGNIN BIOSYNTHESIS PATHWAY

Teonte Brooks¹, Sue Sherman Broyles², Jeff J. Doyle²

¹*Mississippi University for Women*, ²*Cornell University, Ithaca, NY*

Alfalfa (*Medicago sativa*) is a tetraploid that is able to fix nitrogen from the atmosphere through a symbiosis with soil bacteria. Alfalfa is a commonly used forage crop that could be manipulated for biofuel production and increased forage quality. To improve cultivated alfalfa, diploids are often used to identify and map traits of interest for improvement. One way to improve digestibility of alfalfa for animals is by manipulating the lignin composition of alfalfa cell walls, and one way to do this would be by down-regulating components of the lignin biosynthesis pathway. Our purpose was to find single nucleotide polymorphisms (SNPs) from 72 accessions that will help determine if there is an association with biomass and lignin content phenotypes. The key enzymes in the lignin biosynthesis pathway that we investigated as candidate genes for my project were CAD (cinnamyl alcohol dehydrogenase), C3H (coumaroyl shikimate-3-hydroxylase), PAL (phenylalanine-ammonia lyase), and others. We found two SNPs in one of the coding exons of C3H. We also measured the expression levels of some of these genes in alfalfa accessions with

different lignin contents and found differences in expression levels that correlate with lignin content.

02.15

2:00 DETECTION OF TARGET BACTERIA USING A QCM-BASED DETECTOR AND SINGLE-CHAIN FV ANTIBODY

Scott Walper, Sabine Heinhorst, Gordon Cannon
University of Southern Mississippi

Current research focuses on the development of a portable detector that can readily be adapted for detection of diverse pathogens. The detector is modeled on the combination of a quartz crystal microbalance (QCM) platform and a single-chain Fv antibody (scFv) library as the source for bacteria-specific molecules. The antibody library and a high-throughput selection method were utilized to isolate single-chain Fv (scFv) antibodies against the bacterial targets *Salmonella enterica* and the anthrax simulant *Bacillus thuringiensis*. Additionally, a suitable method was developed to immobilize the scFv to the gold electrode of the QCM detector that ensured both activity and proper orientation of the scFv. A prototype biosensor was constructed and demonstrated to be effective in the detection of a minimum of 10^2 target bacteria in an aqueous sample. The detector was successfully employed in the detection of *B. thuringiensis* from "white powder" simulants and the detection of *S. enterica* samples from the surface of agricultural products and in water samples.

02.16

2:15 EXPRESSION OF AN UNUSUAL BACTERIAL MICROCOMPARTMENT GENE FROM *SALMONELLA TYPHIMURIUM TYPHI* (2)

Sarah A. Ali, Fei Cai, Gordon C. Cannon, Sabine Heinhorst
University of Southern Mississippi

Bacterial microcompartments are polyhedral organelles that consist of a thin protein shell and enclosed key metabolic enzyme(s). The prototype, the carboxysome, is limited to autotrophic bacteria. However, similar structures, albeit with a different enzyme "cargo", have also been found in several heterotrophic bacteria. Furthermore, a search of the sequenced bacterial genomes revealed that the ability to form microcompartments is widespread among the bacteria: the genomes of many bacteria contain genes for the two families of conserved microcompartment proteins that form the polyhedral shells of the organelles. Among them, *Salmonella typhimurium typhi* (2) contains the unusual gene 0394, which appears to represent a fusion of the two microcompartment shell gene types. In this study, an expression construct of

Salmonella gene 0394 was generated in the vector pPROEX HTb. The resulting N-terminally His-tagged recombinant protein was insoluble, despite several attempts to optimize expression conditions. Through co-transformation of the *E. coli* host with pGroESL, a plasmid that expresses the GroEs/GroEL chaperone, a portion of the recombinant gene 0394 product was obtained in soluble form that is suitable for protein purification and further characterization.

2:30 Break

Special Session: *Adapting Molecular Tools and Techniques for Use in Marine Science*

02.17

2:45 DEVELOPMENT OF A NEW RNA EXTRACTION METHOD FOR DETECTING *NOROVIRUS* IN OYSTERS

Xunyan Ye, Shiao Y. Wang
University of Southern Mississippi

CDC reports that at least 50% of all foodborne outbreaks of gastroenteritis are due to noroviruses (NoV) and among seafood, oysters from contaminated waters is one of the most worrisome source. Although highly sensitive methods to detect NoV using RT-PCR are already available, isolation of either NoV RNA or virions from oysters remains a cumbersome process. We developed a new method to extract NoV RNA from contaminated oysters that is much faster compared to existing technology. The procedure includes an initial extraction of total RNA using TRIzol, followed by NoV RNA purification using a capture probe and then NoV detection by real-time RT-PCR. Using oyster homogenates spiked with 100 PCR detection units of NoV, the virus can be detected with Ct values less than 30. Compared to published methods that require an initial virus purification step, the new method is much faster to complete. Approximately 3 hr are needed to purify NoV RNA using the new method compared to at least 8 hr using conventional methods. Coupled with real-time RT-PCR, the new method can detect NoV in contaminated oysters within 8 hr.

02.18

3:00 VALIDATION OF LINEAR SINGLE CELL RNA AMPLIFICATION AMONG *KARENIA BREVIS* GENES AND IMPLICATIONS TO SINGLE CELL MICROARRAY ANALYSIS

David Jayroe, Tim McLean
University of Southern Mississippi

Karenia brevis is a toxic, photosynthetic, marine dinoflagellate that causes harmful algal blooms (HABs), also known as red tides, in the Gulf of

Mexico. It is hypothesized that blooms arise from an accumulation of cells, but bloom maintenance is a result of cellular growth and division. It is known that dinoflagellates reproduce asexually. It is not known, however, if and to what extent *K. brevis* reproduces sexually which hinders our understanding of the population structure of this species. In particular, we are interested in understanding what level of genetic diversity exists for a population of *K. brevis* cells within a bloom, as well as what level of diversity exists for cells between blooms in different parts of the Gulf of Mexico or that occur in different years? Using molecular tools such as quantitative polymerase chain reaction (qPCR) and microarray analysis, we aim to assess how genetically similar *K. brevis* cells are to one another based on qualitative (presence/absence) and quantitative (abundance) analyses of RNA transcripts. Single cell transcriptome amplification is a new technique that requires stringent controls to validate representative amplification and suitability for microarray application. qPCR will be used to validate the linear amplification. We plan to compare cells from the same strain, different strains (isolates), as well as within and between environmental populations (blooms). Our results will provide insight for better understanding *K. brevis* population structure and genetic capacity as well as aid in the forecasting/modeling of HABs.

02.19

3:15 IDENTIFICATION OF NON-CODING RNAs IN KARENIA BREVIS

Helen Namataka, Tim McLean
University of Southern Mississippi

Karenia brevis is a photosynthetic marine dinoflagellate that is responsible for the annual harmful algal blooms occurring along the West Florida Shelf and down several other shorelines along the Gulf of Mexico. The incidence and ecology of *K. brevis* blooms has been extensively studied yet more remains to be revealed about the molecular activities that sustain this microscopic alga. The molecular/genetic nature of dinoflagellates appears to be unique among eukaryotes. One such example of this nature is the perceived lack of transcriptional controls for gene regulation such as the core promoter consensus sequence, TATAAA. Analysis of the *K. brevis* transcriptome has revealed the presence of non-coding RNAs (ncRNA) that are complementary to a subset of mRNAs. We are characterizing the sequence and presence of the unique ncRNAs using ribonuclease protection assays (RPAs) and strand-specific PCR experiments. Subsequently, we will determine the potential functions of these ncRNAs within the transcriptome with regard to gene regulation

using coordinated transcript and protein detection under various culture conditions. The concurrent presence of these transcripts suggests possible mechanisms for translational control of gene expression in *K. brevis* and other related dinoflagellates.

02.20

3:30 TRACKING THE SOURCES OF FECAL POLLUTION IN COASTAL WATERS USING LIBRARY- INDEPENDENT METHODS

Christopher Flood, R.D. Ellender
University of Southern Mississippi

Our research examines the efficacy of using library independent methods and human specific organisms to monitor the water quality of the Mississippi Gulf Coast. The two organisms currently employed are *Methanobrevibacter smithii* and *Bacteroides* sp. *M. smithii* represents a methanogen that is commonly found in human feces and sewage. *Bacteroides* spp. are a major component of the intestinal flora in humans. In the future, the inherent survivability of these markers will also be examined with relationship to water temperature, salinity, and turbidity. Temporal spatial relationships of the two markers are considered with respect to the presence or absence at certain collection sites. The collection sites mirror the sites monitored by MDEQ and represent an area of the coast that is commonly used for recreational purposes, but is also frequently closed due to high indicator counts. An analysis of 12 months of coastal sampling contrasting the average enterococcal count at each sampling site, the percentage of times that the *M. smithii* marker appeared in each coastal sample, and the percentage of times that the *Bacteroides* marker appeared indicated that there was no statistical difference between the EN count and the percentages of either marker. An analysis of the enterococcal counts in creeks which drain into the beach environment revealed a significant difference between those coastal sites influenced by creek water versus those not influenced by creek water ($P=0.0531$). Our research indicates that these methods are valuable components for delineating sources of fecal pollution through host specificity.

02.21

3:45 DETECTION OF SALMONELLA spp. FROM MISSISSIPPI COASTAL WATERS AND SEDIMENT

R.D Ellender, Christopher Flood
University of Southern Mississippi

Traditionally, the examination of individual pathogens for assessment of water quality has not been employed. This is mainly due to the cost and time requirements required to perform the appropriate

morphological and biochemical analysis for positive identification of these pathogens. However, the employment of molecular analysis techniques supplemented with traditional techniques allows for more rapid and accurate identification. The main goal of this research is to determine if the marker stn, which codes for an enterotoxin gene specific for salmonella, is present within Mississippi Gulf Coast waters and creek systems, which flow into the Gulf. This research also is aimed at determining if the *Salmonella* marker is present within coastal sediments. Environmental factors, such as salinity, which may contribute to the presence/absence of *Salmonella* is also examined. Examination of salinity's effect on both laboratory grown and environmentally isolated *Salmonella* indicates a difference in the survivability of this pathogen within given concentrations of NaCl in situ. Understanding if a correlation can be made between indicator species and the presence of the stn marker has shown some success. Analysis of *Salmonella* subspecies in coastal waters and sediments using both traditional and genetic analysis has demonstrated that it is more frequently found in samples from freshwater creeks but is found infrequently in coastal waters. Future prospects include the exploration of different enrichment methods as well as different environmental effects.

O2.22

4:00 DETECTION OF N₂ FIXING CYANOBACTERIA WITH MOLECULAR TOOLS

Shanshan Ren, Karen Orcutt, Kjell Gundersen
University of Southern Mississippi, Stennis Space Center

Recent research has proven that microbial nitrogen fixation plays a critical role in the oceanic nitrogen cycle. Unicellular cyanobacteria have been found to be significant diazotrophs whose nitrogen fixation rates could be sometimes as high as or exceed those of the colonial marine cyanobacteria *Trichodesmium* spp. in marine ecosystems. Nitrogen fixation has been suspected in the Gulf of Mexico and low dissolved inorganic N/P ratios in the coastal zone of Mississippi Sound (by NGI) suggest that biological nitrogen fixation might be possible. Our preliminary studies observed numerous *Crocospaera*-like cells in the Mississippi Sound. Molecular analysis of diazotrophic community by detecting *nifH* and 16s genes using standard PCR confirmed the existence of unicellular diazotrophs in this region. Sequencing results showed a 97% similarity of environmental sample genes to *Synechocystis* sp., demonstrating that they are *Synechocystis* cells.

Quantum dots are semiconductive nanometer-

scale inorganic crystals. Unlike the widely used organic fluorophores, Qdots have unique properties such as high quantum yield, high molar extinction coefficients, high photostability, narrow emission spectra/broad excitation spectra which makes it possible to get a bright photoluminescence signal. Since marine microbial diazotrophs show bright autofluorescence, which can fade gradually under the UV light, the use of Qdot conjugates to label these cells is a promising way to detect marine unicellular microbial diazotrophs. We applied Qdot conjugated secondary antibodies associated with specific primary antibodies, and successfully detected nitrogenase and *IdiA* proteins in situ in highly autofluorescent cyanobacterial cells of the unicellular *Crocospaera watsonii* (WH8501) and the non-heterocystous *Trichodesmium erythraeum* (IMS101).

FRIDAY MORNING

DIVISIONAL POSTER SESSION

Exhibit Hall C

9:00a-11:30a

Authors should be available with their posters to answer questions between 10:15a and 11:30a

P2.01

CHARACTERIZATION AND FUNCTIONAL ANALYSIS OF A COTTON RING-TYPE UBIQUITIN LIGASE (E3) GENE

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

The ubiquitin-proteasome proteolysis pathway is responsible for the degradation of abnormal and short-lived proteins to regulate many important biochemical activities in eukaryotes. The pathway requires 3 enzymes, an ubiquitin-activating enzyme (E1), an ubiquitin conjugating enzyme (E2), and an ubiquitin ligase (E3). Using a cotton E2 (GhUBC1) as bait in a bacterial two-hybrid system, we have cloned a unique cotton fiber cDNA, GhRING1, encoding a RING type ubiquitin ligase. GhRING1 contains a RING finger domain with conserved cysteine and histidine residues and is classified as a C3H2C3-type RING protein. Real time RT-PCR analysis indicates that GhRING1 is expressed in cotton fibers in a developmental manner, suggesting that the ubiquitin-proteasome pathway plays an important role in fiber development. The GUS assay is performed to analyze tissue specificity of the GhRING1 promoter in transgenic *Arabidopsis* plants. The assay shows that the GhRING1 promoter is highly activated in stipules and anthers. In vitro auto-ubiquitination and reconstitution assays demonstrate that GhRING1 has the ubiquitin E3 ligase activity. A fiber specific lipid transfer protein 4

(FSltp4) is identified as the target substrate of GhRING1 by using the bacterial two-hybrid system. The interaction of GhRING1 and FSltp4 is further confirmed by a yeast two-hybrid system and an in vitro pull down assay.

P2.02

CONSTRUCTION OF AN OVEREXPRESSION VECTOR FOR GSH1 AND GSH2 IN THE PATHOGENIC FUNGUS, HISTOPLASMA CAPSULATUM

Lauren Matteo, Melissa Adams, Glen Shearer
University of Southern Mississippi

Histoplasma capsulatum is a dimorphic, pathogenic fungus, and the causative agent of the respiratory infection, histoplasmosis. *H. capsulatum* exists primarily as a multicellular mold in the soil, but converts to a unicellular yeast once in the lungs of a host. It is believed that sulfur metabolism plays a critical role in the dimorphic shift exhibited by *H. capsulatum*. Gamma-glutamyl cysteine synthetase (GSH1) and Glutathione synthetase (GSH2) are genes involved in the cysteine metabolism pathway, which are theorized to be major contributors to the dimorphism. This project involves the construction of an overexpression vector for GSH1 and GSH2 in order to determine their contribution to the transition from mold to yeast forms. To validate the overexpression, a flag tag sequence was inserted at the c-terminus and n-terminus ends of the genes. Studies are currently underway to place the overexpression vectors in *H. capsulatum* and observe any physiological or morphological differences from wild-type.

P2.03

A PLASMID CONSTRUCT FOR THE GENERATION OF A GREEN FLUORESCENT PROTEIN-TAGGED CARBOXYsome MUTANT OF HALOTHIOBACILLUS NEAPOLITANUS

Nickolas T. Whitehead², Balaraj B. Menon¹, Gordon C. Cannon¹, Sabine Heinhorst¹

¹*University of Southern Mississippi*, ²*Oak Grove High School*

The carboxysome is a primitive organelle found in all cyanobacteria and some chemoautotrophic bacteria, such as the sulfur bacterium *Halothiobacillus neapolitanus*. Its interior, which is bordered by a thin protein shell, is filled with the CO₂ fixing enzyme ribulose 1,5-bisphosphate carboxylase/oxygenase. The icosahedral protein shell is thought to be built from hexamers of the three related proteins CsoS1A, CsoS1B and CsoS1C, which form the facets of the icosahedrons.

Pentamers of CsoS4A and CsoS4B are believed to occupy the vertices of the structure. The three CsoS1 proteins are very similar; CsoS1A and CsoS1B differ in only two of their 98 amino acid components. CsoS1B is longer by 11 amino acids. To aid in locating CsoS1B in the carboxysome shell, a plasmid construct was designed that yields a CsoS1B-green fluorescent protein fusion protein. To prepare the construct for integration into the *H. neapolitanus* genome, a kanamycin resistance cassette was included that will permit selection of *H. neapolitanus* transformants.

P2.04

DETECTION OF *EHRlichia CHAFFEENSIS* IN THE MIGRATORY BIRDS

William D'Angelo, Parul Singh, Michael Sellers, Shahid Karim

University of Southern Mississippi

Ticks and tick-borne pathogens can be transported over large distances and across geographical barriers by avian hosts. During the spring migration of 2009, 30 blood samples were collected from the passerine birds from Bay you bird stop over observatory (LA). Blood collected from 30 birds were immediately stored in Lysis buffer and bacterial genomic DNA was extracted using Qiagen DNA extraction kit. We performed nested polymerase chain reaction using VLPT gene primers to amplify *Ehrlichia chaffeensis* in the migratory bird blood samples. We detected *E. chaffeensis* in 17/30 blood samples. The results of PCR assay using gene specific primers of other prevalent tick borne pathogens and *E. chaffeensis* will be presented.

P2.05

MOLECULAR CHARACTERIZATION OF TICK SALIVARY SYNTAXIN AND VTI PROTEINS

Kenneth Busby, Nasser Syed, Shahid Karim
University of Southern Mississippi

The Ixodoidea (ticks) are important vectors in the transmission of many human and veterinary diseases. The blacklegged tick, *Ixodes scapularis* is the major vector in the transmission of Lyme disease; the most frequently reported vector-borne illness in the United States. Tick saliva contains a broad array of secretory products facilitating prolonged tick attachment and feeding, and is the usual conduit for pathogens into hosts. Protein secretion into the saliva from the tick salivary glands is due to exocytosis of vesicular membrane bound granular material regulated by SNARE [soluble N-ethylmaleimide-sensitive factor attachment protein receptor] complex proteins. Proteins associated with vesicles, cytoplasm and target membrane are essential components of the exocytotic machinery in the tick salivary glands. Here, in an

attempt to better understand the physiological role of salivary SNAREs in the saliva secretion, Syntaxin isoform and Vti were cloned and expressed in bacterial expression vector. Recombinant proteins, Syntaxin (36 kDa) and Vti (34 kDa) were purified using a Ni-column for the generation of polyclonal antiserum. Syntaxin and Vti antibodies were used to localize endogenous salivary proteins in different developmental stages of tick glands. Considering the essential and central role of SNARE isoforms in the secretory pathways, we disrupted Syntaxin and Vti by RNAi in the female adult ticks. The functional role of selected SNARE proteins in secreting salivary proteins will be discussed in this poster.

P2.06

NYPH SEX DIMORPHISM IN *AMBLIOMMA AMERICANUM* AND *IXODES SCAPULARIS*

Chelsa Williams, Laila Ali, Shahid Karim
University of Southern Mississippi

Ticks are an ideal example of efficient ectoparasite that are able to steal blood, a rich source of nutrients, from their vertebrate hosts for prolonged periods of time. The tick life cycle is comprised of egg, larval, nymphal and adult stages. Nymphs are epidemiologically important stage that primarily involved in transmission of pathogens to the humans. In an attempt to develop a weight based sex differentiation tool for *in vitro* pathogen infections and RNAi in the adult female. The relationship between weights of engorged nymphs and their adult sexes in *Ixodes scapularis* and *Amblyomma americanum* was addressed in this study. Flat nymphs were fed to complete repletion on New Zealand white rabbits, weighed individually and divided into groups based on their weight, and kept until they molted. This suggests that nymphs of both species that become female presumably imbibe more blood than those that became male. To further confirm, we inoculated *Ehrlichia chaffeensis* in the bigger nymphs and held them for molting. Bacterial infection and RNAi delivery results in the engorged nymphs will be discussed.

P2.07

CLONING AND EXPRESSION OF A POTENTIAL CARBOXYSOME SHELL PROTEIN FROM *HALOTHIOBACILLUS NEAPOLITANUS*.

Cedric Crump¹, Abigail S. Newsome¹, Scott Walper², Gordon Cannon², Sabine Heinhorst²

¹Mississippi Valley State University, ²University of Southern Mississippi

Recently, the entire genome of *Halothiobacillus neapolitanus* was sequenced (Genbank

CP001801), and it was found that a gene located in close proximity to the group of genes that encode the carboxysome proteins codes for a protein that is related to the major carboxysome shell proteins. As a first step towards establishing the function of this gene and the relationship of its protein product to the carboxysome, the target gene was cloned into an expression vector with the goal of mass-producing the potential carboxysome shell protein it encodes in *Escherichia coli*. These goals were achieved by using PCR to amplify the gene. The amplified fragment was inserted into the pCR Blunt II-TOPO cloning vector. To create an expression construct the gene was excised from pCR-Blunt II-TOPO and placed in the expression vector pPROEXHTb. This plasmid was introduced into *E. coli* and protein expression was induced with IPTG. Gel electrophoresis revealed that the induced, but not the uninduced *E. coli* cells produced a protein of the expected size. This strategy allows for the purification and further analysis of the protein product.

P2.08

EFFECT OF BLEACH ON PLASMID DNA AND EXTRACTION OF DNA FROM HUMAN CHEEK CELLS

Keshia Dykes, Chancey Bass, Martha Johnson, Naomi Campbell

Jackson State University

The specific objective of this project was to quantify the amount of DNA damage in bleach treated samples. Criminals often use household bleach to remove biological evidence from crime scenes. Household bleach is approximately 2-6% sodium hypochlorite. Hypochlorite ions can induce 8-oxo-7, 8-dihydro-2'-deoxyguanosine (8-oxodG) formation in DNA. In this study, we observed the effect of household bleach on DNA. RF plasmid DNA and human cheek cells were exposed to household bleach at various concentrations (0%, 0.5%, 1%, 2%, 5%, 10%, 25%, and 50%) for 15 min at room temperature. The amount of DNA damage from the bleach treated samples was analyzed by comparing the mean and standard deviation for control samples versus treated samples. Our results showed that minimal DNA damage occurred at 0.5% (v/v) bleach, and more visible signs of DNA damage were observed at 1% (v/v) bleach. The DNA in all samples was completely degraded at a concentration of 25% (v/v) bleach. The amount of DNA extracted from human cheek cells treated with bleach decreased at the 0.5% (v/v) bleach level and we were unable to extract DNA after treating the cheek cells with 1% bleach for 15 min at room temperature. The use of bleach at crime scene would decrease the ability to extract usable DNA from biological samples for STR analysis.

P2.09**DYNAMIC LIGHT SCATTERING ASSAY FOR ULTRA-SENSITIVE DETECTION OF SALMONELLA IN WATER SAMPLES USING GOLD NANOROD**

Sunil Shukla¹, Paresh Ray², Charles Bland¹, Abigail S. Newsome¹

¹Mississippi Valley State University, ²Jackson State University

Three pathogens, Salmonella, Listeria and Toxoplasma, are responsible for 1,500 deaths each year. Salmonella is the most common cause of foodborne deaths and responsible for millions of cases of foodborne illness a year. Sources are raw and undercooked eggs, undercooked poultry and meat, dairy, products, seafood, fruits and vegetables. Early detection of foodborne pathogenic bacteria, especially Salmonella, is therefore an important task in microbiological analysis to control food safety. For sensitive and selective detection of Salmonella, we have developed a gold nanomaterial-based, dynamic light scattering assay for rapid detection of Salmonella in aqueous solution.

P2.10**A GENETIC MODIFIER SCREEN TO IDENTIFY REGULATORS OF THE NEURONAL FATE DETERMINANT *MIDLINE* IN THE EMBRYONIC CENTRAL NERVOUS SYSTEM OF *DROSOPHILA MELANOGASTER***

Sam Muller, Sandra Leal

University of Southern Mississippi

During embryonic CNS development in *Drosophila melanogaster*, transcription factors act in a combinatorial manner to specify neuronal fates. Presently, combinations of a small number of transcription factors including *even-skipped* (*eve*), *dHb9*, *Nkx6*, and *Lim*, have been shown to regulate the specification of motor neuron subtypes. However, these few transcription factors alone can not account for the diversity of hundreds of neurons generated within the CNS. Thus, to identify additional factors that regulate specific neuronal fates, we carried out a genetic screen and identified the T-box transcription factor *midline* (*mid*) as a new combinatorial code member. We find that *mid* represses the expression of *eve* in a small number of neurons and that *mid* interacts with *nkx6* to repress *eve* expression. Further expression analyses reveal that while *mid* is detected predominantly within interneurons, it exhibits minimal overlap with previously identified neuronal fate determinants expressed within either interneuron or motor neuron subtypes. We are currently undertaking two genetic

modifier screens to identify additional *mid*-interacting genes. The first screen will identify genes that modify the expression pattern of the *eve* mutant phenotype observed within *mid* mutant embryos. These embryos exhibit ectopic *eve*-expressing neurons within the lateral regions of the nerve cord. The second screen will identify genes that modify an adult eye mutant phenotype induced by targeting RNAi knockdown of *mid* in the developing eye imaginal disc. These screens will provide additional clues that will help us to decipher the genetic regulatory hierarchy in which *mid* functions to govern neuronal specification in the developing embryonic CNS of *Drosophila*.

P2.11**THE IDENTIFICATION OF A NOVEL GENE THAT REGULATES AXON GUIDANCE IN THE EMBRYONIC CNS OF *DROSOPHILA MELANOGASTER***

Jonathan Buchanon, David Merrill, Sandra Leal
University of Southern Mississippi

Central nervous system (CNS) development relies upon the ability of neurons to extend axons that interconnect precisely with their targets. As such, axonal guidance is a complex and dynamic mechanism that depends on a wide range of ligand-receptor complexes that regulate either axonal repulsion or axonal attraction towards a specific target. A discovery-based developmental biology research laboratory course (BSC 492 of Southern MS) involving undergraduates was initiated to identify novel genes regulating axonal guidance. In wild-type *Drosophila* embryos, Fasciculin II (Fas II) is a protein expressed in a stereotypic pattern within all axons of the CNS. This protein mediates the fasciculation of developing axons in the ventral nerve cord and plays a fundamental role in guiding axonal branching points throughout the CNS. By comparing the CNS expression pattern of Fas II among wild-type embryos with that of embryos carrying chromosomal deficiencies, we identified a number of probable gene candidates within a large genomic interval on the second chromosome that may be required to regulate proper axonal guidance. We obtained 28 mutant alleles or RNAi transgenic lines for the 28 probable gene candidates within the deleted chromosomal interval to determine whether one or more of these genes regulate axon guidance. Thus far, we have assayed 10 of these mutant alleles and found that the Fas II expression pattern was normal or essentially wild-type. We are currently assaying the Fas II expression pattern within the CNS of the remaining 18 mutant alleles to identify the novel gene(s) regulating axon pathfinding.

P2.12

PLACENTAL ISCHEMIA TRIGGERS IMMUNE ACTIVATION AS LEUKOCYTE OVERPRODUCTION OF SFLT-1: A STEP IN THE PATHOGENESIS OF PREECLAMPSIA?

Sarah Rutland, Babette LaMarca, Kedra Wallace, K TamTam

University of Mississippi Medical Center

OBJECTIVE: Placental soluble fms-like tyrosine kinase (sFlt-1) mRNA is increased in patients with preeclampsia. Leukocytosis frequently accompanies the onset of HELLP syndrome. Our lab has shown placental ischemia (PI) and circulating TNF- α to be important stimuli for sFlt-1 production during pregnancy. The objective of this study was to determine if leukocytes stimulated in rats with PI are a source of sFlt-1. **METHODS:** Sprague-Dawley rats were anesthetized on day 14 of pregnancy and underwent examination under anesthesia (NP) or reduced uterine perfusion pressure (RUPP) in which the lower abdominal aorta and both ovarian arteries (0.100mm ID clip) were chronically constricted. Rats were instrumented with a carotid catheter for arterial pressure measurement (MAP) on day 19. Plasma was collected and leukocytes were isolated utilizing Lymphoprep centrifugation technique. Leukocytes were cultured overnight in RPMI media containing, 1.022 ng/ml IL-2 and 4 ng/ml IL-12 at 5% CO₂ and 37°C. Cell culture media was removed and utilized in ELISA to determine sFlt-1. **RESULTS:** MAP increased from 102 +/- 1 mmHg in NP rats to 127 +/- 2 mmHg in response to PI in RUPP rats. Circulating sFlt-1 was 963 pg/ml in NP rats vs 1493 pg/ml in RUPP rats. In addition, sFlt-1 from NP PBL culture was 30 +/- 8 pg/ml. sFlt-1 from RUPP PBL culture increased significantly to 88 +/- 20 pg/ml (P < 0.01). **CONCLUSIONS:** The mechanisms whereby sFlt-1 over expression occurs during preeclampsia are not well defined. This study demonstrates that immune cells are activated during hypertension in response to PI to be a source for excess sFlt-1.

P2.13

PROLIFERATION OF UTERINE FIBROIDS FROM HYPERTENSIVE PATIENTS IS ASSOCIATED WITH INCREASED ENDOTHELIN-1

Evan Turnage, Kedra Wallace, Babette LaMarca
University of Mississippi Medical Center

Objective: Uterine leiomyomas (fibroids) are the most common tumor of the female reproductive tract and substantially reduce quality-of-life in women. A role for the vasoactive peptide, Endothelin-1 (ET-1), was recently demonstrated by other groups to inhibit apoptosis of leiomyoma cells in vitro. However, a role

for ET-1 in human leiomyoma proliferation is unknown. This study was designed to address the hypothesis that uterine fibroid proliferation is associated with production of the vasoactive peptide ET-1 which may serve as a link between uterine fibroid proliferation and the development of hypertension in women. **Design:** An in vitro model of fibroid and myometrium cultivation was used to determine if uterine fibroids are a source of ET-1 and if hypoxia exacerbates ET-1 secretion from uterine fibroids versus myometrium. **Materials and Methods:** Following hysterectomy, fibroids and myometrium are excised from uterus and plated on 6 well inserts. To induce hypoxia, cultures were placed in a modular incubator chamber. Two hours later, ET-1 was measured from cell culture supernatants. **Results:** A blood pressure increase was associated with an increase of ET-1 from fibroid versus myometrium. Moreover, in response to hypoxia fibroid ET-1 increased 2 fold. **Conclusions:** These data support the hypothesis that development of uterine fibroids is associated with hypertension. Furthermore, hypoxia stimulated changes in endothelial vasoactive factors from human uterine leiomyomas. These data suggest a possible link between mechanisms of blood pressure regulation and development of uterine fibroids in hypertensive patients.

P2.14

THE IDENTIFICATION OF A HOMOLOG OF THE EXTRACELLULAR MATRIX PROTEIN, hLAMP 1, IN 24HR-72HR ZEBRAFISH EMBRYO

Ambria McDonald, Allan Ray Sinning, Marianne Conway

University of Mississippi Medical Center

The cardiac extracellular matrix protein hLAMP-1 is part of a multi-component complex that initiates the transformation of endothelium into mesenchyme within the atrioventricular canal and proximal outflow tract of the heart. We have previously reported an 1183 base pair cDNA clone named KMS2 (accession # AY313452) that was isolated from a QCE-6 cDNA library. Sequence and BLAST analysis of this clone revealed no significant homology to previously published sequences. Primers from different regions of KMS2 were used in reverse transcription PCR (RT-PCR) to isolate the chick sequence of hLAMP-1. The initial clone was a 424 bp clone. Subsequent analysis by 3' RACE extended this clone to 1021bp (accession # EF424417). We report here the identification a zebrafish homolog of hLAMP-1. Primers from KMS2 were used in RT-PCR of 24-72 hour zebrafish embryos and identified an approx 400 bp clone that was homologous to the chick and quail sequences. We are currently performing 3' RACE to extend these sequences to the poly A tail and in situ hybridization of

both whole mounts and tissue sections to determine the expression characteristics of these clones in situ. If confirmed, transgenic animals from these animals that contain known heart defects will be screened for disruption in the expression of hLAMP-1.

P2.15

PATHOGENESIS OF STREPTOCOCCUS SANGUINIS KERATITIS IN RABBIT MODEL

Anna Oguhebe¹, Mary Marquart¹

¹*University of Mississippi Medical Center,*

²*Vanderbilt University*

Two clinical ocular strains of *S. sanguinis*, designated 613 and 1006, were used to infect the corneas of New Zealand white rabbits at an inoculum of 10^5 colony-forming units (CFUs) per cornea. Clinical examination of the infected eyes was performed 24 to 72 hours post-infection for strain 613 and 24 to 48 hours for strain 1006. Rabbits were euthanized following the final examination. Corneas were then excised, homogenized, and analyzed for the number of CFUs each contained. Cellular extract was prepared and injected within the corneas of rabbits to observe possible pathogenic effects of potential virulence factors. To isolate virulence factors, proteins from the cell extract were precipitated with ammonium sulfate and then concentrated by centrifugation and suspension in a minimal volume of PBS. The concentrated proteins were then applied to a Sephacryl S300 gel filtration matrix for fractionation. Individual fractions were analyzed by SDS-PAGE and were injected into the corneas of rabbits. Strains 613 and 1006 both caused keratitis in the corneas but strain 1006 caused corneal epithelial erosions. The average \log_{10} CFUs of bacteria recovered from corneas infected with strains 613 and 1006 were 4.88 ± 0.53 and 8.16 ± 0.12 , respectively. Moreover, the cell-free extract from strain 1006 caused corneal epithelial erosions. Strain 1006 caused a more severe keratitis than strain 613. Cell extract of strain 1006 contained a 54 kDa virulence factor that generated erosions. For future studies, this 54 kDa protein will be sequenced and analyzed by database searches for homology to *S. sanguinis* proteins.

P2.16

CULTURAL AND PHYSIOLOGICAL CHARACTERISTICS OF CARYOPHANON LATUM, A FILAMENTOUS BACTERIUM

Mack Felton, Nicole Henderson, Louis Hall, Abigail Newsome

Mississippi Valley State University

Caryophanon latum, is an unusually large prokaryote that is capable of exhibiting different morphological shapes while growing in liquid media. It is dependent on acetate for its carbon source. Three types of media were used with varying concentrations of acetate to produce cultures showing spheroids or trichomes. The different types of broth were Enriched *Caryophanon* Media (ECM), Peptone Yeast Extract (PYA), and Peptone Yeast Extract 1/10 Acetate (PYA 10). There were instances when acetate concentrations were changed in each type of media. Enriched *Caryophanon* Media contained acetate concentrations of 5g/l, 1.25g/l, 0.313g/l, 0.156g/l and no acetate grams/l. Peptone Yeast Extract Media contained acetate concentrations of 5g/l, 1.25g/l, 0.625g/l, 0.313g/l, 0.156g/l. PYA/10 contained acetate concentrations of 0.5g/l. All media used in this investigation were pH adjusted to 7.3. There was a correlation between the acetate concentration in the media and the number of spheroids and trichomes formed and microscopically observed. The higher the acetate concentration, the more trichomes observed in the sample, and the lower the concentration of acetate, the more spheroids were observed. These observations used in further investigations of the organism's cultural and physiological characteristics, which will help to eventually lead to a decision as to whether the organism is suitable to use as a genetic model.

FRIDAY AFTERNOON

Exhibit Hall A

O2.24

1:30 EFFECT OF ENVIRONMENTAL FACTORS ON REGULATION OF BIOFILM BY MSA IN STAPHYLOCOCCUS AUREUS

Gyan Sahukhal, Antony Schwartz, Mohamed Elasri
University of Mississippi

MSA is a putative membrane protein with three membrane spanning regions that might be involved in interaction with the environment for biofilm formation. Previous findings in our lab showed that *msa* regulates the expression of several genes and biofilm formation. Indeed, the *msa* mutant forms a weak and unstable biofilm. The *msa* mutant is able to adhere to surfaces and initiate biofilm but fails to form mature biofilm indicating that the mutant has some defect during later stages of accumulation. To further our understanding of the *msa* mutant's biofilm defect we have studied the role of several environmental factors on the *msa* mutant. Our preliminary results showed that addition of different concentration of salt, glucose and ethanol increased biofilm formation

by msa mutant. The biofilm was also found to be induced under anaerobic condition. The biofilm produced by msa mutant was found to be more susceptible to sodium metaperiodate, DNaseI and proteinaseK treatment than the wild type strain indicating the importance of polysaccharide intercellular adhesins (PIA), extracellular DNA (eDNA) and protein factors in biofilm formation by the msa mutant.

02.25

1:45 ROLE OF MSA IN ANTIBIOTIC RESISTANCE IN STAPHYLOCOCCUS AUREUS

Mieu Brooks, Antony Schwartz, Mohamed Elasri
University of Southern Mississippi

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a pathogen that can cause community and hospital-acquired infections. Their resistance to oxacillin and vancomycin, which are modified antibiotics that are less susceptible to β -lactamase, makes them a high concern in healthcare. Research in our laboratory shows that msa gene is a global regulator of virulence genes. Interestingly, mutation of msa in an MRSA strain reduces susceptibility to β -lactam antibiotics including oxacillin and methicillin. To define the role of msa in antibiotic resistance, we have performed antibiotic susceptibility on an MRSA strain, the msa mutant, and the complement msa mutant. The antibiotics used in this study were oxacillin, vancomycin, and methicillin. Minimal inhibitory concentrations (MIC) and the minimal bactericidal concentration (MBC), were determined for each strain. This study is a prelude to defining the role of msa in antibiotic resistance and the mechanism of action of this regulation.

02.26

2:00 REGULATION OF CYCLO-OXYGENASE-2 BY P38MAP KINASE IN MOUSE EMBRYONIC STEM CELLS

Suja Rajan, Samujwal Chakraborty, Yan-Lin Guo
University of Southern Mississippi

Cyclooxygenase-2 (Cox-2) is a key enzyme for the synthesis of prostaglandins, a group of bioactive molecules that regulate a wide range of physiological and pathological processes. In fully differentiated somatic cells, Cox-2 is stimulated by growth factors, cytokines and various stress stimuli. However, we do not know if it plays any developmental role in embryogenesis. In this study, we demonstrate that, unlike in most somatic cells where Cox-2 is minimally expressed in unstimulated cells, mouse embryonic stem cells (ESCs) constitutively express high level of Cox-2 in the absence of stimulation. Furthermore, Cox-2 expression in ESCs is not affected by TNF- α (tumor

necrosis factor- α), PMA (phorbol-12-myristate-13-acetate), and bFGF (basic fibroblast growth factor), all of which are potent Cox-2 inducers in differentiated cells. However, Cox-2 in ESCs is significantly upregulated by a protease inhibitor MG132. Using approaches combined with a pharmacological inhibitor and p38 α knockout ESCs, we demonstrate that the p38 MAP kinase pathway, but not the NF- κ B, ERK or JNK pathways, is required for MG132 induced Cox-2 expression. Our results suggest that ESCs have developed functional Cox-2/prostaglandins biosynthesis system, but it is regulated in a manner that significantly differs from that in fully differentiated somatic cells.

02.27

2:15 THE [URE3] PRION OF BAKER'S YEAST IS DISADVANTAGEOUS WHEN PRION-CONTAINING YEAST ARE IN DIRECT COMPETITION WITH PRION-FREE YEAST.

Samantha McCorkle, Katie Brinkman, Ross Whitwam
Mississippi University for Women

The [URE3] prion of *Saccharomyces cerevisiae* is used as a model for mammalian prions. The [URE3] prion is infectious and forms amyloids, similar to mammalian prions, but, unlike its mammalian counterparts, the [URE3] prion is not associated with any disease state. It has been assumed that the presence of the [URE3] prion slows yeast growth, and this might be considered analogous to a disease state, but the evidence supporting this is slim and largely empirical. We directly compared growth rates of isogenic prion-containing [URE3] yeast and prion-free [ure-o] yeast and found that, when grown apart, their growth rates were identical in both nutrient-rich and in minimal media. The [URE3] prion, contrary to conventional wisdom, does not slow yeast growth. However, when isogenic [URE3] and [ure-o] yeast are grown in direct competition in the same culture, the growth of the [ure-o] yeast reproducibly outpaces that of the [URE3] yeast. This is the first direct evidence that the [URE3] prion confers a fitness disadvantage to [URE3] yeast and that the [URE3] state is in some ways a true disease state for the yeast.

02.28

2:30 RECOMBINANT EXPRESSION OF THE SMALL SUBUNIT OF RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE/OXYGENASE

Evan Roberts, Balaraj Menon, Sabine Heinhorst,
Gordon Cannon

University of Southern Mississippi

Carboxysomes are polyhedral bacterial microcompartments found in cyanobacteria and certain chemoautotrophs. These primitive organelles consist of a thin protein shell that surrounds the CO₂ fixing



enzyme ribulose-1,5-bisphosphate –carboxylase/oxygenase (RubisCO). Co-compartmentalization of RubisCO with a shell-associated carbonic anhydrase ensures an adequate supply of its substrate, CO₂, and enhances the catalytic efficiency of the enzyme. The RubisCO holoenzyme consists of eight copies each of a large (CbbL) and a small (CbbS) subunit. While CbbL is highly conserved among RubisCO-containing organisms, CbbS is unique to each species. Consequently, purification and isolation of the CbbS protein could give valuable insight into its role in CO₂ fixation. In this project, an expression construct was generated for CbbS from the carboxysome-containing sulfur bacterium *Halothiobacillus neapolitanus*. Induction of protein expression was confirmed by SDS-PAGE and mass spectrometry analysis. However, it was found that recombinant CbbS was insoluble. To increase protein solubility, the *E. coli* expression host was co-transformed with an expression construct of the Gro-ESL chaperonin complex. Recombinant CbbS protein was purified by affinity chromatography and used for the production of polyclonal antibodies. The hexa-histidine tag on CbbS will be used for pull-down assays to identify carboxysome shell proteins that interact with CbbS.

O2.29

2:45 CHARACTERIZATION OF TRANSCRIPTION FACTORS THAT BIND TO THE MOLD SPECIFIC GENE, M46, IN THE DIMORPHIC PATHOGENIC FUNGUS *HISTOPLASMA CAPSULATUM*

Davida Crossley, Glen Shearer

University of Southern Mississippi

Histoplasma capsulatum is the etiologic agent for the respiratory disease histoplasmosis which infects 500,000 Americans each year. The dimorphic fungus grows in the soil as a multi-cellular mold. Once the soil is disturbed, spores are released and inhaled into the lungs. In the lungs, the fungus converts to a unicellular yeast. The mold-to-yeast conversion is a requirement for pathogenesis. Therefore, to understand the molecular basis of dimorphism, we have isolated several mold and yeast-specific genes. The subject of this study is the mold-specific M46 gene. 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 is being studied. The putative protein sequence of all four strains is highly conserved. Fusion of the reporter Gene, GFP to each of the four Hc promoters has shown that all four strains has a functional M46 promoter. Therefore, we now hypothesize that the reason for lack of expression

of M46 in strains G184AS and G217B may be due to a missing or non-functional trans-regulating factor(s). The presence of the trans-regulating factors, will be determined by gel shift and south western blot analysis. Comparison of electrophoretic mobility shifts of DNA-protein complexes from the expressing and non-expressing M46 stains may give insight on the reason for lack of expression. A south western blot will estimate the size of the transcription factor(s) that bind M46. Future work will consist of identifying the transcription factors.

3:00 Break

3:15 Division Business Meeting

CHEMISTRY AND CHEMICAL ENGINEERING

Chair: Karl Wallace,
University of Southern Mississippi
Vice-chair: Ramaiver Venjatrman,
Jackson State University

THURSDAY MORNING Lakeview 2

Session 1

Chair: Dr. Karl J. Wallace

8:50 Introduction and Welcome

O3.01

9:00 A NEW ELECTROGENERATED CHEMILUMINESCENT IMMUNOSENSING SYSTEM FOR DETECTION OF C-REACTIVE PROTEIN

Thomas Maestri, Shijun Wang, Wujian Miao
University of Southern Mississippi

Anodic electrogenerated chemiluminescence (ECL) with tri-n-propylamine (TPrA) as a coreactant was used to determine C-reactive protein (CRP) by immobilization on aldehyde-activated US450 paper membrane using tris(2,2'-bipyridyl) ruthenium (II) (Ru(bpy)₃²⁺) labels in a sandwich-type antibody-antigen system. Binding of the anti-CRP protein to the membrane occurred by forming a weakly-bonded Schiff base at the N-terminus of the protein. In order to form a stable bond to membrane, the protein was reduced to a secondary amine with a NaCNBH₃ reducing agent. To detect and enhance the amount of binding of the protein to the membrane, FTIR spectra of several membranes

were collected to determine that the greatest amount of binding to the surface occurred after reduction in a slightly basic (pH 9.5) buffer solution. To determine the amount of binding to the membrane, the ratio of the protein peak ($\sim 1638 \text{ cm}^{-1}$) to the membrane peak (1576 cm^{-1}) was compared. The results showed a 9.2% increase in binding to the membrane of the protein in pH 9.5 sodium borate solution as opposed to a pH 7.5 PBS buffer solution; binding was also 15.7% higher in a membrane where the Schiff base was reduced compared to one that remained unreduced. ECL detection of CRP through the sandwich-type system was found at an intensity of 0.6 nA for a $1.0 \mu\text{L}$ solution of CRP. Future work will be to find a linear increase in ECL intensity to CRP concentration.

O3.02

9:20 DETERMINATION OF HEAVY METALS IN WATER SAMPLES BY ICP-AES USING YEAST (*Yamadazyma spartinae*) IMMOBILIZED ON Al_2O_3 NANOPARTICLES

Sitki Baytak², Zikri Arslan¹

¹Jackson State University, ²Nevsehir University, Nevsehir, Turkey

Microorganisms, including yeast, bacteria and fungi immobilized enable extraction of trace metals from numerous samples when immobilized on natural and synthetic support materials. The process involves a combination of active and passive transport mechanisms, and are generally classified into two divisions as biosorptive (passive) uptake by non-living biomass and bioaccumulation by living cells. Here, a solid phase extraction procedure based on biosorption of Co, Cu, Fe, Mn and Zn on yeast (*Y. spartinae*) loaded on a solid phase of Al_2O_3 nanoparticles. Column contained 100 mg of nano Al_2O_3 with average particle size of 50 nm. Determinations were made by ICP-AES. The conditions including pH, solid-phase mass, flow rates, eluent type and sample volume were examined for the quantitative recovery. Cu and Fe were retained at pH 6 while Co, Mn and Zn were retained at pH 8. Elution was performed with 2 mL of 5% HNO_3 . The recoveries of Co, Cu, Fe, Mn and Zn were $100 \pm 2\%$, $98 \pm 2\%$, $100 \pm 2\%$, $98 \pm 2\%$ and $99 \pm 2\%$, respectively for spiked water samples. The enrichment factor when using a sample volume of 500 mL was 250 for all metal ions. The detection limits for Co, Cu, Fe, Mn and Zn were 1.4, 1.6, 0.6, 1.3 and 0.6 ng/mL before enrichment respectively. The method was validated by analysis of the standard reference material of water and then applied to tap water and lake water samples.

O3.03

9:40 ELECTRONIC PROPERTIES OF SQUARINE DYES

Thomas Grant White, Karl J. Wallace

University of Southern Mississippi

The coordination chemistry of heavy metals, for example, Fe^{3+} , Pb^{2+} , Cd^{2+} , Hg^{2+} , and Zn^{2+} , is of current interest, in part, because of their hazards and toxicity in biological, industrial, and agricultural applications. One such dye that has started to appear in the literature is the squaraine class of molecules. These dyes have some unique physical properties. For example, their absorbance typically falls in the visible to NIR region of the spectrum and they also have high extinction coefficients. This property is a very attractive one in sensor design, and is desirable for integration with optical instrumentation. A series of squaraine dyes have been synthesized and their optical properties (UV-VIS and Fluorescence Spectroscopy), and their electrochemical behavior (cyclic voltammetry, and electrogenerated chemiluminescence) has been investigated. The effect of these squaraine dyes towards acid (HCl), base (DBU), and transition metals (for example Fe^{3+} , Zn^{2+}) will be reported. It has been shown that the dye molecules undergo a structural or conformational change resulting from the respective protonation, deprotonation, or transition metal chelation. The electronic properties of these unique chromophores will be discussed.

O3.04

10:00 FUNDAMENTAL THERMOCHEMICAL PROPERTIES OF AMINO ACIDS: GAS PHASE HEATS OF FORMATION AND ACIDITIES

Michele Stover¹, David Dixon², Virgil Jackson², Myrna Matus²

¹William Carey University, ²University of Alabama

Building on prior work on glycine, glutamic acid, and aspartic acid^{1,2}, the goal of the current work is to provide reliable thermodynamic values for amino acids. The gas phase acidity is the free energy ΔG_{acid}

for the reaction $\text{AH} \rightarrow \text{A}^- + \text{H}^+$. The acidities of the remaining amino acids including histidine, leucine, lysine, methionine, phenylalanine, tryptophan, tyrosine, serine, and valine have been predicted using high level electronic structure theory at the composite G3(MP2) level. A broad range of structures of the neutral compounds were studied to determine the lowest energy conformer with the strongest hydrogen bonding. Anions were created by removing protons at different sites including the important $-\text{CO}_2\text{H}$ and NH groups. The calculated gas-phase acidities (GA°) were obtained by using molecular orbital theory at the G3(MP2) level and density functional theory at the B3LYP/DZVP2 level.

Hydrogen bonding plays an important role in the acidities. The heats of formation of the neutral compounds were calculated from atomization energies and isodesmic reactions to provide the first reliable set of thermodynamic properties of the amino acids in the gas phase.

1. "Electronic structure and bonding of the amino acids containing first row atoms." Dixon, D. A.; Lipscomb, W. N. *J. Biol. Chem.* 251, 5992-6000 (1976).

2. "Comprehensive Density Functional Theory Study on Serine and Related Ions in Gas Phase: Conformations, Gas Phase Basicities, and Acidities", Miao, R., Jin, C., Yang, G., Gong, J., Zhao, C., and Zhu, L. *J. Phys. Chem. A*, 109 (10), 2340-2349 (2005).

O3.05

10:20 SELECTIVE DETECTION OF TRIACETONE TRIPEROXIDE USING ELECTROGENERATED CHEMILUMINESCENCE

Suman Parajuli, Wujian Miao

University of Southern Mississippi

The electrogenerated chemiluminescent (ECL) route of detection of triacetone triperoxide (TATP) involves hydrogen peroxide formation which on reduction produces hydroxyl radicals. This radical is a very strong oxidant and can react with $\text{Ru}(\text{bpy})_3^+$ (formed at the electrode by electrochemical reduction) to generate the excited state $\text{Ru}(\text{bpy})_3^{2+*}$ that emits light. The potential source of hydrogen peroxide is the cleaning detergent which could give false positive result for the detection of TATP. The catalase enzyme could decompose H_2O_2 from the sample and avoids false positive results making it possible to detect TATP selectively in the presence of trace amounts of H_2O_2 . Also TATP could be selectively detected in the other common peroxide-based explosives (e.g., hexamethylene triperoxidediamine, HMTD) with ECL as TATP produces light upon the cathodic scanning whereas HMTD can produce light upon either the anodic potential scanning or cathodic potential scanning.

10:40 Break

Session II

Chair: Dr. Ramaiyer Venkatraman

O3.06

10:50 SYNTHESIS, CHARACTERIZATION, AND ELECTROCATALYTIC ACTIVITY OF NOVEL RUTHENIUM(II)-CONTAINING HYDROGEN PRODUCING PHOTOCATALYSTS.

Nerissa Lewis¹, Toyketa Horne², Dorothy Horton¹, Jason Olaivar¹, Alvin Holder¹, David Tiede³
¹University of Southern Mississippi, ²Alcorn State University, ³Argonne National Laboratory

The main theme in this project was to develop and test the hydrogen-producing capacity of some novel complexes that bear a photosensitizer (a ruthenium(II) metal center) and a catalytic metal center {Co(II) or Ni(II)}, all in one molecule. Several novel complexes bearing mixed-metal centers were synthesized and characterized. Two reactions between $[\text{Ru}(\text{pbt})_2(\text{L-pyr})](\text{PF}_6)_2$ (where pbt = 2-(pyridine-2yl)bezo[d]thiazole and L-pyr = 2-pyridin-4-yl-1-oxa-3,7,8-triaza-cyclopenta[1]phenanthrene) and $[\text{Ni}_2(\text{dmgBF}_2)_4]$ (where $\text{dmgBF}_2 =$ difluoroborondimethylglyoximate) produced mixed-metal complexes with ruthenium(II) and nickel(II) metal centers in good yields. The reaction between $[\text{Ru}(\text{N-N})_2(\text{L-pyr})](\text{PF}_6)_2$ (where N-N = 1,10-phenanthroline, 4,4'-dimethyl-2,2'-bipyridine, and 2-(pyridine-2yl)bezo[d]thiazole (pbt); and L-pyr = 2-pyridin-4-yl-1-oxa-3,7,8-triaza-cyclopenta[1]phenanthrene) and $[\text{Co}(\text{dmgBF}_2)_2(\text{OH}_2)_2]$ produced mixed-metal complexes with ruthenium(II) and cobalt(II) metal centers, viz., $[\text{Ru}(\text{N-N})_2(\text{L-pyr})\text{Co}(\text{dmgBF}_2)_2(\text{OH}_2)](\text{PF}_6)_2$ in good yields.

All complexes were characterized by UV-visible, ¹H NMR, and EPR spectroscopy, and cyclic voltammetry, where appropriate. Cyclic voltammograms with acetonitrile as a solvent exhibited reversible waves for the redox processes, $\text{M}^{\text{II/I}}$ and $\text{M}^{\text{I/0}}$ (where M = Co or Ni) for all complexes. In the presence of the p-cyanoanilinium cation (as a source of H^+ ions), $[\text{Ru}(\text{pbt})_2(\text{L-pyr})\text{Co}(\text{dmgBF}_2)_2(\text{OH}_2)](\text{PF}_6)_2$ and $[\text{Ru}(\text{pbt})_2(\text{L-pyr})\text{Ni}(\text{dmgBF}_2)_2](\text{PF}_6)_2$, induced electrocatalysis of H^+ ions during a cyclic voltammetric process to generate hydrogen gas in the acetonitrile. From these results, it can be concluded that these mixed-metal complexes have potential to be efficient photocatalysts which will be used to produce hydrogen from water on irradiation of these complexes in the presence of H^+ ions in aqueous solution.

03.07

11:10 SPECIATION OF MERCURY IN FISH OTOLITHS BY COLD VAPOR GENERATION ATOMIC ABSORPTION SPECTROSCOPY

Erda Kenduzler², Melanie McHenry¹, Zikri Arslan¹

¹ Jackson State University, ² Mehmet Akif Ersoy University, Burdur, Turkey

Fish otoliths are composed of mainly calcium carbonate that deposit in layers on protein matrix. The trace elements originating from the water of the fish's environment accumulate in the otoliths throughout the life of fish. The elemental signatures of these elements are used as powerful tools in fishery to understand population dynamics, mixing issues and to identify essential nurseries. Mercury has not been utilized yet in such studies due to the detection problems at low levels. It is however known that inorganic Hg accumulates in fish to substantial levels and methylated within the tissues. To date there is no information about the levels of Hg and mercury species in the otoliths of fish. In this study we developed a methodology to achieve identification and quantification Hg species in otoliths to elucidate possible pathways of incorporation of this element. Cold vapor generation has been used as a highly sensitive technique for detection. The conditions for selective generation of Hg vapor from inorganic Hg and methyl Hg were optimized in HCl medium. The effects of various oxidizing agents, including potassium ferricyanide, potassium permanganate, cerium nitrate, were used to convert CH₃HgCl to inorganic Hg. The latter afforded rapid conversion of CH₃HgCl to Hg²⁺.

Stannous chloride allowed reduction of Hg²⁺ to Hg vapor while NaBH₄ was essential in reduction of species from methyl Hg. Under the optimum conditions, the detection limits were around 40 ng/L Hg. Preliminary results indicated that Hg was mainly in methylated form in the otoliths.

03.08

11:30 N-SUBSTITUTED 1,8-NAPHTHALIMIDES AS FLUORESCENCE PROBES

Wolfgang Kramer, Irene Corrao, Anna Allred, Jeral Self

Millsaps College

Naphthalenediimide derivatives have been of interest due to their fluorescent and DNA intercalating properties. Naphthalimides have also been evaluated for photodynamic therapy but high cytotoxicity posed a problem in phase I and phase II trials. Phenyl substituted 1,8-naphthalimides have a fluorescence quantum yield of 0.3. The fluorescence is

strongly depending on the solvent. Polar protic solvents lower the ISC rate by raising the energy of the second excited triplet state and lowering the energy of the first excited singlet state. The fluorescence quantum yield consequently increases dramatically. Substitution with electron donors can result in fluorescence quenching by electron transfer. Aliphatic amines have been used to as pH-dependent fluorescence quencher. In addition, anion binding moieties have been used to create INH-logic gates in combination with amines.

In our studies with nitrogen onium salts we have investigated the influence of aromatic amines with variable spacers and different oxidation potentials. Pyridines were connected to the naphthalimide nitrogen via methylen spacers. The pyridine substitution pattern does strongly influence the naphthalimide. N-oxidation converts pyridine into its electron-rich N-oxide which much more efficiently quenches the naphthalimide fluorescence. N-alkylation reduced the electron density and thus increases fluorescence. This talk describes the fluorescence changes of 1,8-naphthalimide linked pyridines in different environments as well as their use as fluorescence probes responsive to pH and oxidation state.

11:50 Lunch

THURSDAY AFTERNOON Lakeview 2

Symposium: Chemicals in the Environment, Sensing and Remediation

Chair Dr. Karl J. Wallace

03.09

1:30 BINDING AND SELECTIVITY ASPECTS OF ANIONS WITH SYNTHETIC RECEPTORS

Md. Alamgir Hossain

Jackson State University

The field of anion coordination chemistry emerged in 1968 with the discovery of diazabicyclic compounds, known as katapinands, by Park and Simmons [1]. 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 [2]. During the last two decades, this area has been progressed significantly, and a variety of synthetic receptors have been reported that show high binding affinity and selectivity for common inorganic anions. Among the different classes of anion receptors, polyaza macrocycles are widely investigated systems for the binding of a variety of anions in both solution and solid states[3]. The protonation ability of amino groups



makes them effective for anion binding through hydrogen bonding interactions. In an attempt to synthesize selective anion receptor for environmentally important anions, we synthesized both macrocyclic and macrobicyclic compounds from the schiff's base condensation of amines and corresponding aldehyde followed by sodium borohydride reduction. The synthesized receptors have been studied for both halide and oxoanions in both solution and solid states. Details of the synthetic procedures, NMR binding studies, and solid state structures will be discussed in this talk. References: [1]. Park, C. H.; Simmons, H. E. J. Am. Chem. Soc. 1968, 90, 2431. [2]. Bell, R. A.; Christoph, G. G.; Fronczek, F. R.; Marsh, R. E. Science, 1975, 190, [3]. Hossain, M. A. Curr. Org. Chem., 2008, 12, 1231.

O3.10

2:15 DEVELOPMENT OF A NEXT GENERATION SENSOR FOR MEASURING BIOLOGICALLY AVAILABLE IRON IN SEAWATER

Karen Orcutt¹, Karl Wallace¹, Mark Wells¹

¹University of Southern Mississippi, ²University of Maine

There is increasing evidence that iron is important not only in the regulation of bulk phytoplankton production in large regions of the world oceans, but that it also profoundly influences the speciation of algae within the phytoplankton assemblage. The broad implications resulting from these dual effects range from impacts on the global carbon cycle to the possible stimulation of harmful algal blooms. There is a strong need for ultra-sensitive, real-time monitoring and detection technologies that capture the reactive iron pool in seawater that is available to eukaryotic phytoplankton. We present preliminary work on the development of a novel photoactive nanosensor to measure the chemically reactive iron in seawater that builds on our previous work using a liposome-based nanodevice. The nanosensor will be based on Probes Encapsulated by Biologically Localized Embedding (PEBBLE) technology. This approach uses a combination of Time Resolved fluorescence (TRF) and Fluorescence Resonance Energy Transfer (FRET) to greatly amplify the signal to achieve the picomolar level sensitivity needed to study iron in both coastal and offshore waters.

3:00 Break

O3.11

3:15 MOLECULAR GOLD NANOCCLUSERS: ATOM BY ATOM DESIGN

Amala Dass

University of Mississippi

Molecular gold nanoclusters such as Au₂₅(SR)₁₈, Au₃₈(SR)₂₄, Au₆₈(SR)₃₄, Au₁₀₂(SR)₄₄ and Au₁₄₄(SR)₆₀ contain a distinct number of core gold atoms and surface thiolate ligands. Synthesis, spectroscopic and mass spectrometric characterizations (MALDI-MS and ESI-MS) of these nanoclusters will be discussed. The specific topics include a) mass spectrometric identification of Au₆₈(SR)₃₄; (b) Size evolution in Au₂₅ synthesis; and (c) geometric stability of molecular gold nanoclusters.

O3.12

4:00 MEMS CHEMICAPACITIVE CHEMICAL SENSOR SYSTEMS

Todd Mlsna

Mississippi State University

We have been developing chemical sensors that use polymer filled micromachined capacitors to measure the dielectric constant of an array of selectively absorbing materials. Capable of detecting vapors of organic compounds and inorganic gases, each device has ten sensors on a single chip, with different coatings for redundancy and interferent rejection. We have developed MEMS sensors for gas-phase analytes including volatile organic compounds (VOCs), chemical warfare agents (CWA), toxic industrial chemicals and materials (TICS & TIMS), emission gases and hydrogen. The compact size, low power consumption, and low cost of these sensors make them ideal for integration into varied packages for numerous applications. Portable sensor and chemical separation systems are needed for defense and civilian monitoring applications. With recent advances in microfabrication, these systems have achieved capabilities comparable to analytical equipment in laboratories for some applications. We have developed and tested several prototypes that utilize our MEMS sensors with varied configurations. Our most advanced is a miniature gas chromatograph that is compatible with the restrictive size, power and weight limits needed for use in the field or in many industrial monitoring situations. This system can operate with multiple detectors including our polymer-filled, micromachined capacitors. In front of the detector we have built a device containing an air or liquid injection sampling mechanism, a chemical preconcentrator and a chromatographic capillary column. This small system is capable of separating and detecting many target analytes such as common volatile

organic compounds, solvents and chemical warfare agents.

4:45 Closing Remarks

THURSDAY EVENING

Dodgen Poster Session

Exhibit Hall C

Posters on display, 6:00p – 7:00p

Posters must be put up between 4:30p – 5:00p

P3.01

XRF ANALYSIS OF RUBBER PIGMENT ASH USING COMPTON SCATTER MATRIX ABSORPTION CORRECTIONS

Charles Smithhart, Linsey Giachelli

Delta State University

Ash samples were obtained from twenty-four commercial rubber pigment additive packages using an ASTM procedure. XRF spectra of the ashes were collected using a Spectrace 5000 EDXRF spectrometer equipped with a rhodium target X-ray tube. Two NIST standard reference materials were analyzed under the same conditions for calibration and control purposes. Semi-quantitative elemental abundances were obtained by comparing the measured Rayleigh /Compton peak intensity ratios from the ashes to those of one NIST standard. Using another NIST SRM as a control, the results indicated that this method is suitable for quick and accurate semi-quantitative analyses of rubber pigment ash as long as considerations are made for absorption edge effects.

P3.02

EXPRESSION AND CHARACTERIZATION OF RECOMBINANT HUMAN GRANULIN-A (hGrn A) AND ITS POTENTIAL INTERACTIONS WITH AMYLOID- β (A β) PEPTIDE IN ALZHEIMER'S DISEASE.

Michael Samel¹, Amit Kumar¹, Andrew Bateman²,

Vijay Rangachari¹

¹ *University of Southern Mississippi*, ² *McGill University, Montreal, Quebec, Canada*

Granulins (Grn) are generated by the elastase cleavage from its larger, ubiquitously expressed precursor, progranulin (PGrn) that has recently been understood to play a role in frontotemporal dementia (FTD). Several lines of evidence seem to suggest a potential interaction between PGrn/Grn with amyloid- β (A β), however, this has never gained significant attention among the neuroscience community. It is

interesting to know that expression levels of PGrn (and Grn) are increased in many neurodegenerative diseases such as Alzheimer's (AD), Parkinson's (PD) and Creutzfeldt-Jakob disease and ALS. It is also noteworthy that PGrns are observed to be associated with microglia surrounding Ab plaques in AD. Since its involvement in neurodegenerative diseases was established in early 2006, PGrn/Grn has gained significant attention in the neuroscience community. However, since their roles in neurodegenerative diseases have only started to emerge, not much is known about their biochemical functions and molecular mechanisms in relation to AD. Based on the structural homology and BLAST structure comparisons between Grns and Ab fibrils, we hypothesize that Grn can potentially interact with Ab either by nucleation or by inhibition. Here we present the expression of human Grn-A (hGrnA) in E coli, along with purification and characterization of the protein by various biochemical and biophysical methods. The next step would be to characterize the interactions between Ab and hGrnA mainly by fluorescence techniques. Understanding the interactions between these two proteins may provide new insights into AD from an entirely new perspective.

P3.03

PREPARATION OF UNNATURAL AMINO ACIDS USING β -LACTONE INTERMEDIATES

Emily Vogel, Douglas Masterson

University of Southern Mississippi

α -Methyl amino acids have received considerable attention in recent years due to their versatility. We have developed methods, both enzymatic and chemical, which allow us to prepare a series of unnatural amino acids from a common synthetic intermediate. However, we have tried to prepare phenylalanine and tyrosine analogues using this techniques with mixed success. We have utilized a β -lactone intermediate to overcome this problem. The β -lactone allows us to insert the side chain of either tyrosine or phenylalanine using straightforward methods with reasonable yield.

P3.04

SYNTHESIS AND CHARACTERIZATION OF 2-HYDROXY BENZALDEHYDE-N-4, 4'-DIMETHYL-3-THIOSEMICARBAZONE AND ITS COPPER(II) COMPLEX

Ameera Haamid¹, Ramaiyer Venkatraman¹, Frank Fronczek²

¹ *Jackson State University*, ² *Louisiana State University*

Thiosemicarbazones exhibit interesting biological properties. In solution, thiosemicarbazone

molecules can exist in thione–thiol tautomeric form. This unique property of thiosemicarbazone is not only the presence of many electron donor centers in the structure but also the bonding characteristics. As a ligand, thiosemicarbazones are well known to behave as chelating agents towards a wide range of metallic ions forming structurally different complexes. In many instances, they bind the metal ions through the hydrazinic nitrogen, thione sulfur atom and oxygen or nitrogen from parent ketone or aldehyde. Among the metal ions that complex with thiosemicarbazones, copper complexes are of prime interest due to their enhanced and proven biological activity in the field of medicine, industrial and agriculture. In this research, we report the synthesis, crystal structure and spectral data of the title ligand (1), $C_{10}H_{13}N_3OS$, and the copper (II) complex (2), $C_{20}H_{22}Cu_2N_6O_2S_2$. The copper (II) complex is prepared by using 1:1 metal-to-ligand reactant. The metal complex is a dimer in the solid state. The copper atoms are bridged by the phenolic oxygen and in addition are coordinated through the thione sulfur and hydrazinic nitrogen of the thiosemicarbazone molecule exhibiting a square planar geometry around the copper atom. The crystal data is supported by NMR and IR spectroscopy. (Supported by the National Science Foundation under CHE-082135)

**P3.05
SYNTHESIS AND STRUCTURAL
CHARACTERIZATION OF
CYCLOPENTANONE
THIOSEMICARBAZONES**

Haamid Ameera¹, Ramaiyer Venkatraman¹, Lee Ken. S¹, Valente Edward. J²

¹Jackson State University, ²University of Portland

Thiosemicarbazones and their metal complexes have been studied for their potential biological activity. The anti-neoplastic activity of thiosemicarbazones has distinct structure-activity relationships among their substituted derivatives. In our continuing work with thiosemicarbazones, and their derivatives, we synthesized relatively three thiosemicarbazones of cyclopentanone. (1) Syn, 1E-4Z-cyclopentano-4-methyl-3-thiosemicarbazone, $C_7H_{13}N_3S$. Single molecules of (1) comprise the asymmetric unit, two in the cell. Molecules form dimeric H-bonds with neighbors linking molecules in pairs with $R_2^2(8)$ patterns. (2) 2-(dimethylamino)-5-(2'-cyclopentano-hydrazo)-1,3,4-thiadiazole, $C_6H_{15}N_3S$. The molecule is a spiro thiosemicarbazone, with the ipso carbon of cyclopentyl ring making two

bonds to the terminal thiosemicarbazone nitrogens. Molecules are linked in pairs by complementary H-bonding from N4-H...S, forming $R_2^2(10)$ patterns; the

N-H...S angle is 166.0° . The amine is non-planar. (3) 1,2,4-triazospiro[4.4]nonan-3-thione, $C_9H_{15}N_3S$. Single molecules comprise the asymmetric unit, four in the unit cell. The molecule shows the unexpected diazothiolane ring, indicating that a second condensation in an attempt to form the thiosemicarbazone of cyclopentanone. Hydrogen bonding links molecules into dimers through N-H...N contacts. (Supported by the National Science Foundation under CHE-0821357)

**P3.06
EFFECTS OF FATTY ACIDS AND
PHOSPHOLIPIDS ON AMYLOID- β (A β)
PEPTIDE AGGREGATION.**

Amit Kumar, Rebekah Rice, Shiela A. Lidell, Pritesh S. Patel, Dipti Singh, Lea C. Paslay, Sara Morgan, Vijay Rangachari

University Southern Mississippi

The aggregates of A β found in brains of Alzheimer's patients are strongly believed to be the cause for neuronal death and cognitive decline. Among the different forms of A β aggregates, smaller aggregates called 'soluble oligomers' are increasingly believed to be the primary neurotoxic species responsible for early synaptic dysfunction. Since it is well known that the A β aggregation is a nucleation dependant process, it is widely believed that the toxic oligomers are intermediates to fibril formation, or what we call the 'on-pathway' products. Although it is true that there may be toxic oligomers along the fibril formation pathway, it is not obligatory that all toxic oligomers must be 'on-pathway' intermediates. It is important to understand the pathways because if the oligomers are 'off-pathway' products, their half-life can be significantly longer than the 'on-pathway' ones that may result in prolonged toxicity to the neuronal cells. Here, we test this hypothesis in the presence of saturated fatty acids and phosphatidylglycerol lipids by varying their carbon chain lengths. We observed that A β aggregation can adopt more than one pathway, and the pathway is dictated by A β -fatty acid/lipid ratio. Oligomers generated from lipids and fatty acids were isolated and characterized using thioflavin-T (ThT) fluorescence, immunoblotting and atomic force microscopy (AFM). These data are presented and discussed.

P3.07

TRAPPING OF METHANOL BY POLYAZA CRYPTAND

Musabbir Saeed¹, Ganna Gryn'ova¹, Douglas Powell², Jerzy Leszczynski¹, Md. Alamgir Hossain¹
¹Jackson State University, ²University of Oklahoma

The recognition of neutral species is one of the challenges in the field of host guest chemistry. The design of receptors capable of binding neutral molecules is gaining considerable attention, because for their potential applications in separation chemistry. Synthetic receptors can be used to bind and to monitor neutral molecules. Although there are considerable progresses in binding of charged species, however, only a few synthetic receptors have been reported that selectively bind neutral molecule. Polyazamacrocyclic are synthesized from the corresponding amines and dialdehyde under high dilution condition followed by reduction. These compounds are potential hosts for anions when they are protonated, and can interact with anions by electrostatic and hydrogen bonding interactions. However, we isolated a crystal of sulfate complex with p-xylyl cryptand showing a methanol molecule inside the cavity. The three sulfates however are cleft between the macrocyclic arms. To our knowledge, this is the first crystallographic evidence with encapsulated methanol. We also have investigated the interactions in obtained complex of methanol by the means of quantum Mechanical calculation (B3LYP/6-31G(d) level of theory). Calculated energy of interaction between methanol and scavenger molecule is -15.9 kcal/mol, which denotes the stabilization of the system through the formation of a complex. We have also analyzed forming bonding interactions in terms of Bader's "atoms in molecules" theory. Weak interactions of several types (hydrogen, dihydrogen, Van der Waals and weak covalent bonding) are observed in formed complex due to the values of electron densities and Laplacians of the electron densities at bond critical points.

P3.08

SYNTHESIS OF HEXAAZAMACRYOCYCLE FOR ANION BINDING

John S. Mendy¹, Kalpana Rani Dey¹, Musabbir A. Saeed¹, Frank R. Fronczek¹, Alamgir Hossain¹
¹Jackson State University, ²Louisiana State University

Although the majority of enzymatic reactions is associated with anions, the field of anion coordination chemistry is less explored area as compared to the field of cation coordination chemistry. In an attempt to design selective anion receptors, we

prepared a hexamine macrocycle from the high dilution condensation of m-xylyl dicarboxaldehyde and N-(2-aminoethyl) ethane-1,2 diamine, followed by the diborane reduction. The ligand has been characterized and studied for halides and oxoanions in both solution and solid states. During this work, several anion complexes have been structurally characterized by X-ray analysis. Details of the synthesis, NMR titrations studies, and crystal structures will be presented in this poster.

P3.09

RATIONAL DESIGN OF ANION SENSORS: SYNTHESIS AND BINDING OF INORGANIC ANIONS IN LIPOPHILIC SOLVENTS

Kalpana Rani Dey, Toyketa Horne, Md. Alamgir Hossain
 Jackson State University

The anion sensor chemistry is one of the important areas in molecular recognition. As compared to the cation sensors, the ligands for anion sensing are still infancy in the literature even though anions play an important role in biology, chemistry and environment. The majority of enzyme substrates and co-factors are anionic species. It is known that an excess amount of phosphate and nitrate can lead to eutrophication, as well as to disrupt aquatic life cycles. Some other anions, like perchlorate and perchlorate have an adverse effect on the environment, and causes pollution. The development of the synthetic chemosensors is of particular interest in sensing chemistry, because of their high selectivity, sensitivity, and simplicity. During the course of our study, we developed new fluorescent sensors based on the introduction of dansyl groups to acyclic and cyclic polyamines. After protonation of the unattached amines, the ligands were found to interact with both halides and oxoanions in lipophilic solvents. The sensing ability of the synthesized ligands has been studied by fluorescence titration method. The results demonstrate that the receptor exhibits strong selectivity for iodide and phosphate over other anions. The details of the solution studies will be focused in the presentation.

P3.10

TRIPODAL BASED HOSTS FOR ANION BINDING

Whitney Quinn, Brittany Musabbir Saeed, Md. Alamgir Hossain
 Mississippi State University

Anions plays a significant role chemistry and biology. Simple inorganic anions like halides and oxoanions are harmful and can have adverse effects in the human body if present in excess amounts [1]. For example, phosphate, nitrate, sulfate, and perchlorate are

the major contaminants in soil and water. It has been reported that arsenate and fluoride are presently abundant in ground water that causes severe health problems. Synthetic hosts can be used to bind and eliminate these anionic pollutants. Tris(aminoethyl)-amine, tren (L1) with C₃ symmetry is often used to build azacryptands with amine or amide functionality. These molecules are of particular interest for binding anions with three-fold rotation axes, such as nitrate, phosphate, perchlorate and sulfate. The binding predominantly occurs through hydrogen bonding and electrostatic interactions of tren nitrogens with negatively charged species. During the course of our work, we isolated the complexes of TREN with sulfate and perchlorate. The tren was further modified with anthracene units to get the desired host. Details of solid and NMR binding studies will be included in this poster.

P3.11

SELECTIVE COLORIMETRIC AND HIGHLY SENSITIVE DYNAMIC LIGHT SCATTERING ASSAY FOR ARSENIC DETECTION USING GOLD NANOPARTICLE

Sadia Khan, Jhansi Kalluri, Tahir Arbneshi, Adria Neely, Perry Candice, Paresh Ray
Jackson State University

Arsenic contaminated drinking water poses threat to global health. Worldwide nearly 140 million people may have been exposed to drinking water with arsenic contamination levels higher than the WHO guidelines of 10ppb. Unlike organic pollutants, arsenic cannot be transformed into a non-toxic material, as a result there is a long-term need for regular monitoring at sites where it occurs naturally at elevated concentrations. Current laboratory based analytical procedure is less sensitive, time consuming and it needs series of enrichment steps. Though electrochemical methods suitable for the development of low cost hand-held test instruments, but it has been hampered due to lack of selectivity against other contaminants e.g. lead, copper, zinc, iron, and mercury in water samples. As a result, the development of ultrasensitive assays for the real-time detection of arsenic has attracted considerable research efforts in recent years. In last 15 years, noble metal nanostructures attract much interest because of their unique optical properties, including large optical field enhancements resulting in the scattering and absorption of light. Very recently, Surface Enhanced Raman Scattering (SERS) based assay and Surface Plasmon Resonance (SPR) sensor has been reported for Arsenic detection till 1ppb, but none of these assay shows selectivity against ions of alkali, alkaline earth and transition heavy metal ions, which is must for real life

application, in environmental sample. Driven by the need, we use glutathione, dithiothreitol and cysteine modified gold nanoparticle based Dynamic Light Scattering probe for label free detection of Arsenic, with excellent detection limit (10ppt) and selectivity over other analytes.

P3.12

SOLID PHASE PRECONCENTRATION ON ACTIVATED ALUMINA WITH EDTA FOR DETERMINATION OF TRACE ELEMENTS IN FISH OTOLITHS BY ICP-AES

Fahmida Zereen¹, Sitki Baytak², Zikri Arslan¹
¹*Jackson State University*, ²*Nevsehir University, Nevsehir, Turkey*

The use of solid phase extraction or preconcentration protocols has afforded powerful tools to environmental chemists for determination of trace elements and heavy metals at sub-ppb levels from various matrices. To date different adsorbents, including silica gel, activated carbon, amberlite resins, ambersorb, pumice stone and alumina have been used as a solid support material. In this study, a procedure for the determination of trace and toxic metals has been described by ICP-AES based on retention of EDTA complexes on a minicolumn packed with activated alumina. Optimum conditions for pH, amount of adsorbent, eluent solution and flow rate have been determined for quantitative preconcentration of the elements. All elements were retained on the column between pH 2 and 4 followed by elution with 5 mL of 5% HNO₃ solution. The recoveries for Cd, Co, Cu, Fe, Mn, Ni, Pb, V and Zn varied between 95 and 100%. Enrichment factors varied from 200-fold for Cu, Fe, Ni and Pb, 150-fold for Cd, Co, V, Zn 150 to 50-fold for Mn. The preconcentration method allowed detection limits to be improved at least by factor of ten for the elements of interest. The proposed procedure was applied for the determination of the elements in water and fish otoliths by ICP-AES.

P3.13

SOLID PHASE PRECONCENTRATION OF ARSENIC AND ANTIMONY FOR DETERMINATION BY HYDRIDE GENERATION ICP-AES

Zikri Arslan¹, Sitki Baytak², Musabbir Saeed¹,
Alamgir Hossain¹

¹*Jackson State University, Jackson*, ²*Nevsehir University, Nevsehir, Turkey*

Accurate measurement of arsenic levels in

water and other environmental samples is important for public health and protection. In this study, we utilized a novel para-xylyl cryptard-base (PEACRYT) chelating agent that exhibit strong tendency to form a complex with arsenic and antimony within acidic range in water samples. For instrumental analysis, arsenic and antimony complexes were preconcentrated on a minicolumn of activated alumina. The retention of As and Sb occurred within a pH range from pH 4 to 6. The species retained on the column were collected into 15-mL tubes with 10 mL of 50% HNO₃ solution. A hydride generation approach was used to further improve the sensitivity of As and Sb in determination by ICP-AES. Experimental conditions of on-line hydride generation system were optimized for acidity of sample and reductant (NaBH₄) concentration. Practically, 1% HCl and 1% NaBH₄ medium was sufficient for generation of AsH₃ and SbH₃. L-cysteine substantially increased the signals at a concentration of 1% when added on-line to sample solutions. The same agent has significantly eliminated the interferences of transition metals and other hydride forming elements on As and Sb. The procedure has been applied to the determination of As and Sb in water samples and biological materials

P3.14

MEASUREMENT OF IONIC CADMIUM BY ICP-AES FROM LIVER AND KIDNEY SAMPLES OF RATS EXPOSED TO CDSE NANOPARTICLES

Wanaki McDuffy¹, Sitki Baytak², Zikri Arslan¹

¹Jackson State University, ²Nevsehir University, Nevsehir, Turkey

CdSe nanoparticles mainly accumulate in liver and kidney of rats. It was also found that particles dissociate to ionic Cd²⁺ and Se²⁻ in the organs. This phenomenon elevates the risks associated with exposure to CdSe nanoparticles as ionic Cd is highly toxic. In an attempt to provide conclusive evidence to the presence of ionic Cd²⁺ in the liver and kidney samples of the rats that were exposed to CdSe nanoparticles, we investigated separation of ionic Cd²⁺ from organs of rats without altering nanoparticle composition. Several solvents have been examined to elucidate the stability of CdSe nanoparticles during sonication, including water, ethanol and dilute HCl and HNO₃. Acid concentration in sonication medium was varied from 0.1 to 1%. It was found that QDs aggregate even in 0.1% HCl and HNO₃, but were stable in water and ethanol. Interestingly it was also found that sonication did lead

to any significant dissociation of CdSe QDs to ionic Cd²⁺ and Se²⁻ in dilute acids and the aggregated dots were simply separated from the ionic aqueous portion by centrifugation. For organs, 0.1 g portions of liver and kidney were homogenized by sonicating 2 min in 1% HCl medium. Homogenates were centrifuged at 12,000 rpm for 30 min and then aqueous layer was collected. The residual tissue containing the intact QDs was digested in HNO₃. Both portions were analyzed by ICP-AES. Results were compared with those obtained from ICP-MS analysis of the organs to total Cd levels.

P3.15

TRACE METAL PRECONCENTRATION WITH DIPHENYLCARBAZONE IMMOBILIZED ON NANO TiO₂ SOLID SUPPORT FOR DETERMINATION BY ICP-AES

Sitki Baytak², Zikri Arslan¹

¹Jackson State University, ²Nevsehir University, Nevsehir, Turkey

Trace elements such as Co, Cr, Cu, Fe, Mn and Zn are known as essential trace metals for biological organisms. However, high levels of these elements induce toxic effects and therefore, monitoring and determination of these elements are critical for human and environmental health. Solid phase extraction has become popular for determination of trace metals via preconcentration. Applications of various materials have been demonstrated as a solid phase. In this study, a solid phase extraction procedure has been described for the determination of Co, Cr, Cu, Fe, Mn and Zn by ICP-AES using mini-column of diphenylcarbazone (DPC) immobilized on TiO₂ nanoparticles. The retention pH, mass of adsorbent, type of eluent solution and its volume, effect of flow rate and effect of volume samples were optimized. The recoveries of Co, Cr, Cu, Fe, Mn and Zn under the optimum conditions were 98 ± 2%, 97 ± 2%, 98 ± 2%, 98 ± 2%, 100 ± 2%, and 100 ± 2%, respectively. The preconcentration method was measured by ICP-AES. The detection limits were 1.3, 1.5, 0.7, 1.4, 1.6 and 0.8 ng/mL for Co, Cr, Cu, Fe, Mn and Zn before enrichment respectively. The method was validated by analysis of water and fish reference materials and then applied to the determination of Co, Cr, Cu, Fe, Mn and Zn in water samples by ICP-AES.

**P3.16****THE ANALYTICAL METHOD OF MASS SPECTROMETRY AND ITS APPLICATION TO BIOLOGY & POLYMER SCIENCE**Chrys Wesdemiotis¹, Leroy Lucas¹¹Mississippi Valley State University, ²The University of Akron

Basically, mass spectrometry and its applications in biology and polymer science are showcased in this experiment to determine structural end groups of unknown compounds. Mass spectrometry comes to use when finding advancements in polymers as well as cell organelles like tissue. The MALDI-TOF/TOF is characterized by sample preparation & having a large tolerance to combination by buffers, salts, etc. When preparing the standard, there are three parts: metric, sample, and salt. The given ratio for the metric, sample, and salt is 10:2:1, respectively. In the standard preparation, 20mg/ml of metric (DCTB) was used to dissolve in the solvent (THF) and 10mg/ml of sample (PMMA) was used to dissolve in THF. Lastly, 10mg/ml of salt was used to dissolve in THF. Results come out in the form of distribution trend chart called a spectrum when analyzing data from the Bruker Daltonics Ultraflex MALDI TOF/TOF mass spectrometer. The trend chart of the individual view of the distance between two peaks on the spectrum is called spectra. The repeating number is used to make an accurate guess of what is the end group's molecular weight based on the given weights in the standard. In short, the end groups' molecular weights are pending on the monoisotopic mass. The assumed weight is the same as the repeating number: 100.0524 Da. With this assumption on the monoisotopic mass, there is miniscule proof from the peaks that there is an unknown part in the standard as well as a given structure.

P3.17**SYNTHESIS OF A LIBRARY OF BIFUNCTIONAL DNA-CLEAVING REAGENTS**Brooke Lassiter, GeNita Finley, Sameer Goel, Woods Curry, Wolfgang Kramer
Millsaps College

Nitrogen onium salts based on aromatic heterocycles have a potential as photodynamic therapy drugs. The light-induced homolytical nitrogen-oxygen bond cleavage yields a radical cation of the aromatic heterocycle and an alkoxy radical. Both of these transient species are highly reactive and can induce oxidation reactions (radical cation) and radical reactions (alkoxy radical). Both of the species are produced with a quantum yield of about 0.6. Energy wasting steps

appear to be the geminate pair recombination to form several isomers of the methoxy substituted aromatic heterocycle.

To expand the library of 1,8-naphthalimide linked onium salts we attempt to modify the spacer length as well as the attached aromatic heterocycle. Several synthesis attempts have been made to extend the methylene spacer length. Mitsunobu transformation of alcohols into the phthalimides was interfered by the nucleophilic pyridine nitrogen.

Variation of the heterocycle can be accomplished by Friedlaender quinoline synthesis. The precursors were synthesized by Swern oxidation and aniline reduction. After synthesis, oxidation yielded the heteroaromatic N-oxide which was alkylated by trimethyloxonium tetrafluoroborate to give the photoreactive N-methoxy salt. The isoelectronic, photostable N-ethyl derivative was obtained by direct alkylation of the parent heterocycle. The synthesis and photochemistry of the novel compounds is investigated and discussed.

P3.18**DECARBOXYLATIVE PHOTOCYCLIZATION OF CATIONIC PHTHALIMIDE AND QUINOLINE/ISOQUINOLINE ω -CARBOXYLIC ACIDS**David Sandlin, Eli Smith, Wolfgang Kramer
Millsaps College

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.

To expand the versatility of the decarboxylative photocyclization we are cationic precursors as well as different chromophors. Cationic precursors will enable us to use chiral biomolecules, such as DNA, as chiral auxiliaries as well as explore potential interactions in the course of the reaction. In one example, the phthalimide chromophor is attached to a nonconjugated pyridinium moiety which carries the positive charge. The use of different chromophors will greatly increase the synthetic potential of the cyclization reaction. The simple chromophors quinoline, isoquinoline or phenanthridine will give access to new classes of compounds. It has been shown that electron transfer fluorescence quenching does take place in quinoline betaines compounds. The synthesis of the precursors as well as the photochemical transformation is discussed.

P3.19

SYNTHESIS AND CHARACTERIZATION OF Au_{144} AND Au_{25} MIXED MONOLAYER NANOPARTICLES

Rebecca Hardy¹, Laurence Angel², Amala Dass¹

¹University of Mississippi, ²Texas A&M University-Commerce

Nanotechnology is a growing field having great influence in healthcare where for instance gold nano particles can be used to detect and treat cancer. It is the goal of Au_{144} nanoparticle research to purify the particles to determine the structure so the particular nanoparticle, Au_{144} , can be utilized in this respect. A precise method of Au_{144} synthesis has been developed and is being utilized in the lab. UV-Vis and mass spectrometry have proven the synthesis of these nanoparticles from this method. In addition, results from mixed monolayer Au_{25} particles will also be presented.

P3.20

BIFUNCTIONAL DNA-CLEAVING REAGENTS BASED ON A LIGHT-INDUCED HOMOLYTICAL NITROGEN-OXYGEN BOND CLEAVAGE

Austin Baker, Woods Curry, Ashley Wells, Victoria Purvis, Wolfgang Kramer
Millsaps College

The light-induced homolytic nitrogen-oxygen bond cleavage of N-methoxy nitrogen onium salts produces two transient species, each of which has been shown to damage DNA. Each species is reacting with a different mechanism. While the formed radical cation targets the DNA bases, the methoxy radical damages the DNA backbone via hydrogen abstraction. The efficiency of this reaction has been analyzed by the determination of the quantum yield of ion formation. Each transient species if produced with a yield of about 0.6, the energy wasting step being geminate pair recombination to yield methoxy-substituted heterocycles. To effectively cleave DNA, a high ground-state association is desired. DNA binding is determined by UV/VIS, fluorescence and CD spectroscopy titrations. Interestingly, the changes in the CD spectrum can give information about the binding mode. The influence of the spacer length and the heterocycle is evaluated and the synthesis of bifunctional onium salts is optimized with those results.

In vitro DNA cleaving efficiency is determined compared to a known photochemical DNA cleaver by gel electrophoresis with ethidium bromide staining.

P3.21

NANOCLUSTER SIZE EVOLUTION STUDIED BY MASS SPECTROMETRY IN ROOM TEMPERATURE $\text{Au}_{25}(\text{SR})_{18}$ SYNTHESIS

Asantha Dharmaratne¹, Thomas Krick², Amala Dass¹

¹University of Mississippi, ²University of Minnesota

We have carried out a room temperature facile synthesis of $\text{Au}_{25}(\text{SCH}_2\text{CH}_2\text{Ph})_{18}$. A systematic mass spectrometric investigation unraveled the underlying size evolution process that yielded a monodisperse Au_{25} . To be more specific, at early stages of the reaction a mixture of Au_{25} , Au_{38} , Au_{44} , Au_{68} and Au_{102} is formed and subsequent size evolution have led to the synthesis of highly monodisperse Au_{25} . The size evolution via structural reconstruction of the larger cores such as 38, ~44, 68 and 102 to Au_{25} nanocluster has also been studied. Having compared the results that we obtained from UV-vis, TEM, TGA or electrochemical measurements, it was revealed that MALDI mass spectrometry is an indispensable tool that probes the mechanism of nanocluster synthesis providing more concrete information.

P3.22

SYNTHESIS AND CHARACTERIZATION OF Au_{38} NANOPARTICLES

Lance Majors¹, Asantha Dharmaratne¹, Laurence Angel², Amala Dass¹

¹University of Mississippi, ²Texas A&M University - Commerce

It has been a focus of nanoparticle research to determine the structural features and synthesis of the Au_{38} nanocluster for some time. The complexity of Au_{38} purification from the commonly used synthesis has been the gap between obtaining the Au_{38} nanoclusters in its native form and crystallizing it for structural studies. A relatively new method of synthesis of mostly pure Au_{38} nanoparticles has bridged this gap and brought about new questions concerning reaction conditions on particle formation. Utilizing this new method, the synthesis and purification of Au_{38} has been verified using UV-vis and mass spectrometric methods. Studies on particle formation have been carried out to further understand kinetics and cluster aggregation during synthesis. The crystallization of the Au_{38} clusters is an ongoing task in order to determine the structural features of the nanoparticle.

**P3.23****REAL TIME FEED BACK CONTROL OF BIOMASS GASIFICATION**Todd Mlsna, Bidhya Kunwar*Mississippi State University*

We are working on an ONR sponsored program to optimize the conversion of biomass to biofuel for DOD aviation. The process includes three steps 1) biomass conversion to synthesis gas (carbon monoxide and hydrogen) at high temperature; 2) purification and compression of the synthesis gas and 3) catalytic conversion to aviation fuel. The focus of our work is to develop real time chemical monitoring hardware to track the production and composition of the synthesis gas. We then can use this information in a feedback control loop will to dictate the composition of the synthesis gas through the Water Gas Shift Reaction. For this program we are teaming with Seacoast Science, Inc. who has designed, fabricated and completed preliminary field test of an integrated mini gas chromatograph. This system operates using ambient air and thus requires no carrier gas for increased portability. The proposed system will be able to track the concentration of the individual chemicals emitted from bio conversion process. This information is required to optimize the conversion of synthesis gas to aviation fuel. Feedback driven control systems will receive information from the sensor and make decisions regarding heating, venting, air velocity and humidity.

P3.24**GAS CHROMATOGRAPH IN ACADEMIC CHEMISTRY LABORATORIES**Todd Mlsna, Jeannie Kidd*Mississippi State University*

Vernier Software and Technology, Inc. is introduced a new sensor instrument, a portable gas chromatograph in August of 2009. The new instrument, the Vernier/Seacoast Science GC is a perfect fit for today's student learning how to use modern instrumentation. Gas chromatography is an analytical technique in widespread use in many of today's high-tech careers. A mixture of chemicals can be loaded onto a gas chromatography unit and separated into its individual components. This separation allows an informed user to identify the individual compounds of a mixture and potentially to recognize what chemicals are present in the sample of interest. Gas chromatography is used in many biotechnology, chemistry and health related careers and exposure to instrumentation of this sort is extremely relevant for students entering these fields. Laboratories for this unit are being developed in our laboratory in collaboration with Dr. Jack Randall at Vernier Software and Technology. Incorporation of

this unit into the general chemistry curriculum will focus on Principles of Chromatography in General Chem I, Quantification Studies in General Chem. II, and Reactions for Organic Chemistry. Several new labs will be presented including those that teach the separation and quantification with chromatography, Raoult's Law and oxidation of an alcohol into a ketone along with the concepts that they are designed to teach the student

P3.25**CHARACTERIZATION OF LABORATORY GRADED AEROSOLS GENERATED FROM METERED DOSE AEROSOL GENERATORS**Courtney Johnson, Mohammed Ali*Jackson State University*

Characterizing the mechanical properties of aerosol particles is very much useful to understand their effects on environment or administration as pulmonary medicine. Aerosol can be defined as a suspension of solid or liquid particles in a gas. This gaseous substance does not only pollute environment but also useful as medicine in the treatment of respiratory illness like asthma. The electromechanical methods that govern the fate of aerosols in the environment or human lung are impaction, gravitational settling, Brownian diffusion, interception, and electrostatic force. Understanding these deposition methods require precise quantification and analysis of aerosol particle's size, which is referred as aerodynamic diameter in the literature. In this study we present the method of characterization and analysis of this vital mechanical property. Laboratory graded aerosols were generated from commercially available metered dose aerosol generators, and measured the aerodynamic size of each particle real-time in the aerosol cloud by using the electronic single particle aerodynamic relaxation time (ESPART) analyzer. The ESPART works on the principle of Laser Doppler Velocimetry. Raw data was analyzed by adopting numerical methods. The normalized count median aerodynamic diameter and mass median aerodynamic diameter were found $2.99 \pm 0.08 \mu\text{m}$, and $3.93 \pm 0.09 \mu\text{m}$, respectively, which were comparable with the results reported by other investigators. Additionally it was found that the aerosol particles fraction per unit size distribution can accurately represent the aerodynamic size property. It is also concluded that scientists have taken a toxic chemical and made it useful to mankind over the time.

FRIDAY MORNING Lakeview 2

Session 3

Chair: Dr. Ramaier Venkatraman

O3.13

9:00 DIELECTRIC PROPERTIES OF NOVEL FULLERENE-CONTAINING POLYURETHANE

Hanaa Ahmed, Steven Stevenson, Mohammad Hassan, Kenneth Mauritz, Paige Phillips
University of Southern Mississippi

C₆₀ Fullerenol/polyurethane (C₆₀(OH)/PU) and Sc₃N@C₈₀ fullerenols/polyurethane (Sc-MNF(OH)/PU) nanocomposites were prepared from a simple reaction between diisocyanate end-capped prepolymer and different loadings of polyhydroxylated fullerenols in a solvent mixture of THF/DMF. The prepared nanocomposite films had high gel fractions ranging from 72-97% depending on the percent of the fullerenols added. Thermal Gravimetric Analysis (TGA) showed that the thermal degradation onset temperature of the prepared films increases with increasing gel fraction. The Dynamic Mechanical Analysis (DMA) showed loss peaks at approximately -60 °C corresponding to the glass transition temperatures, T_g, of the prepared films. The Dielectric properties of the prepared nanocomposites were studied over the frequency range 0.1Hz - 3MHz at fixed temperatures from -150 to 180 °C. The data obtained from dielectric spectroscopy showed that the dielectric constant, ε', of fullerenol/PU nanocomposites increases with increasing fullerenol loading due to the polarization contributions of the unreacted hydroxyl groups in C₆₀(OH) or Sc-MNF(OH). Furthermore, ε' of Sc-MNF-PU is much higher than that of C₆₀-PU due to the presence of highly polarizable metals and induced dipoles inside the MNF cage.

O3.14

9:20 OLEFIN METATHESIS CATALYSTS BEARING PH-RESPONSIVE NHC LIGANDS

Shawna Balof, Hans Schanz
University of Southern Mississippi

We have synthesized several novel, ruthenium-based olefin metathesis catalysts bearing pH-responsive NHC ligands for external control of catalyst solubility based on ancillary NMe₂ groups. These catalysts perform ring opening metathesis polymerization (ROMP) of cyclooctene (COE) at faster rates than their commercially available counterparts and perform at similar rates during ring closing metathesis (RCM) of diethyl diallylmalonate (DEDAM) in organic media.

These catalysts perform RCM of diallylmalonic acid in acidic protic media, however with only moderate activity, and do not produce polymer in the ROMP of a cationic 7-oxanoborene derivative. One catalyst was used for Ru-separation studies when RCM of DEDAM or 3,3-dialltpentadione (DAP) was conducted in low-polar organic solution. The Ru-species was subsequently precipitated by addition of strong acid and was removed by 1) filtration and 2) filtration and subsequent extraction with water. The residual Ru-levels could be reduced as low as 11 ppm without the use of chromatography or other scavenging methods. We are introducing a new synthetic strategy to develop a template synthesis that allows for the straightforward synthesis of several pH-responsive NHC ligand precursors and their corresponding catalysts.

O3.15

9:40 PERFORMNACE OF HYDRIDE GENERATION FOR SIMULTANEOUS DETERMIANTION OF BISMUTH, LEAD AND TIN BY ICP-AES IN BIOMINERALS

Domingos Afonso¹, Sitki Baytak², Zikri Arslan¹
¹Jackson State University, ²Nevsehir University, Nevsehir, Turkey

Heavy metals, such as arsenic, cadmium, lead, selenium and tin, are detrimental to ecosystem and human health at extremely small levels. Accurate determination necessitates the use of highly sensitive instrumentation and analytical chemistry methodologies. Inductively coupled emission atomic emission spectroscopy is a robust, multielement capable technique that takes the advantage of hot argon plasma to produce excited species. However, the sensitivity of ICP-AES is not adequate to detect these elements in environmental samples at low µg/g levels due to the complexity of emission spectrum and inefficiency of solution nebulization. Hydride generation is popular technique commonly used for flame atomic absorption spectroscopy for measurement of hydride forming elements. In this study, we examined the performance characteristics of hydride generation with ICP-AES for simultaneous determination of bismuth, lead and tin. The conditions were optimized for hydrochloric acid, potassium ferricyanide and sodium borohydride concentrations. To affect the hydride generation, acid concentration of the sample solutions were varied from 0 to 3% v/v. Solutions were mixed on-line with 3% K₃Fe(CN)₆ followed by reaction with 2% m/v NaBH₄ solution. The gaseous hydride was analyzed by ICP-AES. The detection limits varied between 0.10 µg/L and 0.2 µg/L. The effects of various transition metals and hydride forming elements were investigated. Chromium, copper and nickel were found to suppress

signals to some extent when present at high levels. The method was applied to the analysis of fish otoliths and bone ash samples.

O3.16

10:00 SYNTHESIS OF SEVERAL ANALOGUES OF UNNATURAL LYSINE FROM A COMMON SYNTHETIC INTERMEDIATE: FOR INCORPORATION IN SST14

Souvik Banerjee, Dale Jr Rossado, James W Wiggins, Douglas S Masterson

University of Southern Mississippi

Presently there has been extensive focus on the synthesis of unnatural alpha, beta and gamma Lysine, in order to incorporate them in the peptide specific cut sites of small peptides, such as Somatostatin. Because it has been already proven that incorporation of these unnatural amino acids increases the in vivo half life of these peptides and this is the important procurement for the cancer treatment. Our goal is to synthesize enantiomerically enriched Lysine analogues from a common synthetic intermediate and to incorporate them in the TRY-LYS cut site of the SST14 Peptide. The presence of the phthalimide protecting group in our Lysine chain helps us to obtain very high enantioselectivity in pig liver esterase hydrolysis of the prochiral diester Lysine derivative to get to the common half ester intermediate. Our synthetic route allows us to vary the chain length of the "R" group of the Lysine from 1 to n # of carbons, as well as to extend the carbon back bone from alpha to beta and from beta to gamma derivatives.

O3.17

10:20 THEORETICAL CALCULATION OF THE N-H STRETCH IN AMMONIA

Joseph Bentley, Ver Geshia Johnson

Delta State University

The potential energy curve for the N-H stretch in the ammonia (NH₃) molecule is modeled by fitting a data set generated by GAUSSIAN. The GAUSSIAN calculation was a restricted Hartree-Fock calculation with a 6-31G(d) basis set. The fitted potential energy curve was compared with the output from GAUSSIAN. Subsequently, the stretching vibrational wavenumbers were calculated using a one-dimensional model with a set of DVR points as a basis set.

10:40 Break

Session 4

Chair: Dr. Karl J. Wallace

O3.18

10:50 DECIPHERING STRUCTURAL AND FUNCTIONAL FINGERPRINTS FOR PROTEINS

Yong Zhang, Yan Ling, Christopher Mills, Rebecca Weber

University of Southern Mississippi

Spectroscopic techniques are powerful tools to provide "fingerprint" information for biomolecular structures and functions. We use quantum chemical methods to accurately predict many spectroscopic properties and use such calculations with structural modeling and experimental spectroscopic data to determine protein structures. Recently, a critical reaction intermediate, oxyferryl species for tryptophan 2,3-dioxygenase (TDO) was reported, exhibiting a unique Mössbauer quadrupole splitting parameter that is noticeably greater than those of any other heme-based ferryl species but much smaller than those of protonated ferryl species. TDO is an important hepatic enzyme in the kynurenine metabolic pathway for energy production, neurotransmission regulation, and NAD biosynthesis. Our predictions of Mössbauer data have a theory-versus-experiment correlation coefficient $R^2=0.98$ and our computational investigations on possible structural influences from both the heme ligands and protein environment suggest that the unusual quadrupole splitting is a result of the hydrogen bonding to the oxo group in a unique active site environment, which for the first time discovered a role of hydrogen bonding to the critical oxyferryl species and was confirmed by recent mechanistic investigations. In another case, we enabled accurate predictions of three characteristic spectroscopic properties, ¹H and ¹⁵N NMR chemical shifts and NO vibrational frequencies in synthetic HNO and RNO heme complexes, with $R^2 = 0.990-0.998$. Based on comparisons with experimental measurements for the first spectroscopically well characterized HNO-protein complex - MbHNO (Mb = myoglobin), a dual hydrogen bond mode for HNO in Mb was proposed for the first time, which can also account for its unusual stability observed experimentally.

O3.19

11:10 PHOTODEGRADATION OF NITROFLUORENES

Samuel Dasary, Jaunice Bronner, Amanda Fletcher, Ramaiyer Venkatraman, Hongtao Yu

Jackson State University

Nitro-PAHs are an important class of

environmental pollutants. Polycyclic aromatic compounds are formed during incomplete combustion of organic material. In the presence of nitrogen oxides (NO_x), the neutral PAHs (such as fluorene) are converted into nitro-PAHs. NPAHs are also emitted from coal flyash, smelting, effluent and engine exhaust. In the present work we have investigated. Photochemical degradation of 2-nitrofluorene (2-NF) and 2,7-dinitrofluorene (2,7-DNF). In a typical experiment 2-NF or 2,7-DNF in the concentration range of 50-100 μ M were irradiated using 365nm wavelength UV light. UV-VIS absorbance change was used to monitor degradation. Further chromatographic techniques were used to identify the photoproducts. Our results showed that approx 60% degradation of the selected NPAHs was achieved following first order rate kinetics.

O3.20

11:30 EXTERNAL ACTIVITY CONTROL OF HEXACOORDINATE RU-ALLENYLIDENE AND INDENYLIDENE COMPLEXES

Samantha Pope, Hans J. Schanz
University of Southern Mississippi

Over the past four decades, metathesis has evolved to become a highly valuable and versatile tool in organic and polymer synthesis. Since the early 1990s ruthenium-based Grubbs-type Ru-benzylidene catalysts have immensely broadened the application spectrum of this reaction due to their high tolerance towards functional groups as well as moisture and molecular oxygen compared to homogeneous molybdenum-based systems. The technology today has evolved into a very important synthetic tool for the production of high performance materials as well as therapeutic agents.

A major drawback of the technology is the limited external activity control of the catalytic reactions. We have recently developed a reversible inhibition/activation protocol using basic N-donor ligands and non-nucleophilic acid which can function as an "off/on" switch for the reaction. Our research is focused on developing new systems with a variety of Ru-carbene complexes and N-donor ligands which allow for the external activity control based on this technology. We have synthesized and investigated Ru-carbene complexes for which the intellectual property is not protected (this has been a major obstacle in the commercial use of olefin metathesis thus far). We have investigated the effect of the external stimulus on the activity and stability of the catalytic Ru-species.

O3.21

11:50 TRANSFORMATION OF TRICLOSAN FACILITATED BY Fe(III)-SATURATED MONTMORILLONITE

Chamindu Liyanapattirana¹, Kang Xia¹, Steven Gwaltney¹

¹ *Mississippi State University*, ² *Mississippi State Chemical Laboratory*

Triclosan (TCS) is a common antibacterial agent used in a wide array of pharmaceutical and personal care products. TCS is usually washed down to the sewer systems and ends up in the environment via wastewater effluent and biosolids. Once in surface water, a fraction of TCS can be transformed in to carcinogenic compounds such as 2, 8-dichlorodibenzo-p-dioxins. The main goal of this research was to investigate the transformation of TCS in Fe (III)-saturated montmorillonite, a commonly found 2:1 aluminosilicate in soils. In this study, TCS was incubated in darkness with Fe (III)-saturated montmorillonite at different concentrations with and without the presence of water. The experiment was also conducted with the presence of HPLC grade water in darkness and under external fluorescent light source. The transformation products were characterized using HPLC/MS and quantified using HPLC/UV at different time intervals up to 100 days. Within 1 to 5 days, depending on the initial TCS concentrations, 50% of the TCS incubated with Fe (III)-saturated montmorillonite was rapidly polymerized into dimers and trimers. Similar transformation products, but in lower quantity were observed in the aqueous experiments with and without fluorescent light exposure. The dimer and trimer transformation products were stable over a period of 50 days and resistant towards further oxidation. SPARTAN-06 quantum mechanics program was used to evaluate the most possible structural confirmation of the dimer and trimer products. The calculations predicted two dominant dimers and trimers. The modeling results confirmed the experimental data obtained by HPLC/MS.

O3.22

12:10 AN INDICATOR DISPLACEMENT ASSAY FOR SENSING FE3+

Scott Jones, Andrea McDonald, Karen Orcutt, Karl J Wallace

University of Southern Mississippi

There has been plethora of new molecular sensors for the detection of heavy metals that utilize colorimetric or fluorescence mechanisms. An area of interest is the detection of total iron content (Fe²⁺ and Fe³⁺) in the ocean. There have been a number of large-



scale "seeding" experiments carried out throughout the world to aid in CO₂ sequestration from the growth of algae blooms. We will report on the progress and development of molecular sensors, specifically to monitor Fe³⁺ in water, based on an Indicator Displacement Assay (IDA) that will utilize lanthanide ions as a sensing motif. Here we will discuss the synthesis of the molecular receptors, and our initial studies towards Fe³⁺ monitoring.

O3.23

12:30 ELECTROCHEMICAL AND ELECTROGENERATED CHEMILUMINESCENT STUDIES OF A RUTHENIUM(II) COMPLEX [Ru(pbt)₂(dpp)](PF₆)₂

Erendra Manandhar, William Seawell, Erick Moffett, Suman Parajuli, Shijun Wang, Alvin A. Holder, Wujian Miao

University of Southern Mississippi

The electrochemical behavior of a ruthenium(II)-containing complex, [Ru(pbt)₂(dpp)](PF₆)₂ (where pbt = 2-(pyridine-2-yl) benzothiazole, dpp = 2,3-di(pyridine-2-yl) pyrazine] was studied in acetonitrile (MeCN) containing 0.10 M tetra-n-butyl ammonium perchlorate (TBAP). The complex displayed a reversible Ru^{II/III} redox process with $E_{1/2} = +1.2$ V vs Ag/Ag⁺ (10 mM), one reversible process of dpp/dpp⁻ with $E_{1/2} = -1.26$ V vs Ag/Ag⁺ and two reversible pbt/pbt⁻ couples with $E_{1/2} = -1.45$ V and -1.70 V vs Ag/Ag⁺ respectively at a Pt electrode, with a scan rate of 100 mV/s. Results of spectroscopic behavior, along with the electrogenerated chemiluminescence (ECL) of this complex obtained via ion annihilation and coreactant type ECL, will be presented.

12:50 Closing Remarks

ECOLOGY AND EVOLUTIONARY BIOLOGY

Chair: Mac H. Alford,
University of Southern Mississippi
Vice Chair: Paul Mack,
Mississippi University for Women

THURSDAY MORNING EXHIBIT HALL C

DIVISIONAL POSTER SESSION

8:30a-11:30a

Posters may be set up starting at 8:00a

Authors should be available with their posters to answer questions between 8:30a and 9:30a.

P4.01

EFFECT OF CHICKEN ANTIBODY ON INFLUENZA A VIRUS EVOLUTION IN VITRO.

Lindsey Pittman², Rajagowthamee Thangavel¹, Stephen Stray¹

¹Mississippi Medical Center, ²Base Pair Program, Murrah High School

Influenza A virus that causes epidemics in humans normally starts out in other species, particularly birds. The hemagglutinin (HA), among other components, changes and humans do not have antibodies that bind to the different types. Because influenza A viruses initially come from birds, we are seeing if chicken antibody works differently than human or mice antibody, and if it does, how. We have grown influenza virus in the presence of chicken antibodies, and those that continue to grow have changed to have better resistance to those antibodies in some way. We are isolating and sequencing the HA genes to determine whether mutations have occurred that cause the HA protein to lose antibody binding sites. We have recently isolated a mutant virus that is resistant to antibody neutralization. By determining the sequence of this mutant virus and other viruses, we will be able to ascertain where chicken antibodies bind to HA. This information may be useful in designing better vaccines for new strains of influenza.

P4.02

POTENTIAL EFFECTS OF SUDDEN OAK DEATH ON LITTER COMPOSITION AND SOIL TEMPERATURE, MOISTURE, AND RESPIRATION OF A MESIC OAK FOREST IN THE SOUTHERN APPALACHIANS

Monica H. Moss Watkins¹, Ronald L. Hendrick, Jr.²

¹University of Southern Mississippi, ²The University of Georgia

The causal agent of sudden oak death (SOD), *Phytophthora ramorum*, is expected to eventually invade forests in the southern Appalachians. Dominant overstory, *Quercus rubra*, and understory, *Rhododendron maximum*, species are susceptible to the pathogen and may be affected by SOD. The objective was to quantify the effects of simulated SOD on litterfall and soil temperature, moisture, and respiration under two scenarios: a moderate severity outbreak of SOD with high mortality of *Q. rubra* only (Girdle Only) and a high severity scenario in which the *R. maximum* understory would be severely impacted in addition to *Q. rubra* (Girdle + Removal). In the first two years posttreatment, litterfall in both scenarios was as expected: due to aboveground loss of biomass there was more litterfall in the Girdle Only treatment and less litterfall in the Girdle + Removal treatment, which simulated a later stage of SOD when *R. maximum* litter would no longer be contributed. As expected, soil temperature was slightly greater in the Girdle + Removal treatment than in the Control or Girdle Only treatments; however soil moisture did not decrease and was similar to Control in both scenarios. While there was no significant effect on soil respiration in the Girdle Only treatment, lower soil respiration only in the Girdle + Removal treatment suggests *R. maximum* removal created large, persistent belowground root gaps, indicative of an overall decrease in root and microbial production respiration rather than an increase in decomposition respiration due to greater litter input from dead roots and increased temperature.

P4.03

ENUMERATION OF VIBRIO PARAHAEMOLYTICUS IN THE VIABLE BUT NONCULTURABLE STATE USING DIRECT VIABLE COUNTS AND RECOGNITION OF INDIVIDUAL GENE FLUORESCENT IN SITU HYBRIDIZATION

Kimberly Griffitt¹, Nicholas Noriega III¹, Crystal Johnson², Jay Grimes¹

¹University of Southern Mississippi - Gulf Coast Research Lab, ²Louisiana State University

Vibrio parahaemolyticus (Vp) is a gram-negative, halophilic bacterium indigenous to marine and estuarine environments and capable of causing food-

and water-borne illness in humans. Currently, culture-based techniques are used for quantification of Vp in environmental samples; however these can be misleading as they fail to detect Vp in a viable but nonculturable (VBNC) state leading to an underestimation of the population density. VBNC is a dormant state used by the *Vibrios* to survive such harsh conditions as starvation, low temperature or unfavorable salinity. VBNC bacteria are still capable of causing illness, and it is therefore desirable to develop a method of rapidly and accurately enumerating VBNC Vp in environmental samples. In this study we used a novel fluorescence visualization technique called recognition of individual gene fluorescence in situ hybridization (RING-FISH), which targets chromosomal DNA to enumerate Vp that had entered the VBNC state. A polynucleotide probe labeled with Cyanine 3 (Cy3) was created corresponding to the ubiquitous Vp gene that codes for thermolabile hemolysin (tlh). A culture of Vp was induced into the VBNC state and enumerated at regular intervals using direct plating counts and RING-FISH microscopic counts. The percentage of the culture which entered the VBNC state was calculated as the difference between total and viable counts.

P4.04

DISTRIBUTION OF TYPE THREE SECRETION SYSTEMS IN VIBRIO PARAHAEMOLYTICUS ISOLATED FROM THE NORTHERN GULF OF MEXICO

Nicholas Noriega¹, Crystal Johnson², Kimberly Griffitt¹, D.J. Grimes¹

¹University of Southern Mississippi, ²Louisiana State University

Vibrio parahaemolyticus is a halophilic gram-negative bacterium found naturally in marine and estuarine environments. Subpopulations of *V. parahaemolyticus* found in the environment possess pathogenicity factors that are capable of causing food and water-borne gastroenteritis, wound infection, and septicemia. Two well characterized pathogenicity factors include thermostable direct hemolysin (tdh) and tdh-related hemolysin (trh). Some strains of *V. parahaemolyticus* contain two non-redundant type III secretion systems (T3SS), T3SS1 and T3SS2. Furthermore, a recent study has revealed two distinct lineages of the *V. parahaemolyticus* T3SS2: T3SS2 α and T3SS2 β . We collected 130 *V. parahaemolyticus* isolates containing tdh and or trh from three environmental reservoirs in the Northern Gulf of Mexico for screening of pathogenicity factors T3SS1, T3SS2 α , and T3SS2 β . The majority of potential pathogens were detected in the sediment, including all tdh-/trh+ isolates. T3SS2 α components were detected in



all *tdh*⁺/*trh*⁻ isolates and zero of 109 *trh*⁺ isolates. One *T3SS2α* gene, *vopB2*, was found in no environmental strains and all *tdh*⁺/*trh*⁻ clinical strains. Fluorescence in situ hybridization adapted for individual gene recognition (RING-FISH) was used to confirm the presence/absence of *vopB2* and may represent a novel marker for identifying increased virulence among strains. *T3SS2β* was found in all *tdh*⁻/*trh*⁺ isolates and in no *tdh*⁺/*trh*⁻ isolates. To our knowledge this is the first study to confirm the presence of *T3SS2β* genes in *V. parahaemolyticus* from the Gulf of Mexico. This work represents one of the few studies examining the distribution and co-existence of *tdh*, *trh*, *T3SS1*, *T3SS2α*, and *T3SS2β* in a collection of environmental *V. parahaemolyticus*.

P4.05

THE PREVALENCE OF UREASE IN VIBRIO PARAHAEMOLYTICUS

Tracy Berutti, Rachele Cooley, D. Jay Grimes
University of Southern Mississippi/Southeast

Vibrio parahaemolyticus is a marine bacterium that causes gastroenteritis and wound infections. Although hemolysins are well known virulence factors, urease is also present in many pathogens. With this enzyme, urea is hydrolyzed into carbon dioxide and ammonia. This activity contributes to survival in the digestive tract, inflammation, blood vessel permeability and tissue invasion. A collection of 157 *V. parahaemolyticus* isolates from Mississippi coastal waters were investigated for urease and hemolysin activity using Christensen's urea agar and Wagatsuma agar. The relative abundance of hemolysin producing *V. parahaemolyticus* was consistently high throughout. In contrast, the number of urease positive organisms increased from 36% in 2006 to 80% in 2007 and 97% in 2009. It has been shown that hemolysins need not be present in urease positive organisms to cause disease. Accordingly, it is possible that an increasing prevalence of organisms with both virulence factors could increase this pathogen's ability to cause disease in healthy individuals.

P4.06

FEMALE ORNAMENTATION AND INTRASEXUAL AGGRESSION IN NORTHERN CARDINALS, *CARDINALIS CARDINALIS*

Caitlin Winters, Jodie Jawor

University of Southern Mississippi

Sexual selection results in traits that provide a reproductive advantage to the bearer by indicating an individual's quality to potential mates or rivals. The northern cardinal, (*Cardinalis cardinalis*), is a territorial, bi-parental, multiply ornamented bird of the eastern

United States. Survival of offspring is dependent on both parents providing adequate food and nest defense. It is therefore expected that both sexes would have a vested interest in the ability of a potential mate to protect the nest from intrusion. Ornaments may be used to indicate information about this quality. In northern populations, the melanin-based facemask ornament in females has been shown to indicate intrasexual aggression at the nest. The purpose of this study was to expand upon these results with females of a southern population. Female behavior was assessed by simulated territory intrusions using a female decoy placed at the nest of an incubating female cardinal. Her behavior was monitored and scored for aggressiveness. The bird was then caught using mist nets so that facemask area and brightness could be determined. We found no correlation between facemask color or area and aggressive behavior suggesting that southern females do not show the same relationship as their northern counterparts. It is possible that shorter breeding seasons foster more aggressive interactions because of limited time and resources and that ornamentation has been selected to convey this competitiveness. The longer southern breeding season may create a divorce of this ornament from aggressive behavior due to decreased gains from aggressive interactions.

THURSDAY AFTERNOON

Conference Room

O4.01

1:30 A TAXONOMIC REVISION OF THE 'SINGULARES' GROUP OF CASEARIA SECT. CASEARIA (SAMYDACEAE)

Mac Alford¹, Ashley Rich²

¹*University of Southern Mississippi*, ²*University of Arkansas at Pine Bluff, Pine Bluff, Arkansas*

The 'Singulares' group of Casearia sect. Casearia (Samydaceae) was studied in order to determine the number of species, their correct names, and their geographical distributions. In a monumental study of the family in 1980, Hermann Sleumer concluded that the group consisted of only two species of flowering shrubs and trees from northern South America, but his treatment has rarely been followed by field botanists, some of whom have recognized as many as seven species. Unfortunately, confusion persists, because several of the studies which recognize additional species are based on limited geographical sampling. For this study, 373 specimens of the group, representing its full geographical range, were borrowed from herbaria. Each of the specimens was measured or examined for 13 characteristics, which were evaluated

statistically for correlations. Based on these data, at least four species are inferred to comprise the 'Singulares' group. Key features include stipule persistence, petiole length, leaf margin, and leaf shape (length/width ratios).

O4.02

1:45 THE TARANTULA *APHONOPELMA MOJAVE*: SEPARATE POPULATIONS OR SEPARATE SPECIES?

Bernadette DeRussy, Brent Hendrixson
Millsaps College

In light of the global biodiversity crisis facing us today, identifying and cataloging the planet's species is of utmost importance. And despite arguments for and against the validity of different species concepts, few would disagree with the presumption that multiple lines of evidence provide the most rigorous assessment for determining when separate populations are indicative of different species. In this study we investigate *Aphonopelma mojave*, a small tarantula species from the Mojave Desert in the western United States. Previous research on these spiders showed that this species consists of two morphologically distinct populations (eastern and western) separated by a low-elevation geographic barrier. Given this information, we hypothesized that these two populations are sufficiently isolated from each other and perhaps should be granted full species status. We tested this hypothesis specifically by analyzing spatial patterns of genetic variation in a gene from the mitochondrion (*cytochrome c oxidase subunit I*). Our results convincingly demonstrate that these populations are genetically distinct from each other. This indicates a lack of gene flow between the two populations and corroborates the morphological and geographic differences previously noted. Taken together, we argue that the populations have diverged to the point that we consider them different species. Our results also unveil the potential utility of using genetic data for delineating species boundaries in tarantulas, a group of spiders whose classification and taxonomy has been hampered by sloppy research in the past.

O4.03

2:00 EXPRESSION OF YIN, A PUTATIVE OLIGOPEPTIDE TRANSPORTER, IN THE REPRODUCTIVE TRACT OF *DROSOPHILA MELANOGASTER*

Katherine Butler¹, Yael Heifetz², Paul Mack¹
¹Mississippi University for Women, ²The Hebrew University of Jerusalem, Rehovot, Israel

The biology of gamete formation results in a dynamic that makes females a scarce resource for males. Thus, males compete for access to females for

reproduction, in turn, driving the evolution of male-male competition both before and after mating. In the latter case - sperm competition - overlapping ejaculates of separate males vie for the opportunity to fertilize a female's eggs. This complicated interaction can drive the evolution of exploitation and manipulation in both sexes, frequently via the inclusion of additional peptides in the ejaculate. In the fruit fly, *Drosophila melanogaster*, sperm and sperm-associated proteins have various effects on females ranging from increased ovulation to increased mortality rates. To date, few studies have addressed how females might respond to these associated proteins. From a set of previously identified candidate genes sharply up-regulated after mating, we identified one gene, *yin*, which may be involved in the transport of sperm-associated proteins or their metabolites into the epithelium of the female reproductive tract. We sought to verify initial microarray data that suggested the general up-regulation of *yin* in mated vs. unmated females. We specifically examined *yin* expression in the uterus (UT), rectum (RP), seminal receptacle (SR), and spermathecae (SP) in both unmated and mated 3-day old females at various post-mating times. Our results suggest that *yin* expression increases significantly in both UT and SR and possibly also the SP. Our data also indicate expression of *yin* increases even more dramatically in mated females over the subsequent 24 hours relative to unmated females.

O4.04

2:15 PATTERNS OF OVIPOSITION FOR CULEX MOSQUITOES IN RESPONSE TO Aedes albopictus LARVAE

Anne Winters, Donald Yee
University of Southern Mississippi

Aedes albopictus, an invasive species from Asia, is now the most dominant container species in the southeastern United States and has been found to be a strong competitor against many resident container mosquitoes. The ovipositional response of many *Culex* to the presence of *Aedes albopictus* larvae has not been determined, although such information could be useful for understanding the role of interspecies interaction in containers. The purpose of this study was to quantify *Culex* oviposition in containers across different densities of *Aedes albopictus*. Field collected *Aedes albopictus* and *Culex* eggs were hatched, and first instar larvae were placed in twenty-five containers in the field into which wild adult *Culex* were allowed to freely oviposit egg rafts. Five replicates of each of the five larval density treatments were established: high *Aedes albopictus*, low *Aedes albopictus*, high *Culex*, low *Culex*, and a control containing no larvae. Bowls were checked daily and *Culex* egg rafts were counted.

Subsequently, larvae were identified to species in the lab to understand the response of specific *Culex* species to larval density treatments. Mean differences in egg rafts among treatments will be analyzed using analysis of variance. A preliminary study determined that there were significant differences in the number of *Culex* egg rafts laid in response to four treatments, with significantly more egg rafts laid in high *Aedes albopictus* densities and no larvae controls, and fewer in low *Aedes albopictus* or high *Culex* containers. These data will help determine if *Aedes albopictus* larvae affect *Culex* oviposition.

2:30 Break

O4.05

2:45 PREDACIOUS DIVING BEETLES (COLEOPTERA: DYSCIDAE) OF SOUTHERN MISSISSIPPI: EFFECTS OF ENVIRONMENTAL PARAMETERS ON ABUNDANCE AND SPECIES RICHNESS AMONG THREE HABITAT TYPES.

Kristopher Pitcher, Donald Yee

University of Southern Mississippi

Predacious Diving Beetles, as both avid dispersers and predators, likely have important ecological roles in aquatic habitats. Little is known about environmental factors that affect dytiscid abundance and richness patterns among aquatic habitats. During early summer 2009, dytiscids were collected from 67 sites near Hattiesburg using dip nets. Forty-four of these sites were re-sampled in early fall for seasonal comparisons. Sites examined included tire ruts, ditches, and ponds. Tire ruts and ditches were defined as man-made; ponds were considered naturally formed. For each site, we measured total area, mean canopy cover, aquatic vegetation cover, and depth. Based on logistic regression analysis of the four habitat parameters during the first collection, only increasing canopy cover had a significant weak negative effect on beetle presence. MANOVA indicated that habitat types only varied significantly by depth, with ruts significantly shallower compared to other habitats. There were no significant differences in total number of beetle species or individuals among habitat types, suggesting the measured parameters have little influence by themselves. Of the 19 species identified, two displayed different abundance patterns among habitat categories during early summer. Mean abundance of *Laccophilus proximus* was higher in ruts than ponds, whereas mean abundance of *Liodes cantralii* was higher in ditches than other habitats. Results for *Laccophilus proximus* may support its hypothesized role as a colonizer of new habitats. The study suggests that dytiscid communities do not

strongly vary among these habitats; however, some individual species seem to prefer some habitats over others, suggesting non-random beetle assemblages.

O4.06

3:00 INFLUENCE OF DETRITUS, MICROORGANISMS, AND HABITAT PARAMETERS ON LARVAL MOSQUITO (DIPTERA: CULICIDAE) COMMUNITIES IN TREE HOLES AND DISCARDED AUTOMOBILE TIRES IN HATTIESBURG

David Allgood¹, Kevin Kuehn¹, Jamie Kneitel², Donald Yee¹

¹*University of Southern Mississippi*, ²*California State University, Sacramento, Sacramento, CA*

Few studies have simultaneously compared mosquito communities between tree holes and automobile tire habitats, although differences in environmental factors or food web parameters may be important for explaining differences between resident mosquito communities. We sampled larval mosquitoes, microorganisms, and microorganism productivity in tree holes and discarded tires around Hattiesburg during the summer of 2009 to determine if differences in environmental variables and mosquito communities existed between container types, and to understand the importance of environmental variables to mosquito communities. We sampled 12 containers at two tire and tree hole sites during early and late summer. For each container we enumerated mosquito larvae and measured several environmental parameters: canopy cover, total water volume, and detritus (separated by type). MANOVA revealed that tree holes and tires differed in factors related to microorganisms (protozoan richness and abundance, fungal biomass) but not in other factors like detritus or water volume. Analysis of community dissimilarity between containers indicated strong differences, with tires principally comprised of *Aedes albopictus*, *Anopheles crucians*, *Culex coronator*, *Culex quinquefasciatus*, *Cx. salinarius*, and *Cx. territans*, whereas tree holes contained *Ae. triseriatus*, *Orthopodomyia signifera*, and *Toxorhynchites rutilus*. Although we found that mosquito communities differ between tree holes and tires, the factors important for such differences remain unclear.

O4.07

3:15 THE CAROLINA BAYS: AN INVESTIGATION OF NORTH AMERICA'S POST LAST-GLACIAL MAXIMUM ENVIRONMENT(LGM)

LaEsha Barnes¹, Cedric Hall², Dewayne Branch², Malcolm LeCompte²

¹Mississippi Valley State University, ²Elizabeth City State University, Elizabeth City, NC

Approximately 13,000 years ago, the Laurentide Ice Sheet's retreat was interrupted by a return to glacial climatic conditions that persisted for over 1,000 years. The events precipitating the dramatic, millennial long climatic cooling, known as the Younger Dryas (YD), remain both a mystery and the subject of debate. It has recently been hypothesized that a fragmented comet or asteroid might have simultaneously initiate the YD and formed the Carolina Bays. However, Carbon 14 dating and pollen analysis indicates an earlier genesis. To understand the processes that created the bays, it is helpful to probe their interior structure. Analogous to the Gamburtsev mountain research, sedimentary core samples and a ground penetrating RADAR survey were used to probe the interior of the bay to collect evidence consistent with either the terrestrial or extraterrestrial formation theory. Soil processing techniques were used to extract possible impact markers from soil samples. Data charts were built then compared to previous studies conducted on the Carolina Bays and their correlation to the Younger Dryas period. The soil samples analyzed within the team's current research were taken from Sandra Kimbel Bay in the year 2008 and additional samples were taken from the team's expedition at Rocky Hock Bay. In the future, these samples will be analyzed for more impact markers to provide a more in-depth understanding of the Carolina Bays.

3:30 Division Business Meeting

GEOLOGY AND GEOGRAPHY

Chair: Johnathan McMillin, HACH Company

Vice-chair: John Banks, MS Dept. of Environmental Quality

THURSDAY MORNING

Forrest 2

8:30 Introduction

O5.01

8:40 A REVIEW OF TERRESTRIAL AND FRESHWATER VERTEBRATES FROM MARINE CRETACEOUS DEPOSITS IN MISSISSIPPI

George Phillips

Mississippi Museum of Natural Science

Upper Cretaceous marine deposits in Mississippi are very rich in marine vertebrates, but all named post-Tuscaloosa formations within the state have also yielded terrestrial and freshwater vertebrates. Nonmarine vertebrate remains are known from marine deposits representing environments ranging from very near-shore zones to relatively deep, middle shelf waters. Their presence is largely the result of coastal river input, seaward retreat of storm surge, and reworking of pre-existing paralic sediments. Although alligator gar (*Atractosteus*) also frequent coastal marine waters, other gar (*Lepisosteus*) and lungfish (*Metacerasodus*) are freshwater taxa. Lizards (Teiidae) were recently reported from two localities in Mississippi. Nonmarine chelonians are represented by several terrestrial and freshwater taxa, including the tortoise-like *Basilemys* (Nanhsiungchelyidae), which is best documented from inland stream deposits in the Western Interior. Turtle shell fragments representing 'giants' of the riverine softshell family (Trionychidae) are known from the Mooreville Formation. Much of the nonmarine turtle material accumulated to date, however, has yet to be identified beyond the ordinal level. Nonmarine, coastal Cretaceous crocodilians are well documented in the state, and pterosaurs are represented by a couple of fragmentary elements. Dinosaurs are known from all five formations in Mississippi's Gulfian sequence and represent five major types: hadrosaurs, nodosaurs, ornithomimosaurs, raptors (Dromaeosauridae), and large theropods (Tyrannosauroidae). Hadrosaurs are by far the most abundant. Like lizard remains, Cretaceous mammals are known only from nearshore transgressive lags in Mississippi, and both groups are rare due to size and

fragility. However, several different types of early mammal are represented.

O5.02

9:00 SCALING RELATIONSHIP BETWEEN SOCIO-PHYSICAL VULNERABILITY AND FINANCIAL LOSS

Bandana Kar

University of Southern Mississippi

According to the United Nations, among the various natural hazards, hydro-meteorological hazards affect about two-thirds of the coastal population of the world. Recent studies have also suggested that the continual increase in coastal population (i.e., twice as fast as in inland areas) and infrastructure contributes to significant financial damage from storms and coastal flooding than from any other hazard. Hurricane Katrina of 2005 and hurricane Andrew of 1992 are examples of the largest and worst economic disasters in the U.S. history, resulting in some \$200 billion and \$25 billion in damages, respectively. To mitigate and prepare for future storm surge events, decision makers are advocating for "loss estimation" and "vulnerability assessment". Because of the geographic distributions of storm surge risk, it is however, essential to understand "what scale is appropriate to compute loss and socio-physical vulnerability". This can help understand "the relationship between loss and vulnerability". In this study, at five scales of analysis (i.e. parcel, block, block group, tract and county), social and physical vulnerability, and financial loss was computed. Finally, the variation of relationship between social-physical vulnerability, and financial loss was explored at each scale of analysis.

O5.03

9:20 CAMPANIAN-AGE (75.4 MILLION YEAR OLD) BIOTITE ASH FALLS FROM VOLCANIC ERUPTIONS AT MISSISSIPPI

David T. Dockery III

Mississippi Office of Geology

The Stanolind Oil & Gas Company #1 Homer L. Cox well in Section 24, T. 6 N., R. 1 W. in Hinds County encountered two igneous sills or dikes, associated with the Jackson volcano, in the Cotton Valley Group at 10,357 feet and 10,430 feet in a sequence of red sandstones, siltstones, and shales. These intrusions were 12 and 17 feet thick, respectively, and consisted of an upper calcitized trachyte porphyry with a specific gravity of 2.45 and a lower olivine biotite basalt with a specific gravity of 2.98. The magma chamber feeding the Jackson volcano most likely had a trachytic composition, which mixed on occasion with injections of basaltic magmas from

the upper mantle. Martin et al. (2008) attributed an eruption of the Nea Kameni Volcano in Santorini, Greece, to an intrusion of a mafic, olivine-rich magma a month before the eruption. Evidence of such events at Mississippi, can be seen in two biotite ash deposits in the middle Chalk member of the Campanian-age Demopolis Chalk. One ash deposit was reported by Schmitz and Russell (1994) from an exposure in an exploration trench at the Holcim Cement quarry near Artesia; it had a radiometric age of 75.4 million years old as determined from sanidine crystals associated with the biotite (Obradovich cited in Dockery, 1996). Another 30-foot exposure of the middle Demopolis Chalk on the Tombigbee River in Sumter County, Alabama, which was photographed and sampled by Charlie Smith, contained a four-foot interval of chalk heavy with biotite.

9:40 Break

O5.04

10:00 THE TATUM LIMESTONE MEMBER OF THE CATAHOULA FORMATION IN COVINGTON COUNTY

James E. Starnes, D. Kenneth Davis

*Mississippi Department of Environmental Quality
Office of Geology*

The Tatum Limestone Member of the upper Catahoula Formation was named for a lime unit encountered by the "Atomic Energy Commission, Hydrologic Test Site #1" on the Tatum Salt Dome in Lamar County. The Tatum was present in five of five test holes conducted by the Mississippi Office of Geology during the mapping of the Hot Coffee, Collins, Seminary, Williamsburg 7.5 min quadrangles in Covington County. The Tatum is a marine unit marked by the presence of the foraminifera, Heterostigina. This unit was cored in the test hole, Plum Creek #5 Covington (MDEQ E-Log# H0026) in the NE ¼, SW ¼, SE ¼, SW ¼, of Section 4, Township 8 North, Range 14 West in Covington County. The Tatum in this test hole is about 30 feet thick and sits approximately 130 feet below the base of the Hattiesburg Formation. The base of the Tatum consists of a bioturbated, calcareous clay which grades upward into a bioclastic limestone, then into a fossil rich calcareous sandy marl. The upper part of the Tatum consists of a sparingly fossiliferous, regressive, glauconitic sand. This Tatum likely grades, up-dip, completely to a sand unit and may become dominantly a limestone, down-dip. The persistence of the Tatum in the shallow subsurface may prove to be a good regional correlation marker in test holes used for geological mapping in south central Mississippi.

05.05

10:20 THREE-DIMENSIONAL RECONSTRUCTION OF MARINE CLAY AT THE NANOMETER LEVEL

Jessica Douglas¹, Kenneth J. Curry¹, Richard Bennett², Ann Curry¹

¹University of Southern Mississippi, ²SEAPROBE, Inc., Picayune

Clay formation begins with the weathering of parent rock, forming clay mineral platelets, and developing during transport and deposition into structures called fabric signatures and aggregates. Organic matter is trapped during clay sediment transport, deposition, and during post-depositional processes by encapsulation and held in clay fabric signatures at higher concentrations than expected under regimes of oxidation and enzymatic digestion. The basis for this phenomenon of organic entrapment is both chemical, based on clay surface charges, and physical, based on clay fabric morphology. Our study focuses on physical protection of organic matter by clay fabric, employing direct visualization with transmission electron microscopy. We have developed a technique to obtain ultra-thin serial sections of laboratory consolidated chitin-rich clay (90% illite, 10% smectite). Selected areas of sections are photographically mapped, assembled as mosaics, serially stacked, and reconstructed electronically using image analysis software. Three-dimensional reconstruction of organo-clay fabric has not been previously attempted. A study by Curry et al. (Geochim. Geophys. Acta 2007) showed that chitin within 10 nm of a clay surface was protected from digestion with chitinase, but the study was limited to two-dimensional images. We have created three-dimensional images of clay fabric which represents a challenging step in analyzing the distribution of organic matter in the fabric. Here we demonstrate three-dimensional reconstructions and discuss analysis strategies we intend to use for organic matter-clay fabric studies. We anticipate that elucidating the 3-D fabric characteristics at this scale of organization will enhance our understanding of organic matter physical protection during sediment diagenesis.

05.06

10:40 HEAVY MINERALS IN NEARSHORE BEACH SANDS ASSOCIATED WITH THE HIGHSTAND REGRESSIVE PHASE OF SEQUENCE CYCLE TP1.4

David E. Thompson

Office of Geology, MDEQ

In east-central Mississippi, previously unmapped Paleocene units of Naheola Formation have been delineated in conjunction with surface mapping

efforts by the Mississippi Office of Geology. In Section 1, T. 17 N. R. 12 E., Choctaw County, nearshore beach sands are positioned at the top of the Oak Hill Member of the Naheola Formation. The Oak Hill Member is a highstand, regressive deposit at the top of sequence stratigraphic Cycle TP1.4 (Mancini and Tew, 1991). The nearshore beach environment attributed to the sands is readily identifiable due to the presence of distinct heavy mineral bands. These beach placer deposits accumulated along the swash zone, where turbulent surf washes over the beach face. The Oak Hill Member is approximately 100 feet thick and typically fines downward into a dense clay sequence interlaminated with very fine-grained quartz, mica, and carbonaceous material. The Oak Hill member is underlain by the Matthews Landing Member of the Porters Creek Formation, the condensed section/transgressive portion of Cycle TP1.4. The nearshore beach deposits at the top of the Oak Hill Member are abruptly and unconformably overlain by very coarse-grained sands with meta-quartz pebbles of the Coal Bluff Member of the Naheola Formation, which is a lowstand deposit at the base of sequence stratigraphic Cycle TP1.5. Similar beach sand facies have been identified along strike, to the southeast, in Winston, Noxubee, and Kemper counties. Heavy mineral content of the Oak Hill sands includes the TiO₂ minerals (leucoxene, ilmenite and rutile), zircon, kyanite, sillimanite, and staurolite.

THURSDAY AFTERNOON

Forrest 2

05.07

1:00 SEAGRASS COVERAGE ASSOCIATED WITH BARRIER ISLAND DYNAMICS SINCE 1940 FOR PETIT BOIS ISLAND, NORTHERN GULF OF MEXICO

Brittany Haney Foster¹, Gregory Carter¹, Alan Criss¹, Gabriel Blossom¹, Patrick Biber²

¹Gulf Coast Geospatial Center of Southern Mississippi,

²Department of Coastal Sciences of Southern Mississippi

Seagrasses are diverse, productive, and serve an important role in coastal environments by stabilizing sediment and improving water quality through filtering nutrients and contaminants. They provide food in coastal marine food webs and create essential nursery habitat for many commercially and recreationally valuable species, but are declining globally. This study utilized remotely sensed data to quantitatively determine seagrass coverage for the Mississippi barrier islands. Individual seagrass beds were identified visually in historical imagery. Total seagrass areal coverage for an island in a given year was determined

by the sum of areas within polygons drawn manually around the perimeter of each seagrass bed seen in the image. In 1940, Petit Bois supported approximately 54 ha of seagrass which declined to 19 ha by 2007. Petit Bois appears to be the only island for which change in seagrass coverage has corresponded with a decline in island land area. Seagrass decline on Petit Bois may thus be explained largely by the nearly 40% reduction in the island's land area which occurred over the period of 1940-2007.

O5.08

1:20 A STUDY CORRELATING ALLUVIAL FAN STRATIGRAPHY AND GEOPHYSICAL TECHNIQUES ON AN ALLUVIAL FAN IN PANOLA COUNTY.

John Andrew S. Fleming¹, Zachary A. Musselman¹, James B. Harris¹, Charlotte Byrd¹
¹Millsaps College, ²Mississippi Department of Environmental Quality

The portion of the Mississippi River alluvial aquifer underlying the Delta Region of Mississippi is a threatened natural resource with groundwater withdrawals exceeding local recharge rates. The largest groundwater withdrawals in the Delta region are used to support agricultural and aquacultural activities. Bluff-line deposits, in the form of alluvial fans, may be crucial recharge areas and may provide valuable clues to stratigraphic and hydraulic connectivity between the Mississippi River alluvial aquifer and older deposits of the bluff. The goal of this project is to correlate near surface geophysical data with the shallow stratigraphy (upper 3 meters) of an alluvial fan in Panola County. Geophysical techniques included ground penetrating radar (GPR) and ultra-shallow shear-wave seismic reflection. GPR data were collected using a pulseEKKO PRO with a 100 Mhz antenna. Reflection data were collected using a 24-channel seismograph and a 0.5 kg claw hammer and a small triangular block of wood as an energy source. Sediment samples were collected by hand augering at the two locations of the seismic lines. Samples were air-dried, sifted to determine grainsize distribution, and described texturally under a microscope. The sampling location nearest the apex of the fan showed a greater variation in grainsize than the distal location. Preliminary interpretation of the seismic reflection and GPR data set from the apex of the fan indicates that a strong reflection correlates with a shallow gravel layer, however no strong shallow reflections were identified in the data set from the distal location.

O5.09

1:40 EFFECTS OF HURRICANE HUGO ON VEGETATION CONDITIONS IN SOUTH CAROLINA

Keith Omweri, Shrinidhi Ambinakudige

Mississippi State University

Hurricane Hugo made a landfall in South Carolina on September 21, 1989. Devastating winds of Hugo claimed about 35 lives, and destroyed properties and infrastructure worth several billion dollars. These winds also destroyed the vegetation, affecting the natural ecosystem of the region. Destruction of vegetation by Hurricanes alters the carbon sequestering capacity of the Southeastern forests. The objective of this study was to find out the effects of Hurricane Hugo on the vegetation conditions in South Carolina. Study analyzed the spatial and temporal changes in Normalized Difference Vegetation Index (NDVI) in South Carolina over a period of seventeen years using 14-day NDVI composites of Advanced Very High Resolution Radiometer (AVHRR) satellite. The results of the study indicate that the Hurricane Hugo has significantly affected the vegetation conditions of the area and could be a significant factor in reducing carbon storage in US forests.

2:00 Break

O5.10

2:20 LAND COVER, REMOTE SENSING, AND BIOGEOGRAPHY

Jerry Griffith

University of Southern Mississippi

While many features of the earth's surface remain essentially unchanged, many other biophysical and human features are dynamic. Globally, 40% of land has been converted to agricultural use. Places as disparate as the Philippines, Ghana and the eastern United States have lost more than 90% of their natural habitat (Prugh et al. 2008). And because changing environments can alter the amount of available resources and affect quality of habitats, the connection to the presence and distribution of organisms is strong. In fact, some feel that land use and land cover change comprise a large part of global change and perhaps have an impact even greater than climate change (Jensen, 2005). The purpose of this overview presentation is to provide a synopsis of the changing view of connections between land cover change and biogeography. The first part will review the identification of land cover and its change. The second part will focus on biogeographical applications of land cover studies - namely the application of island biogeography and landscape ecology principles to

patches of land cover. The evolution of perspectives on land cover change analysis to biogeography lies in the improved capability of sensor to detect changes as well as the quality of a particular land cover or vegetation class, and new perceptions of how units of land cover should be modeled when used in conjunction with wildlife and vegetation data.

05.11

2:40 A DISTINCTIVE LITHOFACIES BETWEEN THE PRAIRIE BLUFF AND OWL CREEK FORMATIONS (UPPER CRETACEOUS) OF NORTH MISSISSIPPI AND ITS CHARACTERISTIC FAUNAL CONTENT

George Phillips

Mississippi Museum of Natural Science

The lithology and macrofossil content of a previously recognized but unnamed facies between the Prairie Bluff and Owl Creek Formations is sufficiently different from the typical marly chalk and sandy marl that characterize most of the former and terrigenous nature of the latter as to warrant distinction as a named unit. The unnamed lithofacies is a calcareous muddy fine quartz sand frequently characterized by an abundance of well-preserved small, burrowing echinoids (Spatangoida). It is conformably bounded below and above by the typically non-sandy Prairie Bluff lithology and the sandy clays to clayey fine sands of the Owl Creek Formation, respectively. It differs from the Owl Creek in its nonargillaceous lithology and nonaragonitic fossil content. The outcrop of this facies extends a minimum 20 miles, from south of Pontotoc north to New Albany. This lithofacies is minimally described (but not named) in the older (1940s) and more recent (1980s) literature, which refer to its distinctive lithology and macrofauna. Of particular interest are the benthic macroinvertebrates, which include not only an abundance of small heart urchins, but also an equal abundance of bryozoans, sea pens (Pennatulacea), and a small oyster (*Cubitostrea tecticosta*). In addition to small spatangoids, the echinoid fauna contains a diversity of taxa totaling (at least) eight species, including phymosomatoids, cassiduloids (*Hardouinia*), and very rare arbacoids (*Codiopsis*) and holasteroids (*Cardiaster*). The proposed (and available) name for this lithologically and faunally distinct facies is "Nixon sand," for a community near Pontotoc where the bed was first encountered by the writer.

05.12

3:00 EVALUATING LIQUEFACTION POTENTIAL USING CONE PENETRATION TEST AND MICROMORPHOLOGICAL ZONING CRITERION: APPLICATION TO NORTHWEST MISSISSIPPI

Steven Fox, Adnan Aydin, Mary Beroya
University of Mississippi

This study examines various approaches to utilization of the cone penetration test (CPT) results in evaluating liquefaction potential. Because CPT-based subsurface profiles are not often available at the required density, delineating boundaries of highly liquefiable zones is not reliable from the widely-spaced and randomly scattered CPTs alone. In this preliminary study, we demonstrate the use of micromorphological criteria to guide stratigraphic interpolation between and extrapolation from the CPTs. This method is applicable to areas with significant subsurface geology complexity. The area selected for this study is situated in a complex alluvial basin filled with various types and states of unconsolidated sediments and is vulnerable to the liquefaction hazard due to its proximity to the potential earthquake generators (especially the New Madrid Seismic Zone). The study is limited to parts of Tunica and DeSoto counties where there is basic and seismic CPT profiles prepared by the USGS.

3:20 Division Business Meeting

THURSDAY EVENING Dodgen Poster Session Exhibit Hall C

Posters on display, 6:00p – 7:00p

Posters must be put up between 4:30p – 5:00p

P5.01

THE GEOGRAPHY OF RECOVERY: MAPPING RECOVERY IN SOUTHERN MISSISSIPPI POST KATRINA

David Holt

University of Southern Mississippi

The geography department at University of Southern Mississippi has been conducting studies using Geographic Information Systems (GIS) to document and monitor the recovery rate of the Mississippi Gulf Coast. This has been problematic as GIS data are not readily available before 2005 and the movement of people after Hurricane Katrina has been difficult to quantify. Using boots on the ground field work, we have identified over 8,200 parcels that are either damaged or blighted in the area south of Interstate 10. We are now trying to use quantify the recovery efforts on the Gulf Coast of Mississippi Katrina+4.



HEALTH SCIENCES

Co-Chair: Fazlay Faruque, University of Mississippi Medical Center

Co-Chair: Ibrahim Farah, Jackson State

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

Co-Vice Chair: Stanley Smith, University of Mississippi Medical Center

THURSDAY MORNING Lamar 2

Public Health Mini-Symposium

8:30a-9:15a Opening Presentation

Dr. Mary Currier, MD, MPH
State Health Indicators and 2009 H1N1 Influenza

O6.01

9:30 CONTROL OF APPETITE, OXYGEN CONSUMPTION, AND ENERGY EXPENDITURE BY THE CENTRAL LEPTIN SIGNALING PATHWAYS DURING ALTERATIONS IN AMBIENT TEMPERATURE

Jarrett Morgan¹, John Hall¹, Jussara do Carmo¹
¹University of Mississippi Medical Center, ²Belhaven College

The peptide hormone leptin acts on the central nervous system (CNS) through three main signaling pathways: Irs2-PI3K, Shp2-MAPK, and Stat3. These pathways may differentially regulate the effects of leptin on energy expenditure, oxygen consumption (VO₂), and body temperature. The objective of the present study was to compare basal body temperature and metabolic rate in young (10-15 weeks) mice lacking leptin receptors or one of the 3 main leptin signaling pathways in different areas of the CNS at cold and warm temperature. Mice were implanted with temperature probe transmitters and kept in special metabolic cages to measure food intake, body temperature, VO₂, and energy expenditure (EE) at 30 and 10°C. Compared to wild type (WT), mice with leptin receptor (LepR), Stat3, and Irs2 deletions in different areas of the brain (proopiomelanocortin neurons, paraventricular neurons, and forebrain) have greater food intake (1.9 vs 2.2 g/day) at the thermoneutral zone (30°C). At 10°C, the LepR, Irs2, and Stat3 deletions all exhibited elevations in food intake by 30% compared to thermoneutrality. No

significant change was observed in body temperature. Also, these mice had 9% lower VO₂ at thermoneutrality compared to WT and reduction by 15% at 10°C. However, at thermoneutrality and at 10°C, these mice had a 21% increase in EE compared to WT mice. Our results indicate that leptin's CNS effects are crucial for regulation of thermogenesis and energy expenditure.

O6.02

9:45 DISPARITIES IN THE UNDERSERVED AND MINORITY CANCER POPULATION

David Wallace¹, Melissa Manning¹, Rebecca Masters¹, Shelby Sheffield¹, Marguerite Clarkson²
¹Cooperative Intern Program between Mississippi Gulf Coast Community College, Jackson County Campus Honors Biology Students, ²The Singing River Hospital System, Pascagoula, MS, ³The National Aeronautics and Space Administration, Stennis Space Center

The Cancer Research Center (CRC) of the Singing River Health System, through a grant awarded by the National Cancer Institute (NCI), is exploring the barriers to clinical research trial participation among the underserved and minority cancer patient population of South Mississippi. Underserved is defined as elderly (over age 60), uninsured or underinsured, African-American, or Hispanic minority. This study utilized retroactive analyses of the clinical trials' screening database developed by the CRC to track eligibility. Demographic variables were analyzed in relation to study-specific eligibility criteria (disease stages/characteristics, previous medical history, and/or physical exam/organ systems) to identify and trends across patient populations. The CRC hopes to identify barriers to accrual-based on eligibility criteria for clinical trials.

O6.03

10:00 THE PURPOSE OF CLINICAL INTERVENTIONS PERFORMED BY PHARMACISTS AND THEIR EFFECTIVENESS IN A HOSPITAL SETTING

Amanda Vargas¹, Janet Rush-Pugh²

¹Cooperative Intern Program between Mississippi Gulf Coast Community College, Jackson County Campus Honors Biology Students, ²The Singing River Hospital System, Pascagoula, MS, ³The National Aeronautics and Space Administration, Stennis Space Center

The purpose of this project was to document the time pharmacists spent recording clinical interventions within the hospital system. Clinical interventions are implemented to improve, maintain, or assess the health of a patient in a clinical situation. New software introduced to the hospital encouraged the

recording of these interventions and categorized them to identify trends within hospital units. The interventions were also categorized into a percentage for each hospital and its unit; they were then separated into specific months and types. The data collected served to validate the need for the continued performance of clinical interventions by pharmacists due to their effectiveness in relation to their ability to prevent potential mistakes and adverse outcomes, save hospital fiscal resources, and improve patients' recovery time, treatment efficiency, and/or therapy.

O6.04

10:15 MEDICATION ADHERENCE IN A HYPERTENSION REFERRAL CLINIC

Amber Holdiness, Patrick Boler, Kenneth Butler, Deborah Minor, Anthony Mawson
University of Mississippi Medical Center

Adherence to medications is a clinical management problem encountered in many patients, especially those with multiple co-morbidities. The objective of this study was to evaluate medication adherence and measures of cardiovascular risk factor control using the modified Morisky Medication Adherence Scale (MMAS) in a hypertension referral clinic population. A mixed methods study consisting of a survey administered to hypertensive clinic patients (N=255) and a retrospective records review to ascertain chart recorded medication adherence (pill counts, refills), hypertension control, dyslipidemia (LDL) control, and diabetes control (HbA1C). Statistical analyses included descriptive statistics as well as Spearman's rho to demonstrate strength of association between dichotomized MMAS scores and risk factors. The study population was primarily female (65.1%) and African-American (53.7%) with a mean age of 57 years. The MMAS score was moderately associated with chart recorded medication adherence ($\rho = 0.341$, $p < 0.001$). MMAS scores were weakly associated with dyslipidemia ($\rho = 0.253$, $p = 0.002$) and hypertension control ($\rho = 0.192$, $p = 0.002$) as determined by review of last laboratory reports and clinical blood pressure readings, respectively. Additional analyses revealed MMAS scores were weakly associated with chronic disease index ($\rho = 0.142$, $p = 0.023$) and negatively associated with depression ($\rho = -0.124$, $p = 0.047$). In addition to being a useful clinical predictor of medication adherence for patients with hypertension and dyslipidemia, it may be useful in screening for depression and an indicator of other co-morbidities.

O6.05

10:30 PREDICTIVE VALIDITY AND RELIABILITY OF THE SOCIAL ATTACHMENT SCALE FOR ADULTS (SATS-A)

Patrick Boler, Amber Holdiness, Deborah Minor, Kenneth Butler, Marion Wofford, Anthony Mawson
University of Mississippi Medical Center

The objective of this study was to describe the validity and reliability of the Social Attachment Scale for Adults (SATS-A), a three-item questionnaire developed to be a rapid clinical measure of the strength of social relationships. Patients (n=255) followed in the UMMC Hypertension Clinic were recruited by convenience sampling. Participants read and responded to SATS-A and the Functional Social Support Questionnaire (FSSQ) questions and provided indicators of self-reported physical and psychosocial health, and a retrospective chart review was completed to determine past medical history and medication adherence. The primary outcomes included correlations between chart recorded medication adherence and the predictive ability of these measures as indicators of general ill-health and poor control of cardiovascular risk factors. Scores from this assessment were dichotomized into high and low groups and then compared using Spearman's correlation coefficient (ρ). The study population was primarily female (65.1%) and African-American (53.7%). Primary analysis found SATS-A to be weakly correlated to the FSSQ ($\rho = 0.185$, $p = 0.003$). Depression was negatively correlated with SATS-A ($\rho = -0.244$, $p < 0.001$). In addition, high levels of physical activity was weakly associated with high SATS-A scores ($\rho = 0.177$, $p = 0.005$). It remains to be determined if the SATS-A will be useful clinical assessment tool in relation to morbidity and mortality. The SATS-A may be used clinically to quickly assess patients for social isolation and depression, but additional investigations are warranted in more diverse clinic populations.

O6.06

10:45 DOES SEASONAL INFLUENZA VACCINATION INDUCE CROSS-REACTIVE ANTIBODIES THAT INHIBIT THE NEURAMINIDASE (NA) ACTIVITY OF PANDEMIC H1N1, 2009 VIRUS?

Hilliary Bland², Richard Webby¹, Glendie Marcelin¹
¹*St. Jude Children's Research Hospital, Memphis*,
²*Mississippi Valley State University*

The 2009 pandemic H1N1 virus has lead to 175,654 confirmed laboratory cases and 1,247 deaths worldwide, as reported by the World Health Organization. While there is a seasonal flu vaccine, there is currently no vaccine approved for human use for pandemic H1N1, 2009. Previous studies suggest



that antibodies directed against hemagglutinin (HA) and neuraminidase (NA), the two large surface glycoproteins found on the influenza virus, is critical for protection against influenza. The aims of our study were two-fold: 1- To determine the levels of human serum antibodies that cross reacts with the NA from pandemic H1N1 2009 and 2- Determine whether there exists an age dependent development of cross reactive antibodies to pandemic H1N1 2009; both of which may be a predictor of immunity against infection in certain age groups. Sera collected from two cohorts of human study subjects were tested for serum antibodies specific for neuraminidase of either pandemic A/TN/1-560/09 and as a control, A/Brisbane/59/02 or A/New Caledonia/20/99 H1N1 seasonal viruses. Participants received one dose of inactivated or live attenuated influenza vaccine during the 2004-05, 2007-08, or 2008-09 influenza season. What we found is that cross reactive antibodies are not significantly boosted by seasonal influenza vaccination. However, a trend suggests there is an increased proportion of elderly tend to have cross reactive NA antibodies, and in higher titer. While evidence indicates there is cross reactive NA antibodies present in the US human population, seasonal vaccination is unlikely to offer any protection against the 2009 pandemic strain.

O6.07

11:00 ASSOCIATION OF WEST NILE VIRUS INFECTION IN HUMANS AND HORSES

William Epperson

Mississippi State University

This report examines the incidence of West Nile Virus (WNV) disease in naive horses and the temporal relationship with reports of clinical human WNV infection. Diagnoses of WNV in horses were available from the South Dakota Animal Disease Research and Diagnostic Laboratory (SD-ADRDL) for 2002, when WNV was introduced in the area. Data for human cases was obtained from the South Dakota Department of Health. A horse was considered a case (n=584) if it resided in South Dakota, had compatible clinical signs coupled with either a positive WNV IgM serum result or direct detection of WNV in tissues by PCR. Cases were restricted to submissions made to SD-ADRDL through veterinary practitioners. Human cases (n=37) consisted of diagnoses rendered by physicians and confirmed through standard methods (serologic or direct detection along with compatible signs). A descriptive analysis showed important trends, including; horses were diagnosed with WNV infection at the same time humans illness commenced, periods of rapid equine diagnoses coincided with similar period in humans, and epidemics in horses and humans ended

simultaneously. Equines can serve an important passive surveillance species for WNV. Given the equine density in most areas of the US, the health care offered by veterinarians, and availability of veterinary diagnostic laboratory testing, cost effective passive surveillance systems are possible.

11:15a-Noon Closing Presentation

Dr. James Glisson, MD, PharmD
Dietary Supplements: A practical Review for the Clinician

THURSDAY AFTERNOON

Poster Session I

1:30-4:30

Authors should be available at their posters to answers questions between 1:30p and 3:00p

Public Health Themed Posters

P6.01

PATIENT PERCEPTIONS, FEELINGS, AND BEHAVIORS REGARDING ESTHETIC DENTAL TREATMENT AT THE UNIVERSITY OF MISSISSIPPI SCHOOL OF DENTISTRY

Pia Chatterjee Kirk, Phebe Clare Winters, Jasen Estep, Joey Sessums, Matthew Harris, Michelle Bolton, Alison Hogan, Lane Baxter, Margaret Ellzey
University of Mississippi School of Dentistry

This study is a psycho-behavioral investigation to compare the perceptions, feelings, and oral health behaviors of patients before and after receiving either esthetic dental treatment or non-smile zone dental treatment at the University of Mississippi School of Dentistry. Because the term "esthetic" refers to an individual's perception of beauty, we must first define our own dental-oriented terms: esthetic and non-smile zone. In this study, esthetic dental treatment refers to any procedure that involves the smile zone, including whitening, anterior composite resin restorations, orthodontics, porcelain veneers, or anterior crowns. Non-smile zone dental treatment, for our study purposes, is defined as any procedure not involving the smile, including posterior restorations (both amalgam and composite resin), anterior lingual composite resin restorations, and posterior crowns and/or bridges (both cast metal and tooth-colored), and prophylaxis. A survey, designed specifically for this project, will be administered to patients in the School of Dentistry receiving esthetic treatment. The same survey will be given to patients receiving non-smile zone dental treatment. Participation will be voluntary and

anonymous. Participation will occur in school of dentistry clinics following the esthetic or non-smile zone dental treatment. Further data will be collected at one and six month intervals. The results will be analyzed using frequency analyses and Repeated Measures Analysis. Comparisons will be made between all items representing feelings, perceptions, and behaviors prior to and following dental treatment.

P6.02

SPECTRAL MEASURES OF HEART RATE VARIABILITY IN PATIENTS WITH DRUG NAIVE MAJOR DEPRESSION COMPARED TO AGE AND GENDER MATCHED HEALTHY CONTROLS

Quadreka Smith¹, Johnsons Pradeep², S. Sucharita², Vaz Mario², Sharada Rajanna¹, K. Srinivasan²
¹Alcorn State University, ²St. John's Research Institute, St. John's Medical College and Hospitals, Bangalore, Karnataka, India

Epidemiological studies have indicated a strong antecedent effect of depression as a risk factor in the development of cardiovascular morbidity and mortality. The present study was to compare spectral measures of heart rate variability in drug naïve patients with major depression who were physically healthy with age and gender matched normal controls, taking note of some of the methodological issues related to earlier studies. Ten (10) subjects, 7 males and 3 females were included in both groups. This study examined the impact of change of posture on baseline measures of heart rate variability in patients with major depressive disorder compared to age and gender matched healthy controls. It was observed that the change in posture had a varying effect on heart rate variability measures between depressed and healthy controls. The effect of change of posture on both parasympathetic and sympathetic cardiac autonomic indices was dampened in patients with major depression compared to normal controls. In normal situations on standing there was a significant decrease in parasympathetic and a significant increase in sympathetic cardiac indices. In patients with major depression this effect on the respective arms of cardiac autonomic axis was less leading to suggest impaired cardiac autonomic control. In conclusion, the results suggested impaired modulation of cardiac autonomic control in patients with major depression. The presence of impaired cardiac autonomic control may be the basis for the association between major depression and increased risk for coronary artery disease. (This international research work conducted at St. John's research Institute was supported by NIH/NCMHD/MHIRT Grant #MD001532.)

P6.03

HEMATOLOGICAL CHANGES IN ASYMPTOMATIC VITAMIN B₁₂ DEFICIENT ELDERLY HUMAN SUBJECTS

Justin Nash¹, Sucharita S.², Sharada Rajanna¹, S. Benny², Mario Vaz²

¹Alcorn State University, ²St. John's Research Institute, St. John's Medical College and Hospitals, Bangalore, Karnataka, India

Severe deficiency of Vitamin B₁₂ can lead to a wide spectrum of hematological, neuropsychiatric and cardiovascular disorders. Frank vitamin B₁₂ deficiency is associated with subacute combined degeneration, autonomic neuropathy and peripheral neuropathy typically precedes the development of anemia. The purpose of the present study was to ascertain the hematological changes in asymptomatic vitamin B₁₂ deficient elderly human subjects with age and gender matched controls and to evaluate cardiac autonomic, peripheral neural and cognitive function in a subpopulation of asymptomatic vitamin B₁₂ deficient elderly subjects. Forty-nine (49) elderly subjects of both genders and above the age of 60 years were recruited. There were no differences in any of the anthropometric parameters between the groups. 10 subjects were found to be anemic, and five of those subjects showed microcytic changes, mean corpuscular volume (MCV) of 7 subjects was >90 fL. There was a strong negative association between vitamin B₁₂ status and MCV (r=-0.28, P=0.07) in elderly subjects. Measurement of delta change in cardiac sympathetic activity suggested significant increment in vitamin B₁₂ replete group compared to deplete group with change in posture (P=0.02). Cardiac parasympathetic activity with change in posture was significantly lower in replete group (P=0.07). There were no changes in nerve conduction parameters (motor and sensory velocity) and cognitive functions between vitamin B₁₂ replete and deplete groups. Vitamin B₁₂ status was associated with hematological variation as well as alterations in cardiac sympathetic and parasympathetic activity in asymptomatic vitamin B₁₂ deficient elderly subjects. This International Research Training involving the first author was supported by NIH/NCMHD/MHIRT # MD001532

P6.04

PREDICTORS OF PULSE PRESSURE AND CHANGE IN PULSE PRESSURE WITH AGE IN THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY

Kenneth Butler, Alan Penman, Thomas Mosley
University of Mississippi Medical Center

Pulse pressure (PP), an indirect measure of arterial stiffness, is a strong predictor of CVD risk.

Determinants of PP and change in PP with age are not well described. In a population-based cohort of 10,854 white and African-American men and women 44 - 66 years of age (mean 53.6 years) not taking anti-hypertensive therapy, SBP and DBP were measured at 4 visits 3 years apart (average 3.4 visits per person). At each visit three readings were taken using a random-zero sphygmomanometer and the average of the last two values computed. In a random effects linear model the average annual change in PP was 1.09 mm Hg (SE 0.02, $P < .0001$), after accounting for baseline age differences. Race, sex, diabetes, smoking, drinking, and BMI were statistically significant predictors of average PP at any time point, but total and HDL cholesterol were not. Diabetes, the most influential predictor, increased the average PP at any time point by 4.86 mm Hg (SE 0.41). Current (but not former) drinking was the only risk factor associated with a decrease in the average PP at any time point, by 1.05 mm Hg (SE 0.23). In addition, diabetes (women only) and BMI (women only) were associated with an increase, and current drinking with a decrease, in the average annual rate of change in PP. In this middle-aged cohort, diabetes, BMI, and current drinking are important determinants of both the absolute level of PP and the annual rate of change in PP with age.

P6.05

BLOOD PRESSURE CONTROL AMONG PERSONS WITH AND WITHOUT CHRONIC KIDNEY DISEASE OR DIABETES IN A HYPERTENSION REFERRAL CLINIC

Kenneth Butler, Deborah Minor, Marion Wofford
University of Mississippi Medical Center

Strict blood pressure control is pivotal in the management of patients with chronic kidney disease (CKD) or diabetes mellitus (DM) but is frequently difficult to achieve. The aim of this study was to assess level of blood pressure (BP) control in 1,286 patients without or with CKD or DM at the UMMC hypertension referral clinic. Patient charts were reviewed for clinical variables, serial BP measurements, and antihypertensive drug therapy. Patients were divided into two target groups. Patients in group 1 were those free of CKD or DM and had a target of $<140/90$ mmHg, while patients in group 2 had CKD or DM and a control target of $<130/80$ mmHg. Overall, at the last visit, systolic BP (SBP) was 128 ± 14 mmHg. Diastolic BP (DBP) was 77 ± 9 mmHg. There was no significant difference in SBP between groups 1 and 2; however, the DBP of group 2 was 5 mm Hg lower compared to group 1. Patients received a median of 2 (1-8) antihypertensive drugs. Diuretics were used in 70% of patients in group 1 and 60% of patients in group

2. Group 1 demonstrated control in 81% of cases ($n=721$), while those in group 2 demonstrated a control rate of 46%. In conclusion, patients with difficult to treat chronic diseases, like CKD or DM, must be more aggressively managed to achieve control.

P6.06

INTRODUCING FLAVORS TO CHILDREN TO ENHANCE FOOD ACCEPTABILITY

Alma Hill, Sylvia Byrd, Julie Wilson
Mississippi State University

The number of overweight children between the ages of 6 and 11 has tripled in the US in the last three decades. The majority of children ages 4 to 13 years do not consume the recommended amounts of fruits, vegetables, whole grains or milk. Research shows that young children's food preferences and food acceptance are affected by the association of experience with the particular food. If the experience is positive, the child will be more likely to have increased consumption. The objective of the study was to ascertain the effects of a week-long camp focused on food, flavors and cooking for children entering third through sixth grade. A survey to evaluate eating behaviors was given on the first day of camp and six months later. Institutional Review Board approval was obtained. The results revealed that camp participation had a significantly ($P \leq .05$) positive effect on campers' frequency of eating vegetables and whole grains. Positive camp experiences with new flavors and foods were proven to have a positive effect on the tendency of children to eat vegetables and whole grains. These results indicate the need for hands on experiences with food in child care, schools and at home.

P6.07

ANTHROPOMETRIC MEASUREMENTS USED TO ASSESS ADIPOSITY IN AFRICAN AMERICAN ELEMENTARY SCHOOL CHILDREN

Jack Pennington, Brent Fountain, Sylvia Byrd, Julie Wilson

Mississippi State University

Over nine million children 6-17 years old are overweight in the United States. Unless the current trend is modified, children will face the highest risk ever for associated health problems as adults. The purpose of this study was to evaluate methods used to measure adiposity through a comparison of accuracy, cost effectiveness, ease of use, and practicality. Institutional Review Board approval was obtained. Data were collected on 826 African American children. Hip and waist circumferences, percent body fat, height and weight were collected. Body Mass Index, Waist to Hip

Ratio (WHR), and Waist to Height Ratio (WHTR) were calculated. Weight and hip circumference were correlated ($r = .94135$), waist and hip circumferences were correlated ($r = .92826$) and waist circumference was correlated to BMI ($r = .92396$). The highly correlated results indicated that a variety of measurements could be used for measuring children.

P6.08

CARDIOVASCULAR RESPONSE TO TWO AND FOUR MINUTES WALKS USING STANDARD WALKER AND/OR PLATFORM WALKER WITH WHEELS IN A NON WEIGHT BEARING INDIVIDUALS

Felix Adah, Neva Greenwald, Joy Kuebler, Becca Pearson, Elgenaid Hamadain
University of Mississippi Medical Center

This study examined cardiovascular responses to two and four minutes walk, using different gait devices in a non weight bearing individuals. Few studies have explored impact of various walkers and different times of walk on the cardiovascular system. Male and female physical therapy students, ($n=18$, ages from 22 to 32 years) were studied at two time periods. In part I, participants ambulated with a standard walker (SW) and a platform walker with wheels (PWW) for 2 minutes and the heart rate (HR), respiratory rate (RR), and blood pressure (SBP and DBP) before and after walk were measured. Part II consisted of same participants and same vital sign measures but ambulated for 4 minutes. Participants ambulated with non weight bearing on one foot and at self selected pace. ANOVA was used to determine statistical significance and a confidence interval of 95% or a p value <0.05 was considered significant. Results indicated that ambulation for 2 or 4 minutes produced statistically significant difference between before and after measurements of HR, SBP, and RR for SW, PWW and DBP (for two minutes walk using RW only). Remaining DBP differences were not significant. When all groups in each of the vital signs studied were compared, there was no statistical significant difference. Our study suggests that ambulation using any of the gait devices in 2 or 4 minutes walks significantly increased the vital signs of HR, PR, SBP and DBP (in a two minute walk using a platform rolling walker).

P6.09

A COMPARISON OF URINE AND SERUM fPSA LEVELS IN VARIOUS AGE GROUPS

Kendrick Davis, George Hoard, Stacy Vance, Michelle Tucci, Ham Benghuzzi
University of Mississippi Medical Center

Prostate cancer is one of the most common cancers that affect one out of six men and is the second most common cause of cancer-related death in men in the United States. In many disease states, the use of a biomarker is a standard method of determining both the presence and the risk of the future development of disease. Prostate Specific Antigen (PSA) has specific applications for early detection, risk prediction and follow-up evaluation in the treatment of prostate cancer patients. Free PSA levels can be used as a valuable tool in distinguishing between hyperplasia, prostatitis, and malignant cancers. One of the most commonly used test for early treatment or prevention of benign or malignant hyperplasia or the prostate is the free PSA in serum. Urine is a convenient and readily available specimen and its usage may be of value in encouraging screening for prostate problems. The subjects for the trial were all males between the ages of 21 and 89. Data obtained suggests: (1) Serum samples analyzed from males age 70-89 had the highest amount of fPSA detected in comparison to the control. (2) Urine sample values were insignificantly different in the 70-89 age category. In conclusion, this study determined that urine produced greater sensitivity to fPSA than serum. Further studies need to be conducted to determine the overall clinical application of urine fPSA.

P6.10

DETERMINING IF OBESITY IS A RISK FACTOR FOR CERVICAL CANCER

Laura Hearn, Antonio Hannah, Michelle Tucci, Zelma Cason, Ham Benghuzzi
University of Mississippi Medical Center

Cervical cancer involves the squamous epithelium of the ectocervix and the glandular epithelium of the endocervix. It affects women of all ages and races. Studies have addressed the effect of obesity on cervical cancer. Objective is to identify risks as obesity and access to screening as an indicator for cervical cancer. Hypothesis: Obesity has a positive correlation with cervical cancer, cervical cancer screening plays a part in the correlation between obesity and cancer of the cervix. States and national databases obtained values for population, race, obesity, the incidence cervical cancer and the mortality from cervical cancer. Hypothesis information on national and state PAP smear screening rates were evaluated. Mississippi had the highest level of obesity followed by Alabama, New York and Pennsylvania were modestly obese and Colorado and Montana were the leanest states. Cervical cancer in MS, AL, MT, CO, NY, PA were compared to the national average and MS and AL overall had the highest incident, MT and CO had the lowest. Cervical cancer in black women in MS was higher than the national level, but comparable to AL,

NY, PA, indicates that obesity plays a role. Mortality rate from cervical cancer in MS was greater than any other state. To determine if this was due to an access to care issue, the number of PAP screening were compared for each state. More black women in MS were screened than white women. Studys needs to be performed in order to determine if there is a true link between obesity and cervical cancer.

P6.11

COMPASSION FATIGUE AMONG CRITICAL CARE NURSES: A PILOT STUDY

Donna F. Borre¹, Mary Tan²

¹South University, Georgia, ²Holmes Community College

When nurses listen to traumatic experiences of patients who are suffering, they may experience compassion fatigue. The purpose of this pilot study was to educate nurses on the recognition, awareness, and prevention of compassion stress in hopes of reducing the risk of compassion fatigue. A mixed methodology pilot study revealed awareness of compassion fatigue knowledge in critical care setting. Test results showed participants increased their knowledge and awareness after the educational presentations and that the information could be instrumental in the identification, recognition, and prevention of compassion fatigue. By making nurses aware of the susceptibility and seriousness of compassion fatigue, we can identify nurses working in prolonged exposure, to various traumatic experiences and who are compassionate and empathetic as being at risk.

General Health Posters

P6.12

AN *IN VITRO* CORROSION STUDY OF CONTEMPORARY AMALGAM PAIRED WITH TYPE III GOLD

Emilee Peeples

University of Mississippi School of Dentistry

This study investigated type III gold of several surface areas paired with contemporary amalgam in a galvanic corrosion cell. The null hypothesis of this experiment was that a larger gold sample (cathode) would have no effect on the rate of corrosion of the smaller amalgam sample (anode) in a galvanic cell. This problem has been a concern of dentists for many years. This situation occurs clinically when gold crowns are placed next to smaller amalgam restorations. Half of the contemporary amalgam samples were allowed to set for twenty four hours and the other half were allowed to set for thirty days. The gold and amalgam samples were placed in Ringer's

solution with a nitrogen diffuser and a Standard Calomel Electrode. The cell was then placed in a constant temperature oven at 37°C, and coupled potentials and currents were measured over a period of seventy two hours. The results revealed that regardless of the potential, which is a measurement of the tendency of a reaction to occur (thermodynamics), the current (measurement of the kinetics) remained very low. Therefore, the contemporary amalgam sample was not significantly corroded over the time period evaluated.

P6.13

THE EFFECTS OF GENDER AND HORMONES ON RESORPTION OF ALVEOLAR BONE IN RATS WITH PERIAPICAL ABSCESSSES

Curtis Caskey, J.L. BAin, H Zhang, LC Sandifer, JP Naftel, Roger Johnson

University of Mississippi Medical Center

There is little comparative information concerning gender differences in the response of tooth supporting alveolar bone to inflammation and systemic disease. Several studies suggest that estrogen prevents the progression of bone inflammation; however, its effects on the progression of oral bone loss coincident to inflammation is restricted to studies of periodontal inflammation. Male, female, ovariectomized female, castrated males, and pregnant female rats with, and without, periapical tooth abscesses were studied. N=16 for each group. To create experimental tooth abscesses, the pulps of the right first and second maxillary molar teeth were exposed using a dental bur. Maxillae were removed 4 weeks later and radiographed. Measurements were made between the M1 and M2 and M2 and M3 teeth. The distance from the CEJ to alveolar crest (A), from the root apex to the alveolar crest (B), and the percentage of root embedded in bone $[(B/A+B) \times 100]$ were assessed from the radiographs. Linear measurements were compared by factorial analysis of variance and a post hoc Tukey test. The distance between from CEJ to alveolar crest and the percentage of root embedded in bone was significantly less in pregnant animals than all other groups ($p < 0.05$). There were no significant differences in these distances between the other groups. There were no significant differences in these distances between the other groups. Thus, pregnancy protects rats from alveolar bone loss by a mechanism yet to be determined. This effect could be similar to that reported for absence of symptoms of rheumatoid arthritis in females during pregnancy.

P6.14

THE EFFECT OF ELLAGIC ACID, BETA-GLUCAN, AND VINBLASTINE IN VARIOUS COMBINATION ON RATS INFECTED WITH *TRYPANOSOMA LEWISI*

Hannah Albritton, Joshua Black, Emily Deaton, Meagan Holton, Angela Meadows, Jarrett Morgan, Sapna Naik, Christopher Richmond, Jessica Wiseman
Belhaven College

Trypanosoma lewisi is a non-pathogenic relative of the blood parasite that causes African sleeping sickness. Experimental data from studies involving *T. lewisi* could be valuable in the search for new treatments for human trapanosomiasis. In this experiment the effects of beta-glucan, ellagic acid, and vinblastine on the level of parasitemia in rats were studied. Ellagic Acid has been shown to be anti-proliferative, beta-glucan has proven to be a biological defense modifier, and vinblastine causes mitotic arrest during microtubule assembly. Twenty-four rats were placed in six groups of four rats each: control negative; control positive; vinblastine and beta-glucan; vinblastine and ellagic acid; vinblastine, beta-glucan, and ellagic acid; beta-glucan and ellagic acid. The dosage amount for each drug was variable. Among all the treatment groups there was no decrease in parasitemia when compared with control positives. The treatment group beta-glucan and ellagic acid yielded a higher concentration of parasitic infection when compared to all other experimental groups.

P6.15

MODULATION ON TISSUE FACTOR-INITIATED EXTRINSIC HYPERCOAGULATION: RELAVENCE TO ANTIINFLAMMATION

Arthur Chu

Delta State University

Tissue factor (TF) is an initiator of the extrinsic blood coagulation, which is often susceptible to upregulation by tissue injury, advanced glycation end-product, or diverse inflammation. TF hypercoagulability is accompanied by elevated generation of clotting factors (e.g., FVIIa, FXa, and thrombin) and fibrin production, all of which are proinflammatory. Protease-activated receptor or Toll-like receptor could mediate such proinflammation. In this laboratory, our experimental results from monocytic THP-1 cultures showed the modulation of endotoxin-induced extrinsic hypercoagulation by intervening TF-dependent FVII activation at posttranslational level. Such unique upstream downregulation of blood coagulation by polycations could present a new class of anticoagulants. Polycationic anticoagulants include compound 48/80, ruthenium red, polybrene, protamine, Bufroin I, and

cationic polyamino acids, all of which preferentially suppress FVIIa formation showing as non-competitive inhibition on FVIIa amidolytic activity. In view of coagulation-dependent inflammation and the new paradigm of blood coagulation-inflammation-thrombosis circuit, the polycationic anticoagulants could contribute to antiinflammation, antithrombosis, and cardioprotection. Further development of effective anticoagulants is of biopharmaceutical significance in broadly easing disease conditions.

P6.16

THE EFFECTS OF ESTROGEN, PARATHYROID HORMONE, AND TESTOSTERONE ON ACTIVATED RAW CELLS

Marquissa Anderson¹, LaKeysha Rose¹, Michelle Tucci², Hamed Benghuzzi², Joseph A. Cameron¹
¹*Jackson State University*, ²*University of Mississippi Medical Center*

Females have higher levels of proinflammatory cytokines following sepsis which is thought to enhance or maintain immune responses, compared to males. The goal of this investigation was to activate macrophages with lipopolysacchride (lps) and then stimulate with estrogen (E), testosterone (T), or parathyroid hormone (PTH) to evaluate the cellular and cytological response over a 24, 48, and 72 hour time period. Both T and PTH showed increased numbers of macrophages after 24 hours which was maintained for the duration of experiment. In addition, by 72 hours, there were increased levels of nitric oxide in all cells challenged with hormones and lps when compared with cells treated with lps alone. The most striking changes were seen in the cellular morphology. Cytological evaluation revealed evidence of aggregation and sheet-like cobblestone appearance of cells treated with estrogen by 24 hours which was maintained for the duration of the experiment. Additional studies are needed to define the role of cellular aggregation and enhanced immune response. Supported in part by NIGMS NIH Grant R 25 GM 50117.

P6.17

VERNONIA AMYGDALINA, PACLITAXEL AND HUMAN CARCINOMA CELL GROWTH INHIBITION

Stephanie Floyd¹, Carolyn B. Howard², Tiffani Slaughter², Ernest Izevbogie²

¹*Mississippi University for Women*, ²*Jackson State University*

Paclitaxel (TAX, Taxol) is an anti-cancer agent used in the treatment of breast cancer, however the side effects associated with use of this drug are numerous and resistance to Taxol is common.

Vernonia amygdalina (VA), a plant native to Africa, is used to treat several conditions. Recently, VA has been shown to inhibit growth of cancerous cells. The purpose of this research was to compare the effectiveness of VA and Taxol toward inhibition of MCF-7 breast cancerous cell growth. We compared MCF-7 cell growth curves generated following treatment with VA versus Taxol. Also, we treated cells with both VA and Taxol to determine whether there is an additive effect of combined treatment. MCF-7 cells were grown in RPMI-1640 medium, supplemented with 10% fetal bovine serum and 1% penicillin-streptomycin. TAX (100 nM) and VA (100 µg/ml) inhibited growth on average of three independent experiments by 50 and 364% respectively. Interestingly, TAX (10 nM) alone had no effects on cell growth, but inhibited growth significantly ($P < 0.5$) in the presence of VA in a VA concentration-dependent fashion. We concluded from these studies that VA alone was more effective than Taxol alone and VA increased the effectiveness of Taxol. Lastly, we sought to probe for three enzymes (Cytochrome P450, CYP) involved in Taxol and VA metabolism using Western blot analysis. We determined protein concentration in the MCF-7 cell line using a BCA assay. Preliminary Western blot data indicate that both Taxol and VA induce expression of CYP 3A4, the enzyme implicated in drug-drug interactions.

P6.18

THE EFFECTS OF PNEUMOLYSIN ON THE CORNEA

Rhonda Caston, Quincy Moore, Erin Norcross, Melissa Sanders, Mary Marquart
University of Mississippi Medical Center

Streptococcus pneumoniae causes keratitis, an infection of the cornea. The purpose of this research was to determine the effects of pneumolysin (PLY), a toxin produced by this bacterium, on the corneal epithelia of mice and on cultured corneal epithelial cells. Recombinant PLY was expressed, purified, and analyzed. Hemolysis assays confirmed the activity of the recombinant PLY. D39, grown to various optical densities (OD), was centrifuged, supernatant removed, and the bacterial pellet sonicated to release intracellular components. PLY in the extracts was quantified and the activity confirmed using an hemolysis assay. Recombinant PLY and D39 were applied to human corneal epithelial (HCE) and cell viability was determined. The effect of PLY was studied in vivo using a mouse model of keratitis. Mouse corneas were scratched and PLY topically applied. Mouse eyes were analyzed 6 days after infection by histology. The ELISA for PLY quantification found that as the OD

increased so did the quantity of PLY until it reached the overnight stage of growth. Similarly, the percent hemolysis increased with the OD. D39 and PLY had a dose dependent effect on HCE cells. As the D39 or PLY concentration increased, the HCE cell viability decreased. The in vitro effect was confirmed in vivo and mice developed a severe keratitis infection. Histology showed PMN infiltrate and fibrin in the corneal stroma and aqueous humor. This study proves that PLY plays a significant role in corneal damage. Further studies will focus on inhibiting PLY and thus decreasing corneal damage due to pneumococcal keratitis.

P6.19

DIFFERENTIAL ANALYSIS OF METAL CONTENT AND DISTRIBUTION IN TUMORS AND NORMAL HUMAN TISSUES

Gabriella Clark¹, Karla Funchess¹, Phuong Nyguen², Zikri Arslan², Ibrahim Farah², Joseph A. Cameron²
¹Hinds Community College, ²Jackson State University

Studies have shown that elemental / metal homeostasis is very essential to the development of the cancer phenotype in many cancers including lung and liver carcinomas. The aim of this study was to investigate the differential relationship of metal concentrations and profiles in cancer and normal tissues of humans. The study hypothesized that elemental / metal concentrations and profiles will show significant differences between cancer and normal tissues as well as between different tissue types in humans. Normal human and tumor tissues of lung, breast and liver tissues used in this study were obtained from US Biomax Company. Tissue samples were prepared using standardized digestion procedure and the ICP-AES (Inductively Coupled Plasma-Atomic Emission Spectrometry) was used to determine the concentrations and profiles of 21 elements including Ag, Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Na, Ni, Pb, Sb, Se, Sr, Tl, V, and Zn. Results showed that nine major elements of Al, Ba, Ca, Cr, Cu, Fe, Mg, Na, and Zn were found to be significantly different in term of their concentrations / profiles in normal and tumor tissues of human lung, breast and liver. It is concluded that metal / elemental homeostasis is essential for normal tissue function and that shifts in elemental distribution and content are tissue specific as well as carcinoma specific. These results warrant further studies to confirm and exploit the possibility of manipulating elemental distribution / content as a cancer therapeutic modality. Supported by NIH-NIGMS Grant R 25 GM 50117.

P6.20

THE INHIBITORY EFFECT OF DANDELION LEAF AND GREEN TEA ON ENTEROCOCCUS AND VRE

Kenosha Clark, Jolande Walker, Stacy Vance, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Green tea and dandelion tea are commercially used as natural herbals for various reasons. Societies around the world have consumed the teas as remedies for heart disease, cancer, digestive and renal complications. The most beneficial components of the teas are polyphenols, commonly extracted from the leaves, which are effective antioxidants. Antioxidants neutralize free radicals, which aid in tissue destruction by infectious organisms. The most beneficial polyphenols of green tea are the flavonoids, particularly, epigallocatechin gallate (EGCG). Dandelion leaves major active component is cinnamic acid. In this study, we evaluated green tea and dandelion leaf for anti-microbial properties against Enterococcus and Vancomycin Resistant Enterococcus species. The goal was to find effective inhibitory concentrations of tea extractions against the bacteria. Dandelion leaves were obtained and saturated in 50 mL of ethanol. A commercially available green tea bag was purchased and saturated in 50 mL of distilled water. Each bacterial concentrate was treated with 20 μ L of the tea extractions. Data obtained suggests: (1) Using spectrophotometric methods, EGCG may be recovered in its highest concentration after 8 hours of brewing. (2) Green tea and dandelion leaf show no inhibitory effect against Enterococcus or VRE. (3) The ineffectiveness of the extracts may have been due to the high concentration of the extracted compounds that was used. In conclusion the ineffectiveness of the extracts may have been due to the high concentration of the extracted compounds that was obtained. Further investigations should be completed to confirm any anti-microbial activity of green tea and dandelion leaf.

P6.21

THE INHIBITORY EFFECTS OF BUCHU LEAF AND GREEN TEA ON ENTEROCOCCUS AND VRE

Kenneth Lockhart, Jasma Shelby, Stacy Vance, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Enterococci are the leading cause of nosocomial infection (or secondary infection acquired while in a hospital). They are responsible for approximately 110,000 cases of urinary tract infection, 25,000 cases of bacteremia, 40,000 wound infections, and 1,100 cases of endocarditis yearly in the United States. Sensitive strains of enterococcus can be treated

with ampicillin and vancomycin, but some enterococci are intrinsically resistant to β -lactam antibiotics. Buchu has been used as a remedy for many different ailments for centuries, for example the leaves were used on the skin as a repellent as well as eaten to relieve stomach pains in South Africa, used to treatment UTIs, kidney stones, muscles aches, and cholera. The objective of this study was to determine if Buchu Tea water or ethanol extracts have antimicrobial properties against VRE and Enterococcus. This study also examined the antimicrobial effects of a commercially available Green tea bag that was allowed to sit for 2 hours in water against VRE and Enterococcus. Data obtained suggests: (1) After 2 hours of brewing a commercially available green tea bag the active catechin obtained was ECG. (2) The administration of Buchu or green tea did not inhibit the growth of enterococci or VRE. In conclusion the ineffectiveness of the extracts may have been due to the high concentration of the extracted compounds that was obtained. Further investigations should be completed to confirm any anti-microbial activity of green tea and Buchu.

P6.22

THE EVALUATION OF CONVENTIONALLY DELIVERED DANDELION IN RMKEC

Maria Nix, Oriundria Archie, Stacy Vance, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Dandelion has long been credited for its herbal medicinal purposes and detoxifying properties. Its use has become diversified within numerous organ systems due to the variable morphology among species. Dandelion is often used as a natural diuretic. Dandelion helps to stimulate increased production of urine by promoting salts and water from the kidney. The active component of Dandelion is: tartaric acid, which is present in highest concentration at peak levels. The purpose of this study was to evaluate the effects of Dandelion in RMKEC using cell count Malondialdehyde assay (MDA), Nitric oxide (NO), Glutathione (GSH), and Transforming Growth Factor- β as markers. Group 2-3 were treated with 10 μ M dandelion, dandelion 1:2, and dandelion 1:10 respectively. The overall data suggest that dandelion 1:10 increased cell proliferation in comparison to the control. Dandelion 1:10 decreased all the biochemical markers with the exception of TGF- β , which was not significantly different from the control. The groups treated with dandelion resulted in a decrease in cell number and an increase in MDA and TGF- β in comparison to the control. Data obtained suggests: (1) The lower concentrations resulted in an increase in cell number and a decrease in the biochemical markers. (2) Glutathione levels exhibited a dose dependent decrease

(dandelion> dandelion 1:2> dandelion 1:10). The data suggests dandelion 1:10 may be the best concentration to use as a protective antioxidant to prevent renal damage.

P6.23

THE EFFECTS OF TRAUMA ON KIDNEY FUNCTION AND STRUCTURE

Mazzeran Moore, Stacy Vance, Michelle Tucci, William Fuller, Lusha Xiang, George Russell, Ham Benghuzzi

University of Mississippi Medical Center

The kidneys are responsible for filtering waste and reabsorbing necessary materials. Stress and the release of stress hormone have been shown to affect kidney function. A combination of obesity and stress may play a significant role in the detrimental outcomes associated with obese trauma patients. The objective of this study was to determine the effect of obesity alone and in combination with trauma on the kidney. A total of ten obese Zucker rats and 10 lean Zucker rats were further divided into two sub-groups, control and trauma. Animals were sacrificed seven days post surgery and their adrenal glands collected and processed for histology. Area and length measurements were obtained from the glomerulus, distal and convoluted tubules of the kidney. Statistical results indicated significant difference between trauma and control subjects. Urinalysis results from obese trauma rats showed decreased glomerular filtration. Staining for Aquaporin-2 showed increased reactivity in both lean and obese animals following trauma, which indicates increased water retention following systemic stress. The obese rats showed increased Aquaporin-2 distribution prior to trauma with increased reactivity after trauma. Periodic acid Schiff's staining of the kidney sections in control and trauma obese rats showed changes in the glomerulus consistent with diabetic patients with glomerulosclerosis and nephrotic syndrome. The results were obtained were significantly different between lean and obese subjects. The differences seen in the urinalysis data for urine composition and filtration may be an important indicator for poor outcomes of obese patients following trauma surgery.

P6.24

THE EFFECTS OF TRAUMA ON THE ADRENAL GLAND IN OBESE AND LEAN ZUCKER RATS

Stephanie Jones, Stacy Vance, Michelle Tucci, William Fuller, Lusha Xiang, George Russell, Ham Benghuzzi
University of Mississippi Medical Center

Obesity is associated with hypersecretion of cortisol and aldosterone and a high prevalence of arterial hypertension. In addition, stress has been shown to activate the hypothalamic-pituitary-adrenal axis and trigger the release of glucocorticosteroids and catecholamines into the circulation. Sustained stress eventually alters physiological function leading to increased vulnerability to diseases as well as changes in the dynamics of the adrenal gland. A combination of obesity and stress may play a significant role in the detrimental outcomes associated with obese trauma patients. The objective of this study was to determine the effect of obesity alone and in combination with trauma on the adrenal gland. A total of ten obese Zucker rats and 10 lean Zucker rats were further divided into two sub groups, control and trauma. Animals were sacrificed seven days post surgery and their adrenal glands collected and processed for histology. Differences in each zone were detected using histomorphometric analysis. Overall, the results show that following trauma in both the lean and obese animals there was an increase in the adrenal areas. Interestingly, the medulla was increased in the obese rats where the glomerulosa zone showed the largest change in the lean rats when compared with their respective controls. Understanding these differences is crucial and may shed light on the increased mortality seen in trauma obese population. Increased catecholamine synthesis may be responsible for the negative outcomes, whereas increased in the stress hormone cortisol in the lean may be more favorable. Additional studies in this area are warranted.

P6.25

RETINOID AND CITRAL MODULATED CELL VIABILITY, METABOLIC STABILITY, CELL CYCLE PROGRESSION AND DISTRIBUTION IN THE A549 LUNG CARCINOMA CELL LINE

Karla Funchess¹, Gabriella Clark¹, Quannessa Trimble², Ibrahim Farah², Joseph A. Cameron²
¹*Hinds Community College*, ²*Jackson State University*

Lung cancer is the second leading deadly cancer in United States. Recent publications have found retinoid receptors to be effective therapeutic targets in some cancer cell lines and that retinoids were functional cell modulators of the RAR/RXR nuclear hormone receptors that may impact the development of lung cancer. We hypothesize that retinoic acid and retinyl esters will negatively impact the A549 lung carcinoma cell line model in vitro and that exposure to higher concentrations of retinoids will induce impairments indicative of metabolic implications seen in chronic conditions such as cancer. The aim of this study was to expose the A549 cell line model to various

concentrations of retinoic acid, retinyl esters, and Citrals (0-160 mg/ml). The effects were measured through phase microscopy, cell proliferation MTT assay, FACS analysis for cell cycle parameters and western blot analyses for cyclins. Data generated from phase contrast microscopy and MTT assays showed an increased physical destruction, metabolic impairment and a decrease in the viability of A549 cell line model after 72 hours of exposure to retinoic acids and retinyl esters. Results from FACS analysis showed modulation in the cell cycle distribution/progression upon exposure to retinoids and that Citrals did reverse these effects in the cell line model. We conclude that modulation of metabolic integrity, cell cycle distribution and cell survival through retinoids/citrals in the lung carcinoma model is promising and warrants further therapeutic investigation. Supported by NIGMS NIH Grant R 25 GM 50117.

P6.26

IN VITRO METABOLOMICS OF THE BREAST CANCER DRUG TAMOXIFEN

Terrance Rush¹, Brittany Brown¹, Christine Purser², Stanley Smith²

¹Tougaloo College, ²The University of Mississippi Medical Center

Tamoxifen is a selective estrogen receptor modulator that blocks proliferation of estrogen receptor positive breast cancer cells. Tamoxifen is metabolized to a number of different metabolites including 4-hydroxytamoxifen, N-desmethyl tamoxifen, and endoxifen. Endoxifen has a much higher affinity for estrogen receptors compared to the parent drug tamoxifen. Cytochrome P450 2D6 is important in the tamoxifen to endoxifen conversion. P450 2D6 is polymorphic and in populations some individuals have high levels of activity while others have no P450 2D6 activity. In the former case, significantly more endoxifen would be expected to be produced while in the latter case little or no endoxifen would be expected to be formed. Retrospective studies have suggested that the high activity polymorphism is correlated with better outcomes in breast cancer therapy while the no activity polymorphism is correlated with poorer outcomes. Our aim was to try to use in vitro techniques to mimic the conversion dynamics and reproduce the tamoxifen metabolome. We used ligand binding assays to quantify binding of tamoxifen to P450 2D6. We then performed in vitro assays to measure metabolite formation under control (no 2D6 present), intermediate activity (human liver microsomes), and high activity conditions (high levels of P450 2D6). Our results indicate that tamoxifen was converted to several metabolites in our in vitro system. However, we were not able to unambiguously identify metabolites based

on HPLC retention times. Mass spectroscopy will be conducted to help confirm identities. (Mississippi Functional Genomics Network REO Award NIH/NCRR P20 RR016476 to TLR & BRB)

P6.27

PROBING CYTOCHROME P450S: INSIGHTS INTO CONFORMATIONAL DYNAMICS USING LASER FLASH PHOTOLYSIS

Stephanie Burks, Stanley Smith

University of Mississippi Medical Center

The cytochrome P450s are a superfamily of hemoproteins involved in the metabolism of numerous exogenous and endogenous compounds. Cytochrome P450 2E1, which is ethanol- inducible, metabolizes several therapeutic compounds including acetaminophen and the volatile anesthetic halothane and is responsible for the bioactivation of many low molecular weight carcinogens such as benzene and nitrosamine. P450 2E1 can readily uncouple during catalysis producing reactive oxygen species (ROS) which can bind to cellular macromolecules and lead to organ toxicity. Of particular interest are the structural and conformational features of cytochrome P450 2E1 that influence how it interacts with drugs, xenobiotics and other substrates as well with other cellular effectors. We used laser flash photolysis to quantify P450 binding kinetics. P450s produce a characteristic Soret band at 450 nm when reduced and liganded with carbon monoxide (CO). The heme-CO bond can be disrupted with a high-energy laser pulse. The rebinding kinetics can be measured spectrophotometrically. These measurements yield information about the active site environment of P450s as well as information about global changes in conformational dynamics. Our studies indicate that the conformational dynamics of P450 2E1 are more rapid compared to other P450s involved in drug metabolism.

P6.28

MORPHOMETRIC ANALYSIS OF THE KIDNEY FOLLOWING SUSTAINED DELIVERY OF GROWTH FACTORS

Rhea Richardson, Tamika Taylor, Alex Whittington, Olga Golanov, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Degenerative disc disease is a leading source of pain as well as increased health care costs in the United States, and research efforts into understanding the pathophysiology of this disease is necessary for the development of new management strategies. Addition of growth factors to stimulate chondrocyte development are on the horizon as new treatment modalities for degenerative disc disease, but increasing growth factor concentrations in the body may have adverse effects on

vital organs. The objective of this study was to investigate whether sustained delivery of TGFb, IGF-1, or TGFb + IGF-1 can increase chondrocyte proliferation without causing adverse effects at the kidney level. The results showed increased chondrocyte proliferation and decreased apoptosis at the traumatized discs in all growth factor treated animals after 28 days. Analysis of the vital organs results showed slight increases in kidney wet weights, and closer histomorphometric evaluation of the tissue revealed changes in the proximal tubules in IGF-1 and IGF-1 +TGFb treated animals. Further investigation to evaluate the potential physiological or pathophysiological effects of the growth factors at the organ levels is warranted before use as therapeutic agent to treat degenerative disc disease. (Supported in part by an award from Howard Hughes Medical Institute)

P6.29

THE EVALUATION OF CONVENTIONALLY DELIVERED BUCHU TEA IN RMKEC IN VITRO

Benjamin Pettigrew, Vinna Truong, Stacy Vance, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Many natural products on the market are not regulated by the Federal Drug Administration. Many claim to be beneficial in fighting disease or maintaining health. Buchu is sold as tea that has stimulant, diuretic, antiseptic properties. The antiseptic and strong diuretic properties are evident due to the active ingredient in the herb, diosphenol. The leaves of the contain essential oil such as limonene, isomenthone, diosphenol (buchu camphor), terpinen-4-ol and minor sulfur containing compounds such as 8-mercaptop-methane-3-one. These essential oils have been shown to have antiproliferative effects on cancer cell lines. The goal of this study was to determine if essential oils or the water soluble components in Buchu would induce cellular damage or decreased cellular viability in primary kidney tubule cell lines. The results show that the essential fraction of the Buchu leaves showed a significant increase in cellular MDA and a significant decrease in TGFb production. Undiluted water fraction of Buchu showed a 50% increase in cell number along with a significant increase in TGFb. Buchu water soluble component diluted 1:2 and 1:10 did not increase cell production, and lowered TGFb to values comparable to control. The concentrations used were ineffective in reducing the proliferation of renal cells; however, the lipid fraction did induce substantial increases in MDA. Longer incubation times may show more toxic effects and increased cellular damage. More

investigation is needed to substantiate the claims Buchu is beneficial in fighting disease and maintaining health.

P6.30

THE ROLE OF EPIGALLOCATECHIN-3-GALLATE AND THYMOQUINONE ON LPS STIMULATED MACROPHAGES

Renee Wilkins, Michelle Tucci, Hamed Benghuzzi
University of Mississippi Medical Center

Inflammatory processes can occur over short periods in response to pathogens or can be activated by intracellular reactive oxygen species. The use of antioxidants has been shown to be beneficial in stimulating immune cells to increase phagocytosis and up-regulating the cellular processes to limit acute inflammation. The goal of this study was to determine the preventative effects of water soluble epigallocatechin-3-gallate (EGCG) and lipophilic thymoquinone (TQ) on RAW 264.7 macrophages followed by challenge with lipopolysaccharide (LPS). Macrophages were treated with EGCG (10µM) and/or TQ (10µM) for 2, 24, and 48 hour durations followed by a single bolus of LPS (0.01 µg/mL). Cell viability was assessed by cell number and cellular morphology. Cellular glutathione levels, malondialdehyde and nitric oxide levels determined cellular function. Inflammatory markers were quantitated by the use of multiplex ELISA technology. EGCG was not able to suppress the effects of LPS over 48 hours. TQ was able to protect cellular morphology, and reduce cellular glutathione and nitric oxide. The combination of antioxidants did not offer a greater protective effect than when using the antioxidants alone.

P6.31

ACADEMIC PERFORMANCE OF COMMUNITY COLLEGE STUDENTS ENROLLED INTO UNIVERSITY HEALTH RELATED PROFESSIONS PROGRAMS

Latoya Richards, Zelma Cason, Hamed Benghuzzi, Megan Dillon

University of Mississippi Medical Center

The requirement for quality academic performance and success rates for health care professional students remains high by the public and the training program. Research has suggested that 2-year transfer students are less likely to complete baccalaureate degrees than students from four-year universities or colleges. Community colleges enroll nearly half of all undergraduate students in the United States. These colleges were originally chartered as "junior" colleges, offering the first two years of a four-year college degree at considerably lower cost than

other universities/colleges. At the same time, four-year universities/colleges serve as the benchmark for academic excellence and a 'quality' education. Our study compares the academic performance of health related profession students that transfer from community colleges to those from public/private universities over a ten year period. The records of graduates from the clinical laboratory science program and cytotechnology programs for a ten year period were randomized, evaluated, and tabulated. The data contained the type of transferring school, and the entrance and graduation GPA. Results were evaluated using SIGMA STAT statistical program. Our results indicated that overall graduates that transfer from public/private universities usually have higher GPA's and score higher on their national board examinations. However, there was no difference in the clinical performance of graduates from the different types of schools. We conclude that college/university students transferring to health related professions, such as clinical laboratory science or cytotechnology, demonstrate a slightly higher academic performance and are more likely to pass their national board examinations, than transferring students from community colleges.

THURSDAY EVENING
Dodgen Poster Session
Exhibit Hall C

Posters on display, 6:00p – 7:00p

Posters must be put up between 4:30p – 5:00p

P6.32

COMPARISON OF MEASURES OF HEART RATE VARIABILITY USING A SIMPLE PORTABLE TELE-DEVICE (CLUE MEDICAL) WITH STANDARD MEASURE - A PILOT STUDY IN HEALTHY HUMAN SUBJECTS

Jessica Twigg¹, Bettaiya Rajanna¹, Sharada Rajanna¹, Sucharita S², Mario Vaz²

¹Alcorn State University, ²St. John's Research Institute, St. John's Medical College and Hospitals, Bangalore, Karnataka, India

Heart rate variability (HRV) is the spontaneous oscillation of beat-to-beat time intervals around the mean value. The main determinants of HRV are sympathetic and parasympathetic (vagal) cardiac nervous inputs. This study compares the indices of HRV (low frequency (LF) an index of cardiac sympathetic activity), high frequency (HF) an index of cardiac parasympathetic activity) and LF/HF ratio) using a simple portable tele-device (CLUE MEDICAL) with standard measures. Twenty (20) healthy male

subjects between the ages of 18 and 50 years were recruited. Base measurements were made following which the subject performed three maneuvers. Spectral analysis was performed on continuously recorded ECG signal using a Fast Fourier Transform. Heart rate computed from the two devices at rest and during each maneuver was comparable. Correlations between the heart rates recorded from the two devices were high ranging between 0.998 to 0.999. These data suggest high fidelity of heart rate recordings from the two devices when averaged over a 2 minute period. At rest, normalized LF power and HF power from the CVMS device was not correlated with the corresponding measures from the CLUE Medical device. In contrast, the LF/HF ratio a measure of sympatho-vagal balance was strongly correlated between the two devices at rest ($r=0.969$) and during each of the maneuvers ($r=0.944$ to 0.989). The data suggested that the two devices can be used interchangeably for sympathovagal balance. (Supported by NIH/NCMHD #MD001532. This research was done by Jessica Twigg in 2009 Summer at St. John's National Academy of Health Sciences, Bangalore, India)

P6.33

INVESTIGATION OF MECHANISM UNDERLYING ANTINOCICEPTIVE SYNERGISTIC EFFECT OF TRAMADOL AND GABAPENTIN IN MICE TAIL-FLICK TEST

Andre Haymer, Xiaoli Dai, Claude Brunson, Ike Eriator, Tangeng Ma

University of Mississippi Medical Center

Tramadol is an atypical opioid analgesic and gabapentin is a γ -aminobutyric acid (GABA) derivative. Gabapentin has a limited antinociceptive effect but it significantly potentiated antinociception of tramadol. It is unclear of how gabapentin potentiates antinociceptive effect of tramadol. This study is to determine whether GABA receptors are implicated in the antinociceptive synergistic effect of the two drugs. Experiments were conducted in NIH Swiss mice. Tramadol (60 mg/kg) was intraperitoneally injected to mice and gabapentin (75 mg/kg) or saline (control) was per orally administered to mice 30 min before tramadol injection. To investigate the role of GABA receptors, bicuculline (GABA_A receptor antagonist; 2 mg/kg) and 2-hydroxysaclofen (GABA_B receptor antagonist; 3 mg/kg) were subcutaneously injected to mice 15 min before gabapentin or saline administration. The mouse tail-flick was tested before and after drug administrations at different intervals. Results indicated that pre-administration of GABA_A receptor antagonist bicuculline had no effect on tramadol (alone or in combination with gabapentin)-produced antinociception

in both genders of mice. Pre-administration of GABA_B receptor antagonist 2-hydroxysaclofen reduced antinociceptive effect of tramadol alone but did not alter the antinociceptive synergistic effect of gabapentin on tramadol. In summary, the present study demonstrated that GABA_B receptor is implicated in tramadol antinociception but not in the antinociceptive synergistic effect of gabapentin on tramadol.

P6.34

THIOAMIDE DERIVATIVE MODULATES ANNEXIN V EXPRESSION IN HUMAN LIVER CARCINOMA (HEPG₂) CELLS

Shannon Jackson¹, Clement Yedjou², Joseph A. Cameron², Paul Tchounwou²

¹Hinds Community College, ²Jackson State University

Thioamide is one of a group of antithyroid drugs prescribed in the treatment of hyperthyroidism. Thioamide derivative is currently used for the treatment of thyroid disease, tuberculosis, and leprosy. Recent in vitro experiment in our laboratory demonstrated thioamide is highly cytotoxic to human liver carcinoma (HepG₂) cells. Although published studies indicate that thioamide derivative has medicinal properties effective against many diseases other than liver cancer, the molecular mechanisms under which this compound induces apoptosis of cancer cells remain largely unknown. In the present study, we proposed to use human liver carcinoma (HepG₂) cells as a test model to evaluate the basis apoptotic mechanism of thioamide derivative. To achieve this goal, the expression of annexin V was measured by flow cytometric analysis. Human liver carcinoma (HepG₂) cells were treated with different doses of thioamide derivative for 48 hours. Results from the flow cytometric assessment (Annexin V FITC/PI) showed a strong dose-response relationship between thioamide derivative exposure and annexin V positive cells undergoing early stage apoptosis in HepG₂ cells. Taken together, our results indicate that phosphatidylserine externalization was involved in thioamide derivative induced toxicity to HepG₂ cells.

P6.35

THIOAMIDE DERIVATIVE-INDUCED CYTOTOXIC EFFECT IN HUMAN LIVER CARCINOMA (HEPG₂) CELLS

Jarrod Young, Clement Yedjou, Joseph A. Cameron, Paul Tchounwou

Jackson State University

Thioamide is an antithyroid drug that has been shown to cross the placental barrier. Use of antithyroid medications in pregnancy may result in fetal hypothyroidism, goiter, and cretinism. The literature review indicated that about 10% of patients taking

thioamide drug have skin eruptions, macules/papules, urticaria, dermatitis, fever, and arthralgia. However, the precise mechanisms involved in thioamide toxicity are not well elucidated. In the present study, we use human liver carcinoma (HepG₂) cells as a test model to evaluate the cytotoxicity of three thioamide derivatives. To achieve this goal, cell survival was determined by the means of MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide, a tetrazole) assay. Human liver carcinoma (HepG₂) cells were treated with different doses of thioamide derivative for 48 hours. Results from MTT assay indicate that thioamide derivative gradually reduce the viability of HepG₂ cells in a dose-dependent manner, showing LD₅₀ value of about 13.58, 32, and 38 μM, upon 48 h of exposure, respectively. Based on this in vitro, our thioamide derivative appears to be highly cytotoxic to HepG₂ cells. This research was financially supported in part by a grant from the Bridges to Baccalaureate Degree Program (BBDP) and in part by a grant from the National Institutes of Health (Grant No. 2G12RR013459-11), through the RCMI-Center for Environmental Health at Jackson State University.

P6.36

THE EFFECTS OF ESTROGEN, PARATHYROID HORMONE, AND TESTOSTERONE ON RAW CELLS

LaKeysha Rose¹, Marquissa Anderson¹, Michelle Tucci², Hamed Benghuzzi², Joseph A. Cameron¹
¹Jackson State University, ²University of Mississippi Medical Center

Several clinical and experimental studies suggest that gender affects immune responses. In this regard, there have also been observations of an extraordinarily significant female predominance of inflammatory arthritis. The purpose of our study was to investigate the cellular effects of estrogen (E), testosterone (T), and parathyroid hormone (PTH) on macrophage cells over 24, 48, and 72 hours. Cells treated with T caused enhanced cell proliferation after 24 hours, whereas cells treated with E or PTH caused less cellular proliferation after 24 hours. By 72 hours all treatment groups had less cell number than the untreated control. Cell membranes were not damaged by the increased hormone levels as evidenced by similar MDA values for experimental and control groups. Interestingly, nitric oxide levels were increased in the estrogen treated cells after 72 hours compared to the control cells. Cytological evaluation of the cells revealed increased aggregation of cells and swelling of those treated with T. The increase in nitric oxide levels by E indicates activation of macrophages, which may ultimately lead to the production of inflammatory

cytokines. More experiments are necessary to address the effects of E on inflammatory cytokine production by macrophage cell types. Supported in part by NIGMS NIH Grant R 25 GM 50117.

P6.37

INFLUENCE OF NICARDIPINE ON PHARMACODYNAMICS AND PHARMACOKINETICS OF METFORMIN IN RATS/RABBITS

April Tatum¹, Satyanarayana S.², Sanjeeva B.E.N.², Satyanarayana T², Eswara Kumar², Sharada Rajanna¹, Bettaiya Rajanna¹

¹Alcorn State University, ²Andhra University, Visakhapatnam, AP, India

Diabetes Mellitus is a chronic metabolic disorder characterized by sustained hyperglycemia. The present study was planned to evaluate the safety of metformin (antidiabetic) therapy in the presence of nicardipine (antihypertensive) in rats (rodent) and rabbits (non-rodent) species. Blood samples were collected from retro-orbital plexus of rats and from marginal ear vein of rabbits at different time intervals and were analyzed for blood glucose level by GOD/POD method and serum metformin levels by HPLC. Results demonstrated production of hypoglycemic / antihyperglycemic activity by metformin in normal and diabetic rats with peak activity at 6th hour and hypoglycemic activity in normal rabbits with peak activity at 3rd hour. Nicardipine alone did not produce any effect on blood glucose levels in normal rats/diabetic rats/normal rabbits. Nicardipine did not affect the hypoglycemic effect of metformin in normal rats/diabetic rats/normal rabbits when administered together. The serum Metformin levels and pharmacokinetic parameters of metformin were not altered significantly in the presence of nicardipine in rabbits. In conclusion, single dose treatment with nicardipine had no influence either in the pharmacokinetics or pharmacodynamics of metformin. There was no interaction between metformin and nicardipine in rats (rodents) / rabbits (non rodent) indicating a low possibility for interaction to occur in humans. The results suggest that combination of nicardipine and metformin might be safe to treat hypertension in diabetic condition. (This international research study was conducted by the author at the School of Pharmaceutical Sciences, Andhra University, India and supported by NIH/NCMHD/MHIRT grant MD0011532.)

P6.38

LEAD INDUCED OXIDATIVE STRESS IN DIFFERENT REGIONS OF THE BRAIN - AMELIORATIVE EFFECTS OF *BACOPA MONNIERI* (BRAHMI)

Kendra Robinson-Taylor¹, Prabhakara Rao Yallapragada², Manoj Kumar Velaga², Charan Kumar Basuri², Sharada Rajanna¹, Bettaiya Rajanna¹
¹Alcorn State University, ²Andhra University, Visakhapatnam, AP, India

Earlier investigations in our lab have demonstrated that lead induces oxidative stress resulting differential expression of apoptotic proteins in different regions of the rat brain. The current study examined the ameliorative effects of Brahmi against chronic lead toxicity. Male Wistar strain rats (100g-150g) were divided into five groups: a) control, b) exposed, c) DMSA (2,3-Dimercaptosuccinic acid) - treated, d) Brahmi-treated, and e) a combination of DMSA plus Brahmi-treated. The treated groups received individually DMSA at a dose of 90 mg/kg body weight/day, the aquatic extract of Brahmi at a dose of 10 mg/kg of body weight/day and a combination of DMSA (90mg/kg body weight/day) plus aquatic extract of Brahmi (10mg/kg body weight/day) for seven consecutive days after 4 weeks of lead exposure. Results indicated a significant (p<0.05) increase in ROS, LPP and TPCC in all four regions of the brain in the exposed group compared with their respective controls. These changes correlated well with the increase in metal concentration of the exposed brain. Treatment with Brahmi resulted in restoration of ROS, LPP and TPCC almost reaching the control group values in all the above brain regions compared to DMSA and a combination therapy. The recovery for ROS was more in the hippocampus followed by the frontal cortex and the brain stem on Brahmi treatment while the cerebellum had a maximum recovery with the combination therapy. The results suggested that Brahmi can mitigate lead induced-oxidative stress tissue-specifically by pharmacological interventions. (This International Research Training involving the first author at Andhra University, India, was supported by NIH/NCMHD/MHIRT #MD 001532.)

P6.39**PROTECTIVE ACTIVITY OF AQUEOUS EXTRACT OF LEAF OF *COMMICARPUS CHINENSIS* IN PARACETAMOL INDUCED LIVER INJURY IN RATS**

Justin Booker¹, Satyanarayana S², S. Arun Kumar², S.P. Gouda², K. Eswar Kumar², Sharada Rajanna¹, Bettaiya Rajanna¹

¹Alcorn State University, ²Andhra University, Visakhapatnam, AP, India

The leaves of *Commicarpus chinensis* (CC) is chewed in India as native medication for gastric and liver disorders. The antioxidant activity of aqueous extract was evaluated by *in-vitro* studies in rats. The hepatoprotective activity of the same was evaluated on paracetamol (PCM) induced toxicity by curative and prophylactic studies in rats. The aqueous extract of the leaves exerted potent inhibition of free radicals in *in-vitro* studies. The extract had significant effect than ascorbic acid, a known antioxidant in scavenging free radicals. The amount of plant extract and ascorbic acid needed for 50% scavenging of superoxide radical, hydroxyl radical and lipid peroxidation inhibition activity were found to be 122.45 μ g & 112.08 μ g, 196.8 μ g & 265.25 μ g, 225.2 μ g & 270.2 μ g respectively. The *Commicarpus chinensis* at doses of 30, 100 and 300 mg/kg were administered orally once daily for nine days to rats. In curative studies, the substantially elevated serum enzymatic levels of serum glutamate oxaloacetate transaminase (GOT), serum glutamate pyruvate transaminase (ALT), serum alkaline phosphate (ALP) and total bilirubin (BILT) were restored towards normalization in a dose dependent manner. In prophylactic studies, 300 mg/kg body weight dose of *Commicarpus chinensis* prevented paracetamol induced increase in the above listed parameters. The data suggested that the mechanism of the activity might be due to antioxidant activity since paracetamol produces damage by free radical generation. The presence of flavonoids and phenolics compound in the *Commicarpus chinensis* may be responsible to the hepatoprotective activity. (This international research training was supported by NIH/NCMHD/MHIRT # 9 T37 MD 001532.)

P6.40**SINGLE INJECTION METHOD FOR DETERMINATION OF RENAL HEMODYNAMIC PARAMETERS IN RODENTS**

Alkesh Patel¹, Radu Iliescu¹

¹University of Mississippi Medical Center,

²University of Southern Mississippi

Determination of renal hemodynamic function by measurement of glomerular filtration rate (GFR) and

renal blood flow (RBF) is important when it comes to clinical practice. Present methods are based on clearance of a particular substance by the kidneys. Precise urine collection is needed and can be difficult when dealing with small rodents, such as rats. Catheters were inserted into the femoral vein and artery of Sprague Dawley rats and necessary recovery time was given. Para-aminohippuric acid (PAH) was administered in bolus (500 mg) in the femoral vein. Arterial blood collection was taken at 1, 5, 10, 20, 40, 60, 80, 100, 120, and 140 minutes after injection. Plasma [PAH] – time curve was used to calculate total renal blood flow using the following formula: $dQ/dt = RBF \times C(t)$, where Q is total PAH mass injected and C(t) is the plasma concentration of PAH at any given time. The plasma PAH concentration – time curve was approximated as the sum of an initial, fast logarithmic decay, followed by a slow (renal-dependent) exponential decay calculating the total area under the curve for solving the previous equation by integration. This technique yielded values of RBF ~ 10 mL/min/2 kidneys. In addition, the same experimental approach was compared in the same animals with direct measurement of renal blood flow using transit-time ultrasound flowmetry. Given that direct RBF measurement yielded ~ 5 mL/min/ kidney, we concluded that the single injection technique of PAH is reliable for determination of RBF in small rodents.

P6.41**FIBROBLAST RESPONSE TO INCREASING EGCG CONCENTRATIONS BY EVALUATION OF CELLULAR VIABILITY AND CELLULAR MORPHOLOGY**

Shukla Faruque, Shavelle Courtney, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Catechins have shown antioxidant, antiproliferative, antineoplastic and antiangiogenic properties in vitro and in vivo studies. Epigallocatechin-3-gallate (EGCG), represents 67% polyphenols in tea extract and catechin when studied. Investigations determine concentrations of EGCG that alters growth, viability, cellular morphology of virally transformed cell line compared with concentrations needed to arrest cancer cells. MRC-5 cells obtained from Hybrid Diagnostic divided in three groups of 30 tubes. 10 tubes per group were treated with control (0 μ M) low dose (2 μ M) or high dose (10 μ M) EGCG for each period. After 24, 48, and 72 hours of incubation cell numbers, cellular protein, cellular morphology was evaluated and compared to the control for that period. MRC-5 cells treated with 10 μ M EGCG at 24 hours had increased cell numbers which decreased by 48 hours

with the lowest numbers seen after 72 hours. Cellular proteins were not different for the duration of the experiment. Cellular morphology not altered by additions of EGCG, but by 72 hrs there was a decrease in cell density in the high dose treatment group. Cell suppression in the MRC-5 cells was significantly less than 50 μ M dose used to suppress ovarian or HeLa cell lines. EGCG causes cell cycle arrest since the effects were not seen until 48 to 72 hours following EGCG administration. EGCG did not appear to cause cell cytolysis this was not evident in the cellular morphological evaluations. This information is important since not all cancer types and virally transformed cells respond similarly to EGCG.

P6.42

THE TIME COURSE OF TRANSCRIPTIONAL REGULATION IN ANOXIC FIBROBLASTS: IMPLICATIONS FOR CARPAL TUNNEL SYNDROME

Christine W. Pierce, Michelle A. Tucci, Hamed Benghuzzi

University of Mississippi Medical Center

Background: Hypoxia is the initial cellular insult in carpal tunnel syndrome. While much is known about the gross and histological progression of this prevalent disease, little is currently known about its molecular basis. Additionally, some deliberation presently exists regarding whether the disease occurs as the result of an inflammatory or a fibrotic pathology. **Objective:** The objective of these investigations was to determine the transcriptional regulation in MRHF fibroblasts subjected to an anoxic culture environment with respect to HIF-1 α and TGF- β 1 mRNA expression. **Methods:** MRHF fibroblasts were cultured under anoxic conditions for various durations up to 72 hours alongside normoxic controls. HIF-1 α and TGF- β 1 mRNA levels relative to baseline were determined by real-time PCR. GAP-DH was used as the reference standard for normalization, and relative quantification of fold-differences in mRNA expression by the comparative ($2^{-[\Delta\Delta Ct]}$) C_T method. **Results:** Transcriptional up-regulation of both HIF-1 α and TGF- β 1 were observed in fibroblasts subjected to anoxic culture conditions. Peak mRNA expression was observed after 15 min of anoxic exposure for both HIF-1 α and TGF- β 1. HIF-1 α showed a 7.3-fold increase relative to baseline, and this increase was sustained over time. In contrast, TGF- β 1 mRNA expression was increased 3.3-fold over baseline levels, however, up-regulation was not sustained across the duration of anoxia exposure. **Conclusion:** Both HIF-1 α and TGF- β 1 have been shown to regulate the expression of connective tissue growth factor (CTGF). The pronounced and sustained up-regulation of HIF-1 α

observed suggests that CTGF expression in hypoxic/anoxic carpal tissues is predominantly under the regulatory influence of HIF-1 α .

P6.43

COMPARISON OF FIBROBLAST RESPONSE TO INCREASING CONCENTRATIONS OF FRUCTOSE-1,6-BISPHOSPHATE AND MANNOSE-6-PHOSPHATE.

Jasmine Ellis, David Black, Tamika Taylor, Olga Golanov, Rhea Richardson, Michelle Tucci, Ham Benghuzzi, Joseph Cameron

University of Mississippi Medical Center

Adhesion formation between the flexor tendon and surrounding fibrous sheath results in decreased postoperative range of motion in the hand. Transforming growth factor-beta (TGF- β) is a key cytokine in the pathogenesis of tissue fibrosis. Effects of fructose-1,6-bisphosphate (FBP) and mannose-6-phosphate (M6P), were investigated in vitro as potential compounds that interfere with increased fibroblast proliferation. Fructose-1,6-bisphosphate (FBP) is a glycolytic intermediate that has been used to protect tissues in various hypoxic conditions for years. M6P can interfere with adhesion formation both in vitro and in vivo. Mannose-6 phosphate can isomerized to fructose-6 phosphate and converted to FBP in the glycolytic pathway. This experiment determines if M6P and FBP at similar concentration are able to interfere with cellular proliferation and morphology. Fibroblast cells obtained from American Type Culture Collection, and grown in DMEM media. Cells plated onto 24 well plates at a density of 1×10^5 per well. Six wells per group were treated with control (0.0 μ M), low (0.50 μ M), medium (5.0 μ M), and high (50 μ M) dosages of FBP or M6P for periods of 24, 48 and 72 hours. After the cells were harvested, counted and morphometric data obtained and analyzed compared with control. M6P was able to reduce cell number after 48 hours without evidence altered morphology. FBP treated cells showed increased cell number and increased vacuolization early as 24 hours which was maintained for the duration of the experiment. Data suggests that M6P and FBP do not target the same cellular pathways leading to a reduction in TGFb.

P6.44**THE EFFECTS OF GREEN TEA ON CELLULAR VIABILITY AND FUNCTION OF VIRAL TRANSFORMED AND PRIMARY FIBROBLAST CELL LINES**

Jenna Browder, Brian Lantz, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

Epidemiologic studies, clinical observations and research with laboratory animal models have shown the chemopreventive properties of green tea to be attributed to its polyphenols, in particular, to the catechins. The main catechin, epigallocatechin gallate (EGCG), has also been shown to inhibit cell growth of cancer cells without affecting normal cells. The exact mechanism has not been determined. Our goal was to determine the effects of EGCG on cellular viability and cellular function. MRC-5 viral transformed fibroblast cells and MRHF fibroblast cells were treated with 10 μ M of EGCG for periods of 24, 48, and 72 hours. After each time period, cell numbers, cellular MDA and cellular glutathione were determined using standard laboratory methods and assays. The results show increased cell number and cellular MDA in the viral transformed MRC-5 cells compared with control non treated cells. We also observed an increases in cellular glutathione content in the primary fibroblast cell line, MRHF. The data overall suggest that EGCG in viral transformed cells increases cellular oxidative damage; whereas, in nontransformed cells glutathione, an antioxidant type protein, is up-regulated and possibly offers protection against oxidation. This aspect needs further characterizations. This could lead to the development of selective chemotherapeutic agents that target rapidly or damaged cells and spare "normal" cells.

P6.45**AN EVALUATION OF GROWTH AND VIABILITY OF THE A549 AND MRC-5 CELL LINES UPON EXPOSURE TO SELECTIVE ORGANIC INHIBITORS OF GLYCOLYSIS**

Veshell Lewis, Ibrahim Farah

Jackson State University

Lung cancer is a one of the most prevalent and deadly cancers in United States. Research has shown that cancer cells exhibit higher glycolytic rates than normal cells. The human lung fibroblast cell line (MRC-5) was selected to represent normal human lung and the human alveolar epithelial cell line A549 was selected to represent lung cancer in vitro. These cells were maintained and exposed to eleven different organic reagents including fructose diphosphate (FDP), sodium citrate, ascorbic acid, crude honey, sodium

bicarbonate, D-glucose, oxalic acid, glycerol, zinc acetate, pyruvic acid, and sodium ascorbate at concentration levels ranging from 31.3-2,000 μ g/ml in 96 well plates using MTT, Alamar blue and the T4 cellometer assays as well as phase-contrast photo-imaging. Our results indicate that exposure of A549 cells to these organics resulted in concentration dependent differential cell destruction for the A549 cell line. Eight of the eleven organics used namely zinc acetate, oxalic acid, honey, FDP, pyruvic acid, sodium citrate, ascorbic acid and glycerol showed statistically significant ($p < 0.05$) differential negative effects on the A549 line in comparison to its control as well as to their effects on the MRC-5 cell line. Viability using the T4 cellometer counting ranged between 60-76% for the A549 compared to 96- 100% for its control as well as the exposed MRC-5 cell line. LC50 using MTT assays ranged from 161-1041 μ g/ml. We conclude that eight of the tested organics impaired glycolysis which is crucial to the generation of cellular energy and survival of the A549 cell line.

P6.46**THE EFFECTS OF THYMOQUINONE AND GREEN TEA EXTRACT ON LDL MODIFICATION IN FIBROBLAST CELLS**

Felicia M. Tardy, Ham Benghuzzi, Michelle Tucci

University of Mississippi Medical Center

CVD is the leading cause of death for both men and women in the United States. Previous research has indicated that gender differences exist in CVD; and it is believed that these differences are attributed to sex hormones, especially testosterone and estrogen. Elevated levels of low-density lipoprotein (LDL) are associated with increased CVD risk. The specific aims of this study are to investigate the effects of LDL on the viability and proliferation of fibroblast cells of both male and female origin, and to evaluate the effects of potential antioxidants such as thymoquinone (TQ) and green tea extract on the modification of LDL using fibroblast cells as a model. Results of this investigation suggest that TQ and green tea extract may inhibit LDL modification in fibroblast cells.

FRIDAY MORNING Exhibit Hall B

8:30-10:30 Health Fair

Participants may get free screenings for blood pressure, glucose levels, body mass index, etc.

FRIDAY MORNING Lamar 2

Drug Delivery Systems Mini-Symposium

9:00 RECENT DEVELOPMENTS IN DRUG DELIVERY SYSTEMS

Dr. Ateegh al-Arabi, PhD

O6.08

10:00 ALTERATIONS OF THE MORPHOLOGY OF THE LIVER AND ADRENAL BY STATIN RELEASED BY MEANS OF TRICALCIUM PHOSPHATE LYSINE DELIVERY SYSTEM IN A DEFECT FEMORAL INJURY IN AN ANIMAL MODEL

Felix Adah¹, Hamed Benghuzzi¹, Michelle Tucci¹, George Russell¹, Barry England¹
¹University of Mississippi Medical Center, ²University of Michigan Medical School, Ann Arbor

Statins are 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors are widely used for the treatment of hyperlipidemia. The study developed a targeted statin delivery system using Tricalcium Phosphate Lysine (TCPL) for defect and segmental femoral injuries and evaluated the effects on the histomorphology of the liver and adrenal after sustained delivery of statin for a period of 30 days and 12 weeks post surgery. At the end of 30 days (Phase I), and 12 weeks (Phase II), all the animals were euthanized for histomorphological analysis. Simvastatin used in this study significantly increased fracture healing in both phases. In Phase I study, the adrenal wet weight recorded in the statin group was slightly higher than the weights recorded for the sham and the control groups, but the difference was not statistically significant. Also, there was atrophy of the zona fasciculata and the zona reticularis, and compensatory hypertrophy of the medulla of the adrenal glands in the samples taken from two of the rats. Also, the wet weight of the liver in the statin group was not significantly different from the control and the sham groups. The liver morphology was different from the control with an atrophy of the liver, and a denser appearance. Phase II results showed no significant morphological and wet weight differences of the liver and adrenal glands in the statin group compared to the control and sham groups. In conclusion, sustained

delivery of statin in a short period may lead to alteration of the histomorphology of the liver and adrenal gland in a rat model.

O6.09

10:15 EVALUATION OF CARTILAGE GROWTH FOLLOWING SUSTAINED DELIVERY OF GROWTH FACTORS IN SIMULATED DEGENERATED DISCS OF RATS

Victoria Scott, Michelle Tucci, Ashraf Ragab, Hamed Benghuzzi

University of Mississippi Medical Center

Currently there is no treatment for degenerative disc disease that stimulates cartilage repair. The goal of our research was to identify growth factors that influence chondrocyte number. A rat degenerative disc model was implemented. In this phase of the study, it was hypothesized that continuous sustained release of growth factors alone or in combination would reverse cartilage death associated with degenerating discs. Twenty rats were divided into five equal groups. Group I served as control and groups II -V were subjected to a surgery where a 21-gauge needle was used to pierce the L4/L5 disc posteriorly. Animals in group II received tobramycin released via tricalcium phosphate sustained delivery device (TCP-DD). Animals in group III -V received tobramycin and either TGF, IGF-1, or TGF + IGF-1 via TCP-DD. After 4 weeks the animals were sacrificed and the traumatized discs were removed, sectioned, stained, and evaluated using light microscopy techniques. Transition zone areas were calculated and the number of chondrocyte nuclei per area was determined. After four weeks, animals in group II (trauma only) showed evidence of disc degeneration with the largest decrease in cell number anterior to the site of trauma. Treatment with TGF, IGF-1, and TGF + IGF-1 resulted in chondrocyte numbers similar to control in posterolateral views of the disc, while lateral views and views of the site directly opposite the trauma had less chondrocytes per area than the control. Growth factors provided in a sustained fashion can increase chondrocyte numbers and aid in disc repair.

10:30 EFFECTS OF SUSTAINED DELIVERY OF EPIGALLOCATECHIN-3-GALLATE, (EGCG), SELENIUM (SEL), AND THYMOQUINONE (TQ) ON ES-2 CELLS

Felisa Wilson Simpson, LaToya Ross Richards, Hamed Benghuzzi, Michelle Tucci

University of Mississippi Medical Center

11:00 Health Sciences Business Meeting



HISTORY AND PHILOSOPHY OF SCIENCE

Chair: Andrew Harrell, US Army Corp of Engineers
Vice-chair: Michael Dodge, McGill Law School

THURSDAY MORNING Forrest 1

07.01

9:00 WHAT IS A NATURAL KIND, REALLY?

Paula J. Smithka, Kenneth J. Curry
University of Southern Mississippi

People commonly speak of many "kinds" of things. There are kinds of wines, kinds of books, etc., but "natural kinds" are "kinds" allegedly "occurring in nature." What does this really mean? David Hull (1978. "A Matter of Individuality," *Philosophy of Science*, 45.3: 335-360) states, "...a completely satisfactory explication of the notion of a natural kind has eluded philosophers." The goal of this presentation is to provide such a satisfactory (albeit perhaps not "completely satisfactory") account of natural kinds. In the history of philosophy and of philosophy of science, natural kinds seem to occupy a "privileged" ontological position between being a universal (or general) thing and being a particular thing; i.e., more "real" than a universal thing and more general with longer duration than some particular thing. Oliver Rieppel (2005. "Monophyly, Paraphyly, and Natural Kinds," *Biology and Philosophy* 20: 465-487) says "fuzzy" edges are required on both sides of the disjunction, 'natural kinds are universals or they are particulars'--natural kinds are "in between." For Hull (1978), the disjunction is exclusive. Species, often associated with natural kinds, must be sets (general things) or individuals (particular things); Hull opts for individuals. We agree that the disjunction is exclusive, but accept that if natural kinds have ontological status, they would have to be general things. We deny that general things exist; hence, neither natural kinds nor species, have ontological status as extra-mentally existing things. Instead, we argue that natural kinds and species are conceptual categories, non-arbitrarily formed, based on characteristics that particular organisms exhibit.

07.02

9:20 BIOLOGICAL INDIVIDUALS

Malachi Martin

University of Southern Mississippi

In this presentation I tackle biological individuals by distinguishing between an epistemic and an ontological notion of individuation and arguing for an ontology of nested individuals. Epistemic individuation is the cognitive act of singling out an abstract or concrete entity. Ontological individuation is the objective reality of a concrete entity's being or becoming an individual of some kind. By making this distinction I avoid reifying abstract entities as real entities and ideafying concrete entities as constructs. Conceptualizing an entity does not mean it objectively exists. Furthermore, if individuals or concrete entities are spatially localized, integrated and bounded then individuals are nested in each other and there is no privileged level at which "the individual" resides. This thesis has been advanced by Nachtomy, Shavit and Smith in "Leibnizian Organisms, Nested Individuals and Units of Selection" (2002) and by Stanley Salthe in *Evolving Hierarchical Systems* (1985). If biological individuals, those individuals that are alive, can be nested then false *n*-chotomies evaporate and some "problematic cases" of biological individuals dissolve. For example, strawberry plants and strawberry patches, polyps and polyp colonies, fungal mycelia and mushrooms are each simultaneously biological individuals. I argue that organismic individuals are biological individuals that form lineages and are members of species. Thus, the aforementioned cases represent nested biological individuals, with the former entities in each case being the organismic individuals. Ultimately, I consider these and other cases including slime molds, humans, insect communities, the "superorganism" concept, the species-as-individuals (SAI) thesis and implications for the "units of selection" debate.

9:40 Break

07.03

10:00 WHAT IS THE ONTOLOGICAL STATUS OF A LAW OF NATURE?

Christopher Dyer

Univeristy of Southern Mississippi

It seems uncontroversial that science strives to identify laws of nature. These laws describe and explain the natural phenomena that scientists observe in the world. But what is the ontological status of a law of nature?

Philosophers of science tend to divide into two camps on this particular question. One side answers that laws

of nature state the regularities found in the world; as such, they function as descriptions of the way the world is. Any attempt to explain why it is so will prove fictitious. I call this view the 'Regularity Theory' and its proponents 'Regularists'.

The second view holds that laws of nature reveal the principles that govern the natural phenomena of the world; on this view, the natural world obeys the laws of nature. Physical necessity is a property of laws of nature, or, alternatively, necessity is inherent in the content and structure of the universe. In either case, necessity is something 'out there' in the world. I call this view the 'Necessity Theory' and its adherents 'Necessitarians'.

The aim of this presentation is to provide arguments for and against the Regularist and the Necessitarian positions. Despite Necessitarianism's putative advantage over Regularity Theory, that in absence of necessity all that remains is accident and an unfit basis for scientific activity, I argue that Regularity Theory is more plausible. Positing physical necessity is no more productive than recognizing regularity and is ultimately a non-empirical notion.

07.04

10:20 A SHORT HISTORY OF LOGIC DIAGRAM, 500BC-1900AD (HOW DID THEY TURN INTO LOGIC MACHINES?)

Andrew Harrell

Engineering Research and Development Center

This talk can only include a brief introduction to the history of these ideas. But, they form the foundation of many topics in mathematical logic and computer science. The talk will follow the historical material in Martin Gardner's 1958 book. "Mathematics is the study of what is invariant under change of notation." To agree to this controversial and primary postulate one must subscribe to a certain theory of what logical Truth is. But, this viewpoint about logical truth explains why the definition of terms and the symbols in the logic diagrams that we choose to make and create can be very important. For the talk, first, we will review Aristotle's classification of syllogistic functions and terms. Then, we look at Raymond Lull's different theological concepts including his class diagrams of concepts of a concept. Lull's famous student, Leibnitz's introduced the idea of a monad. The idea of a Monad relates to the modern day set theoretic "What is the Concept of the Number One" in mathematical logic. These ideas will later reappear in the 1990s as a definition of a data structure in computer programming. It only took 400 years for us to figure this out. Then we will briefly consider Venn diagrams and how they relate to Lull's diagrams and some precise abstract mathematical definitions of modern day point set

topology. Finally, requiring all the previous steps, the origin and the importance of the next historical step: Boolean functions and their algebras, will be much clearer.

07.05

10:40 CAN A SCIENCE OF PHILOSOPHY GIVE US HAPPINESS?

Kant Vajpayee

University of Southern Mississippi

Many of us feel that there is an epidemic of unhappiness. It's a serious matter since happiness is what we seek all along! We are expected to handle it on our own. And if we can't, where do we go to seek help? I can't think of a professional other than philosophers. Doctors help us with physical ailments, neurologists with brain problems, psychologists with brain/mind. None in the health care industry seems to entertain problems of unhappiness. Philosophers dwell on the most difficult topics, especially that are abstract. If God is the most challenging topic for philosophers, unhappiness must be the second most challenging one. Can we expect the medical sciences to advance in the areas of mind and soul? Could genetics help them in this direction? Will the scientists be able to do on their own, or might they need the help of philosophers. I have more hope from the philosopher, at least in the near term, than the medical scientists, in delivering happiness to those who need it. Innovative efforts by philosophers might open a new branch of knowledge we may call clinical philosophy. This new field will emphasize the application side of philosophy for the needs of the material market that brings street-level prestige to a discipline. Imagine a store in Turtle Creek mall dispensing happiness! Imagine philosophers on the medical team in hospitals!

THURSDAY AFTERNOON

Forrest 1

07.06

1:40 HOW DO YOU DEFINE THE NUMBER ONE?

Andrew Harrell

Engineering Research and Development Center

The above question arises when we consider how we can develop a better understanding of the interrelations of science and faith. At the turn of the last century work on the area of the foundations of mathematical analysis and the beginnings of the development of mathematical logic increased. This happened along with the invention of digital computers. And, a new area of mathematical area of research called



set theory was created in order to understand what "a real number" in Calculus means. Leopold Kronecker made his famous statement, "God created the integers and all else is the work of man." But, how did God create the integers? Plato's dialogue Parmenides is perhaps his hardest to understand work and the most important attempt in the classical era to try understand different ways we can answer this question. What is a set? What is an empty set (basically this is determined logically when you know what an element in a set is and what a set is)? This talk will give a short history of some of the progress mathematicians and logicians have made trying to answer these questions since the beginning of the last century. We have shown, that except for some notable gaps, how "real numbers (rational, algebraic, transcendental)", and likewise various other "complex and ideal numbers" can all be constructed logically from the positive integers. The possibility of the "notable gaps" come from the proof of the independence of the continuum hypothesis.

07.07

2:00 A FOURTEENTH CENTURY LOGICAL DEBATE OVER COMPLEX TERMS IN CATEGORICAL PROPOSITIONS

Michael J Fitzgerald

Itawamba Community College

Albert of Saxony and John Buridan, both 14th century arts masters at the University of Paris, were engaged in a logical debate over the ability of categorical propositions, i.e. propositions composed of a quantifier, subject term, copula, and predicate term, to have complex subject and predicate terms as their logically proper parts. My presentation will recount their positions on this issue, and argue that their semantic disagreement is particularly important to the development of modern logical techniques because it underlies the disagreements over modern formalizations between logicians trained in the Frege-Russell tradition, and those of the 20th century Polish logicians, Leśniewski in particular, or those of modern combinatory logic. Albert of Saxony, for example, is one of the first logicians to defend a Leśniewskian like view, that categorical propositions can have composite terms as the subject and predicate terms of categorical propositions without turning them into compound propositions. He constructs composite subject and predicate terms utilizing implied operators which are medieval analogues to logical "functors" in modern formal systems. John Buridan, on the other hand, like logicians trained in the Frege-Russell tradition, maintains that composite subject and predicate terms ultimately will turn categorical propositions into

logically compound hypothetical propositions containing more than a single categorical proposition.

2:20 Division Business Meeting

FRIDAY MORNING

Forrest 1

07.08

9:15 CONSIDERING THE SPECIES CONCEPT IN A HIERARCHICAL FRAMEWORK

Kenneth J. Curry, Paula J. Smithka

University of Southern Mississippi

The species concept is one of the most elusive of biological concepts. A typical freshman biology textbook devotes a significant portion of a chapter to the species concept and frequently includes a table of competing species concepts. No other part in the book will present as much uncertainty about biological phenomena as attends the species concept. Our inability to reach even modest consensus about the species concept is manifested in our difficulty with apprehending the vast time and spatial elements of species. We have a world view necessarily limited by the spatial and temporal range that characterizes humans. We conceive of species having some sense of spatial-temporal reality so vast in comparison to our own that we are challenged to apprehend this concept, a concept of our own making which some have argued may not even be ontologically warranted! The species concept is grounded in and inferred from organisms, but organisms are so far removed in dimensions of time and space from species as to doom any clear apprehension of species obvious to all of us. Hierarchical modeling can help us understand systems much smaller or much larger in space and/or time than we are. Here we apply hierarchical modeling to species to help understand both the nature of this concept and the difficulty of understanding the concept. Hierarchical modeling is a method that allows us to separate conceptually the complexity of systems of any space-time dimension, exploring their component parts while retaining the notion of the whole system.

07.09

9:35 THE LEGAL TRIALS AND TRAVAILS ASSOCIATED WITH SOCIAL DARWINISM, EUGENICS, AND PHRENOLOGY

Michael Dodge

McGill University, Montreal, Quebec

On the trail of the Sesquicentennial Anniversary of The Origin of Species, there are a

plethora of topics rife for discussion and reflection. From the more practical history of biologic thought, to the more abstract conceptualizations of biophilosophy, the intellectual offspring of Darwin's work deserve special consideration. One of the more pertinent—though oft forgotten—analyses focuses on the legal consequences of Darwin's thought, with special attention paid to Social Darwinism. While evolutionary thought heralded a new age of scientific enlightenment, proponents of Social Darwinism occasionally used influence and political bodies to engender sinister and draconic laws. This presentation aims to describe the legal ramifications of the Black Sheep of Social Darwinism—Eugenics. Though eugenic thought far preceded the *Origin of Species*, it received a monumental boost from Darwin's work. Eugenicists actively pursued the eradication of undesirables and the "feeble minded", both in Europe and in the United States. Laws were designed both for forced sterilization and to prevent miscegenation, and resulted in infamous controversies like *Loving v. Virginia* and *Buck v. Bell*. Although many laws today are designed to protect against eugenic applications, proponents of eugenics are nevertheless extant in modern society, and dystopian visions of the future continue to call for legal vigilance. This presentation analyzes both the history and future of the Anglo-American legal battles over eugenics, and suggestions to guard against future legal travesty are discussed.

10:00 Break

O7.10

10:20 IS BIOLOGY A VANISHING SCIENCE?

Paula J. Smithka, Kenneth J. Curry

University of Southern Mississippi

Since the time of logical positivism in the early 20th century, a philosophical goal of science has been to achieve unification among the particular sciences by reducing all theories and objects of scientific inquiry to those of physics. Along the way of this theoretical and ontological descent toward ultimate physical particles and theories about those particles, special sciences such as psychology and biology begin to be replaced by neurophysiology and biochemistry, respectively. Marjorie Grene (1974) characterizes this reductionist trend as a "crisis" for "behavioral science" and for biology. She asks, "...is biology vanishing as, for example, astrology or alchemy have already done?" (pp. 36-37). In this presentation, we investigate the reductionist strategy in science and argue that even if such ontological reductionism is possible and desirable, a complete theoretical reductionism is methodologically undesirable.

O7.11

10:40 LIFE: BIOLOGISTS' MOST ENIGMATIC CONCEPT

Kenneth J. Curry, Paula J. Smithka

University of Southern Mississippi

Biologists may be the only professional group who cannot describe clearly in a few words what it is they study. Of course they say they study life, but who among them can say what life is? Freshman biology texts typically devote several pages of chapter one explaining the aspects that are associated with life, but the problem of distinguishing life from nonlife and life from death are among the most enigmatic problems of biology. We suggest that the problem stems from trying to describe life with a single-level ontology. Life at the level of cells is different in significant ways from life at the level of multicellular organisms. Conflating these two ontological levels leads to confused ideas of life. Terms such as respiration and reproduction refer simultaneously and with different meaning to two levels of organization, thus adding to the confusion. Understanding the nature of life requires understanding the conceptual problems attending the concept of life. Here we assume the cell is a basic unit of life. Multicellular organisms exhibit features associated with life on a higher ontological plane that we recognize as qualitative novelty, i.e., emergent properties. These properties are not found in unicellular organisms, but frequently become conflated with attempts to define life. We argue that (cellular) life's most obvious features are complexity of organization and rate of system behavior. These two features in combination allow us, with reasonable reliability, to distinguish life from nonlife and life from death.



MARINE AND ATMOSPHERIC

Chair: David Rosenfield,
University of Southern Mississippi
Vice-Chair: Kevin Yerger,
University of Southern Mississippi

THURSDAY AFTERNOON Exhibit Hall A

**Joint Session with Cellular, Molecular, and
Developmental Biology Division**
*Adapting Molecular Tools and Techniques for Use in
Marine Science*

O2.17

**2:45 DEVELOPMENT OF A NEW RNA
EXTRACTION METHOD FOR DETECTING
NOROVIRUS IN OYSTERS**

Xunyan Ye, Shiao Y. Wang
University of Southern Mississippi

O2.18

**3:00 VALIDATION OF LINEAR SINGLE
CELL RNA AMPLIFICATION AMONG
KARENIA BREVIS GENES AND
IMPLICATIONS TO SINGLE CELL
MICROARRAY ANALYSIS**

David Jayroe, Tim McLean
University of Southern Mississippi

O2.19

**3:15 IDENTIFICATION OF NON-CODING
RNAs IN KARENIA BREVIS**

Helen Namataka, Tim McLean
University of Southern Mississippi

O2.20

**3:30 TRACKING THE SOURCES OF FECAL
POLLUTION IN COASTAL WATERS USING
LIBRARY- INDEPENDENT METHODS**

Christopher Flood, R.D. Ellender
University of Southern Mississippi

O2.21

**3:45 DETECTION OF SALMONELLA spp.
FROM MISSISSIPPI COASTAL WATERS AND
SEDIMENT**

R.D. Ellender, Christopher Flood
University of Southern Mississippi

O2.22

**4:00 DETECTION OF N₂ FIXING
CYANOBACTERIA WITH MOLECULAR
TOOLS**

Shanshan Ren, Karen Orcutt, Kjell Gundersen
University of Southern Mississippi, Stennis Space
Center

FRIDAY MORNING Lakeview 1

8:40 Division Business Meeting

O8.00

**9:00 A HISTOLOGICAL STUDY OF
GAMETOGENESIS IN CAPTIVE RED SNAPPER
(LUTJANUS CAMPECHANUS)**

Agnes Bardon-Albaret, Nancy Brown-Peterson, Jason
Lemus, Angelos Apeitos, Eric Saillant
Gulf Coast Research Laboratory of Southern
Mississippi

Gametogenesis was monitored at the histological level in red snapper (*Lutjanus campechanus*) collected from the wild and maintained under controlled temperature and photoperiod conditions. Gonads were excised from fish sampled every 2-3 weeks from 12 February to 14 May 2009. The first sign of active gametogenesis was from a male on 5 March when temperature was 17°C. Spermatogenesis was completed with free spermatozoa found in the seminiferous tubules on 16 April (20°C) for 3 out of 6 males sampled. Oocyte secondary growth in females was first observed on 16 April, with the appearance of cortical alveolar oocytes in one female. Vitellogenesis was subsequently observed in 13-40% of sampled females between 16 April and 14 May. Twenty fish were maintained in the tanks to monitor spawning activity through daily checks for the presence of eggs in egg-collectors during 14 May - 16 July. No egg release was observed. Ovarian biopsies were taken from 10 females on 16 July for histological inspection. Vitellogenic females were observed at the same relatively low proportion (40%) found on 14 May. These results indicate that some males and females can complete gametogenesis in captivity, further suggesting that inhibition of later events in the spawning cycle such as final oocyte maturation and/or spawning behaviors may be responsible for the lack of spawning activity reported in captive red snapper. This study also revealed a relatively low proportion of females completing gamete maturation in captivity as compared to available data on maturation of wild red snapper.

08.01

9:20 SUCCESS OF POM-BASED INDONESIAN SEAS REGIONAL MODEL: COMPARISON WITH 3 YEARS OF INSITU DATA

David Rosenfield¹, Vladimir Kamenkovich¹, Kieran O'Driscoll², Janet Sprintall³, Dmitri Nechaev¹
¹University of Southern Mississippi, Stennis Space Center, ²University of Hamburg, Germany, ³University of California San Diego

The Indonesian Seas region has presented numerous challenges for numerical modelers - the Indonesian Throughflow must pass over shallow sills, into deep basins, and through narrow constrictions on its way from the Pacific to the Indian Ocean. As an important region in the global climate puzzle, a number of models have been used to try and best simulate this throughflow. The International Nusantara Stratification and Transport (INSTANT) program measured the flow through multiple Indonesian Seas passages simultaneously over a three year period (from January 2004 to December 2006). In this presentation, we present a comparison between the transports calculated from our model and those calculated from the INSTANT in situ measurements at five chokepoints within the Indonesian Seas (Labani Channel, Lifamatola Passage, Lombok Strait, Ombai Strait, and Timor Passage). Our Princeton Ocean Model (POM) based regional Indonesian Seas model reasonably represents the general long-term flow (seasons) through this region. The INSTANT transports were compared to the results of this regional model over multiple timescales. Overall trends are somewhat represented but changes on timescales shorter than seasonal (three months) and longer than annual were not considered in our model. Normal velocities through each chokepoint during every season will be presented, as well as daily volume transports and transport-weighted temperature and salinity.

08.02

9:40 PROFILING MERCURY DISTRIBUTION IN NATIONAL ESTUARINE RESEARCH RESERVE (NERR) BY COLD VAPOR GENERATION AAS: PRELIMINARY RESULTS FROM WATER, SEDIMENT AND FISH SAMPLES

Melanie McHenry, Zikri Arslan, Paul Tchounwou
Jackson State University

Mercury compounds including elemental mercury, inorganic mercury and organic mercury transfer among the soil, atmosphere, and surface waters during the cycle of mercury in the environment. Consumption advisories are based on consumption patterns and contaminant levels for lakes and rivers.

The Grand Bay National Estuarine Research Reserve (NERR) is a biologically diverse area that is a popular recreational site. Increasing population and recreational activities have raised questions about the exposure of public to Hg compounds. This study aims to assess the concentration and distribution pattern of Hg in NERR to better understand the risks associated with contact with Hg. We have utilized a vapor generation atomic absorption spectroscopy (VG-AAS) for measurement of inorganic and methyl mercury levels in sediment, fish and water samples collected from NERR. Vapor generation method was optimized through a series studies with inorganic and methyl Hg solutions using HCl, SnCl₂, NaBH₄ and KMnO₄. Best conditions for Hg vapor generation were obtained for 5% HCl as sample acidity and 5% SnCl₂ as reducing agent. This scheme provided a detection limit of less than 50 ng/l (ppt) for Hg. Preliminary data from analysis of sediment, fish tissue and water samples have shown that levels of Hg was the lowest in water ranging from 40 ppt to 67 ppt that are significantly below 2 ppb MCL set by EPA for drinking water. For sediment, the dry weight mercury concentration ranged from 64 to 181 µg/g. The mercury concentrations in fish tissue ranged from 14.0 to 126 µg/g.

10:00 Break

08.03

10:20 APPLICATION OF A 3 DIMENSIONAL VARIATIONAL DATA ASSIMILATION SYSTEM IN THE MONTEREY BAY

Chudong Pan¹, Maksim Yaremchuk², Dmitri Nechaev¹
¹University of Southern Mississippi, Stennis Space Center, ²Naval Research Laboratory, Stennis Space Center

A 3 Dimensional Variational Data Assimilation (3D-VAR) system is applied in the Monterey Bay region. 3D-VAR method minimizes the cost function to find the best fit between the model forecast field and the data. The model used in this system is the Navy Coastal Ocean Model (NCOM). The data used for assimilation are temperature and salinity profiles from Spray and Slocum gliders deployed during August and September 2003 in the Monterey Bay region. Two independent mooring data sets (M1&M2) recording temperature, salinity and current velocity are used for validation of the model and data assimilation results. The errors between the model and the glider data are reduced to a very low level after the assimilation, indicating the success of the 3D-VAR system in assimilating glider data. However, there is only a little reduction in the model T&S misfits with mooring data after data assimilation, which indicates that the system needs improvement for predictive

capability. The free NCOM model run doesn't describe the variability in the T, S and velocity fields very well, which may be an important reason for poor performance of the model in predicting temperature and salinity at the mooring locations.

08.04

10:40 DISTRIBUTION OF TRACE ELEMENTS IN LOUISIANA SHELF WATERS

DongJoo Joung, Alan M. Shiller

University of Southern Mississippi, Stennis Space Center

The Louisiana Shelf receives inputs from two Mississippi River tributary systems entering differing physiographic environments (i.e. River delta and Atchafalaya Bay) and undergoes seasonal hypoxia of bottom waters. Selected trace elements (Fe, V, Mo and Cr) were determined in samples filtered for total (< 0.45 μm) and truly (< 0.02 μm) dissolved concentrations. We sampled shelf surface and bottom waters (including the rivers) during a period of high river discharge. A river water-seawater mixing experiment was compared with the field data. Molybdenum behaved conservatively in both the field and the mixing experiment. Removal of dissolved and colloidal Fe occurred at low salinity. Colloidal Fe was the major fraction at low salinity, suggesting that the removal of Fe is due to colloidal flocculation. Chromium also showed non-conservative behavior indicative of removal due to colloidal flocculation. For vanadium, non-conservative behavior was observed, with a minimum in concentration at a salinity near 30. The cause of the non-conservative behavior is not clear, but may relate to bottom removal and subsequent upward mixing of waters. Distributions of these trace elements in different mixing zones of Mississippi and Atchafalaya River plumes showed no clear differences. Ongoing studies will extend the number of elements determined and will also look at element distributions during low river discharge as well as during mid-summer shelf hypoxia.

11:00 Break

08.05

11:20 SEASONAL VARIATION OF DISSOLVED TRACE METALS IN THE EAST PEARL RIVER

Moo-Joon Shim, Alan Shiller

University of Southern Mississippi, Stennis Space Center

To study seasonal variation of trace metals in the East Pearl River (EPR), water samples were

collected from August 2001 to July 2003, and from November 2005 to September 2007. Based on river discharge-concentration relationships, three groups of elements are categorized. The first group (Cd, La, Ce, Pr, Nd, Pb, U, V, Cr, Fe, Cu, Ni, and Zn) increased in concentration with increasing river discharge. The second group (Li, Cs, Ti, Mn, Co, and Mo) showed a negative correlation with the river discharge. The third group (Re, Rb, Sr, and Ba) showed weak seasonal fluctuations, but also an abrupt increase in summer and fall, 2006. Most of the second group of elements also showed very high concentrations in summer and fall, 2006.

Adsorption processes are probably of minor importance in explaining seasonal fluctuations because seasonal pH variability is weak. Microbial Mn oxidation also may not be an important controlling factor because Mn concentrations increase as water temperature increases. Based on Rb and Sr concentrations, salt water invasion may have resulted in the abrupt high concentrations of the second and third groups of elements during the low water period in summer and fall 2006. Only the first group metals have significant correlations with DOC, suggesting that the first group metals may have the same source and/or be complexed with organic ligands. Seasonal changes of most of the metals we analyzed are associated with hydrological conditions in the EPR.

08.06

11:40 MODELING OF THE CIRCULATION IN THE SOUTHERN BERING SEA

Yao Li, Dmitri Nechaev

University of Southern Mississippi

Amukta Pass is one of the Aleutian Passes, and the only one where reliable transport estimates are available for three years. Time series data of currents obtained by Acoustic Doppler Current Profilers (ADCP) at the mooring sites in the Amukta Pass are analyzed by the Fourier Transform and the Least Square Regression to estimate the tidal contribution to the transport through the Amukta Pass. These analyses show that the tide is dominating in the transport through the Amukta Pass. The ratios of tidal velocity amplitude to the mean velocity resulted from the Fourier Transform and the Least Square methods are 96.8% and 101.4% respectively. The power density spectrum of the velocity rebuilt from major tidal constituents has peaks with identical magnitudes and frequencies as that of the original velocity. These analysis results are set as the open boundary condition at the south boundary in the domain of the southern Bering Sea. The hourly sea surface elevation and velocity field on the region ranging from 169.65°W to 174.22°W and from 51.33°N

to 53.81°N are modeled by the Princeton Ocean Model (POM) for a period of one and half months. A very strongly tidal influenced circulation pattern is shown in the result.

FRIDAY AFTERNOON Exhibit Hall C

Division Poster Session

1:30p-2:30p

Posters may be set up starting at 1:00p

P8.01

FISH FOOD FROM BEER WASTE

Angela Quintana¹, Steven Newsom¹, Allison Walker², Amy Salamone², Jinx Campbell²

¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²Gulf Coast Research Laboratory, Department of Coastal Sciences of Southern Mississippi, ³The National Aeronautics and Space Administration, Stennis Space Center

Farmed fish are commonly fed fish food containing wild-caught fish. One-third of fish caught annually are used in the production of such products, which is environmentally unsustainable. In an effort to eliminate this unsustainable practice, fungi were investigated as an alternative protein source. Three species of fungus were investigated: *Candida utilis*, *Candida krusei*, and *Geotrichum candidum*. Beer waste (trub) was used as a growth medium for the fungi. The first phase of the project involved making a starter culture by inoculating 250mL autoclaved trub with *Candida utilis* cultures and incubating at 26° C for seventy-two hours in a shaking incubator. An additional 2.5L of trub was autoclaved in a fermenter jar. This trub was then inoculated with the starter culture and aerobically fermented for 24-hours. Upon completion of the aerobic fermentation process, the product was centrifuged and the resulting fungal, single-celled protein (SCP) freeze-dried. The process was repeated using the other two species of fungi. The samples were shipped to Texas A&M University for nutritional analyses. After analyses, the SCP will be formulated into fish food and will undergo fish feeding trials at the Thad Cochran Aquaculture Center at University of Southern Mississippi.

P8.02

INOCULATION AND COLONIZATION OF THREE SALT MARSH PLANT SPECIES WITH ARBUSCULAR MYCORRHIZAL FUNGI

Aimie Chambliss¹, Jinx Campbell², Kathryn Wire²

¹Cooperative Intern Program between Mississippi Gulf

Coast Community College County Campus Honors Biology Students, Gautier, ²University of Southern Mississippi, Gulf Coast Research Laboratory, ³The National Aeronautics and Space Administration, Stennis Space Center

Salt marshes are a significant part of the ecosystem; they provide protection from land erosion and they also provide feeding grounds and act as a nursery for vital marine species. However, the salt marshes on which we depend for commercial fishing and protection are starting to diminish, primarily due to human-induced disturbances, such as pollution, land reclamation, and construction. This loss of essential habitat can lead to a drastic decrease in marine life and a decrease in fisheries. To restore our salt marshes, plants are being grown in nurseries to later be transplanted to marshes. To increase the survival rate of transplanted nursery plants and to improve their growth, studies are being implemented involving arbuscular mycorrhizal fungi (AMF). Nursery plants were inoculated with commercial AMF containing a blend of four types of endospores. This experiment demonstrated the addition of AMF increased the growth of the plants. Currently, the experiment is being repeated to test the AMF medium. In this "repeat" experiment the plants were inoculated with the commercial AMF as before; the plants were inoculated with the medium minus the fungal spores; and three plants had no additions and served as the control group. The overall purpose is to document that it is the fungi in the inoculant and not the inoculant medium that increased the growth of the plants.

P8.03

COMPARING POPULATIONS OF GULF COAST AND EAST COAST GRAY TRIGGERFISH UTILIZING MITOCHONDRIAL DNA GENES

Nick Emerick¹, Eric Saillant²

¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²Gulf Coast Research Laboratory of Southern Mississippi, ³The National Aeronautics and Space Administration, Stennis Space Center

A sequencing assay for a mitochondrial DNA coding gene for developed in gray triggerfish (*Balistes capricus*). Universal Polymerase Chain Reaction (PCR) primers that allow amplification of specific mitochondrial genes were tested on gray triggerfish DNA. The products of the PCR amplification were sequenced together and the sequence was analyzed for potential genetic polymorphism among individuals. Using the assay developed, samples of gray triggerfish from the Gulf of Mexico were compared to samples

from the east coast to determine if genetic differences occurred between the Gulf of Mexico and east coast populations.

P8.04

AN ANALYSIS OF SEA TURTLE STRANDINGS IN LOUISIANA

Jessica DeJean¹, Michele Kelley², Patricia Biesiot¹
¹*University of Southern Mississippi*, ²*Audubon Aquarium of the Americas, New Orleans, LA*

The Audubon Aquarium of the Americas (AAOA) in New Orleans has been collecting and archiving observations about strandings of marine mammals and sea turtles along the Louisiana coast. For the present study, we collated and mapped the data for 163 sea turtles (5 different species) archived over the past eight years. Recorded strandings are concentrated primarily in the Lake Charles area and along Grande Isle and Grand Terre. The strandings peak around the end of April through the beginning of June and again at the beginning of October through mid-November. About 23% of the sea turtles had obvious strike marks. The areas with high stranding concentrations are heavily used by sport and commercial fishermen. The stranding dates overlap with periods of warm weather recreational boating and with open fisheries seasons for menhaden and shrimp. We examined the association between strandings and open fisheries seasons using a chi-squared test. Most strandings occurred during open menhaden season except in 2002 and 2007 where most occurred when both menhaden and shrimp seasons were open. Although there was a statistically significant association between sea turtle strandings and open fisheries seasons, this does not imply that fishing caused the observed morbidity and mortality.

P8.05

THE EFFECTS OF NANOCOPPER ON THE SHEEPSHEAD (CYPRINODON VARIEGATUS) MINNOW

Harris McDonnell¹, Joe Griffitt²

¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier*, ²*Gulf Coast Research Laboratory, Department of Coastal Sciences of Southern Mississippi*, ³*The National Aeronautics and Space Administration, Stennis Space Center*

Nanomaterials are small metal particles about 15-45 nm in size that are becoming widely used and may be released into the environment. Due to this increase in usage, it is necessary to identify if nanomaterials were toxic to aquatic organisms. The purpose of this study was to identify the concentrations of nanocopper

that are toxic to the sheepshead minnow (*Cyprinodon variegatus*). First, a range-finder experiment was established to broadly determine the level at which the nanocopper was toxic. Next, 96-hour LC50 (concentration required to kill 50% of the fish in 96-hours) were determined by exposing sheepshead minnows to a series of five concentrations of nanocopper (calculated from data in the previous experiment) and counting and removing dead individuals daily.

P8.06

THE TOXICITY OF NANONICKEL IN SHEEPSHEAD MINNOW (CYPRINODON VARIEGATUS)

Sean Farrell¹, Joe Griffitt²

¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier*, ²*Gulf Coast Research Laboratory, Department of Coastal Sciences of Southern Mississippi*, ³*The National Aeronautics and Space Administration, Stennis Space Center*

Increasing production and industrial use of nanoparticles has raised concerns about their potential lethality in aquatic organisms. Some researchers believe these nanoparticles, specifically metallic nanoparticles, will affect aquatic life differently than dissolved metal solutions. Continued research on the effects of different metallic nanoparticles on a wide range of aquatic species is necessary to determine their potential environmental impacts. This study continued the nanoparticle research by examining the toxicity of nanonickel on aquatic organisms. Sheepshead minnow (*Cyprinodon variegatus*) were exposed to varying levels of nanonickel concentration to determine the LC50 for the species. The goal of this research was to establish the effects of nanonickel on the sheepshead population and to further the overall research of the potential effects of nanoparticles in aquatic organisms.

P8.07

THE EFFECTIVENESS OF BRUSHING IN THE REMOVAL OF LUNAR SIMULANT DUST FROM THERMAL CONTROL SURFACES IN A SIMULATED LUNAR ENVIRONMENT

Khrissaundra Journey, Rachel Beecham
Mississippi Valley State University

Unlike the Earth's surface, the lunar surface is subject to constant micrometeorite bombardment, cosmic rays, and solar wind radiation, causing the regolith to break up into the particles forming that are referred to as lunar dust. The lunar dust caused major issues for astronauts on the Apollo missions because the

dust contaminated equipment, irritated eyes and lungs, scratched and abraded surfaces, and comprised radiators and seals. The dust covered the surfaces of the radiators that cooled the batteries that operated the Lunar Rover Vehicle. This causes the radiators to become ineffective, and caused the batteries to exceed temperature limits. Dust removal methods using nylon brushes to brush the dust off were ineffective. High fidelity lunar tests are required to successfully design lunar exploration technology. To return to the moon by 2020, high quality thermal and vacuum tests need to be performed. The Lunar Dust Adhesion Bell Jar (LDAB) was created at NASA Glenn Research Center to provide a high fidelity lunar simulation facility to test the interactions of lunar dust simulant. The effectiveness of the brushing to remove the simulant dust is tested inside of LDAB by three thermal tests and then the samples are analyzed using a microscope that magnifies to 100 x. According to the results from the bench test, the nylon brush was used on AZ93 paint and the silver-backed Teflon. The Teflon brush was only used on the AZ93 paint. And the Thunderon brush will only be used on the silver-backed Teflon.

P8.08

DYNAMICS OF PHOSPHORUS IN THE BAY OF ST. LOUIS ESTUARY

Peng Lin, Laodong Guo

University of Southern Mississippi, Stennis Space Center

The riverine export of nutrients, such as phosphorus (P), plays an important role in regulating primary production and water quality in coastal environments, especially in the river-dominated northern Gulf of Mexico. However, chemical speciation of P and its phase partitioning, mixing behavior, and biogeochemical cycling pathways in estuarine environments remains poorly understood. Water samples were collected from the Bay of St. Louis (BSL) along a salinity gradient, from the Jordan/Wolf rivers to the Mississippi Bight in the northern Gulf of Mexico, and quantified for concentrations of various P species, including dissolved inorganic phosphorus (DIP), dissolved and colloidal organic phosphorus (DOP and COP), and particulate phosphorus. Our results show that both concentrations of DIP and DOP increased, in general, with increasing salinity in the BSL, which is contrary to those reported for the Mississippi River plume with extensive anthropogenic inputs. Furthermore, the percentage of DIP in total dissolved phosphorus increased with increasing salinity, whereas the DOP percentage decreased with increasing salinity. COP comprised about 40-90% of the DOP pool, decreasing from the Jordan River to about 40% in the BSL, but increasing again in higher salinity waters in

the northern Gulf of Mexico. This indicates a dynamic change in the abundance and sources of COP during estuarine mixing. These results provided new insights into our understanding of the speciation, mixing behavior, and dynamic biogeochemical cycling of phosphorus in the Bay of St Louis estuary and the northern Gulf of Mexico.

P8.09

REGIONAL CLIMATE VARIABILITY LONG-TERM TRENDS IN SOUTHERN CENTRAL STATES OF USA

Francis Tului, Suseela Reddy Remata, Duanjun Lu, Bhaskar Rao Dodla, Anjaneyulu Yerramilli
Jackson State University

Recent climate model improvements have resulted in an enhanced ability to simulate many aspects of climate variability and extremes. However, they are still characterized by systematic errors and limitations in accurately simulating more precisely regional climate conditions. There is a need to develop a greater understanding of the synergistic impacts of environmental change, and improve development, testing and validation of integrated stress impacts through computer modeling as well as long term real time data. Earlier, we carried out study to understand the interplay of climate variability and air quality. As a part of the study, we observed by statistical methods the temperature trends over Mississippi for the period 1871 to 2008 based on the data collected from the NOAA Climate Diagnostic Center. In this region, we noticed that the temperature variation during the period is split into three zones, a zone of negative trend with cooling in between two zones of positive trend with warming. The regional scale observations are in contrast to the monotonous global positive increasing trend. In the present study, we extend similar investigations in the neighboring southern central states - Alabama, and Georgia to observe the regional climate variability long-term trends. The outcome of the study will be discussed in lieu of the existing global warming changes as reported in IPCC, 2008.

**MATHEMATICS, COMPUTER
SCIENCE AND STATISTICS**

Chair: Paul Ruth,
University of Mississippi
Vice-chair: Elegenaid Hamadain,
University of Mississippi Medical Center

**THURSDAY MORNING
Lamar 1**

09.01

**8:20 FRACTAL SURFACE INTERPOLATION,
Part II**

Andrew Harrell

*Geotechnical Laboratory, Engineering Research &
Development Center, Vicksburg*

This talk will follow up on my MAS 2005 talk which discussed various ways to interpolate data from information on sensor surfaces using 1 and 2 dimensional fractal generation programs. Various schemes using MATLAB programs which input H1xH2 (Hurst exponents) and plot two dimensional Brownian motion surfaces using different mid-point interpolation methods will be discussed. These will be compared to generalizations to two dimensions of my one-dimensional method which plots logarithms of detrended terrain profiles. Ways to use histograms of the power spectrum of the original data and compare with those from the data from the interpolated surface will be explained. These techniques allow the interpolated fractal surface to be investigated as to the goodness of fit with the original sensor data.

09.02

**8:40 STABILITY AND LIMIT CYCLE FOR A
NEW COURNOT'S DUOPOLY GAME**

Travis Dixon, Xiaoqin Wu

Mississippi Valley State University

Cournot Duopoly is a game of competition and reaction between two companies which have dominant influence and control over a market. In order to maximize the profit, each company takes action based on the reaction from its rival to compete with its rival. In this research we propose a new reaction function $f(z)=g(z)=\mu z(1-\sqrt{z})$ and hence obtain the following system:

$$\begin{aligned}x_{t+1} &= (1 - \rho)x_t + \rho f(y_t), \\y_{t+1} &= (1 - \rho)y_t + \rho g(x_t).\end{aligned}$$

We analyze the eigenvalues of the Jacobian matrices in equilibrium points and hence attain the dynamical behaviors of the corresponding Cournot duopoly game such as the stabilities and limit cycles. Numerical simulation is presented to verify the theoretical results.

09.03

**9:00 AMYLOID-BETA (Ab) AGGREGATION
IN ALZHEIMER'S DISEASE**

Clyde Sims, Jr.¹, Preetam Ghosh²

¹Mississippi Valley State University, ²University of
Southern Mississippi

Alzheimer's disease (AD) was named after the German neuropathologist Alois Alzheimer. The disease causes memory loss and impairment of daily activities. AD is characterized by large numbers of fibrillar amyloid deposits in the form of senile plaques. The protein amyloid-beta (Ab) is responsible for neuronal loss. It is our hypothesis that this Ab build-up can be followed and a pinpointed lag time can be determined. By using the Dizzy software as well as Matlab, I able to follow this aggregation rate and perform further experiments to provide more insight into the cause of Alzheimer's disease. These tests and simulations have been ran by other professors, my job was to run them again to reassure the results that were found. I ran simulations on the two different kinds of software, Dizzy and Matlab. The codes were already written out by other professors from different researches. The software Dizzy was too simple to use because it didn't take into consideration of the different speed rates this process takes. Matlab was able to take in all of these different parameters, but due to time, the code was not able to be modified according to my simulation results. If we were to perfect the code, then we would be able to run simulations on a computer to monitor Alzheimer's disease instead of spending money on equipment to do lab experiments.

9:20 Break

09.04

**9:40 THE KOPEL MODEL OF COURNOT
DUOPOLY WITH DELAY**

Jamessa Jordan, Xiaoqin Wu

Mississippi Valley State University

The Cournot duopoly model is a model which describes the competition of two companies on the same products they produce. Each company's action and reaction are independently of its competitor at the same time. In real life, there is a time delay for companies to make decisions and take actions. This leads us to propose the Cournot duopoly mode with delay. Specifically, we consider the Kopel model of Cournot duopoly with delay. In this research, we show that this model can exhibit complicated dynamical behaviors of such as chaos, stability and Neimark-Sacks bifurcation. Computer simulation is presented to confirm our theoretical result.

09.05

10:00 VALIDATION OF CURRENTS PREDICTIONS FROM A NUMERICAL OCEAN MODEL

Jamaris Moore

Mississippi Valley State University

This project entails the study of the process of tidal analysis for ocean currents along the East and Gulf coasts. Tidal analysis procedures will be used to compare a database of model-generated tidal currents to a database of observations-based tidal currents. To accomplish this goal, the un-validated data for the currents observations must undergo a series of quality control analysis. In doing so, the observational data must be made compatible with the numerical ocean model (ADCIRC Model) being used by vertically integrating the currents to get their barotropic components. Tidal analysis procedures and statistics will also be used to compare currents predictions from the observations with those from the model at the coincident locations along the East and Gulf coasts. To show the discrepancy distributions between the observational data and the ADCIRC model for the East Coast and Gulf of Mexico, maps will be generated so that at a glance, one can assess model accuracy.

09.06

10:20 CREATION OF GDL OBJECTS WITH EMBEDDED LEED INFORMATION

Shawn O'Keeffe, Dr Mohd Fairuz Shiratuddin, Desmond Fletcher

University of Southern Mississippi

The Geometric Description Language (GDL) is a computer-programming language that allows for the creation of Graphisoft's ArchiCAD GDL based object libraries. GDL objects are parametric objects and they contain all the information required to describe building elements such as 3D geometric model, 2D CAD symbols and texts. The information in GDL objects is organized in a tree hierarchy based on the Industry Foundation Class (IFC) schema. Using GDL objects allow the creation of many additional building information and parameters that can be embedded into model elements present in designs.

In this paper, we describe two methods for the creation of custom GDL objects; (1) utilizing GDL script and (2) modeling the 3D object using 3D modeling software such as Autodesk 3D Studio Max. We also described the creation of LEED (Leadership in Energy and Environmental Design) related model element parameters using the Vico Constructor software, and LEED model element recipes using the Vico Estimator software. We have developed a prototype 3D model that contains GDL objects embedded with LEED related information and actual cost of products. We are

currently creating new LEED related IFC sub-set schemas so that sustainable built environment information can be interoperable and interchangeable.

10:40 Break

09.07

11:00 REVITALIZING COMPUTER SCIENCE EDUCATION BY USING NONTRADITIONAL METHODS TO TEACH TRADITIONAL TOPICS: A SURVEY OF TOOLS

Jacqueline Jackson

Jackson State University

Far gone are the days of chalkboard and erasers. Today's classrooms are equipped with smartboards, computers and mounted projectors. Lectures once handwritten during a class period are now projected. It is evident that technology has entered into institutions of higher learning and has become a part of the teaching process. However, how many are using technology to its full potential? How many are using technology as a tool to demonstrate key concepts? In recent years, "teaching with technology" has taken on a different meaning. To teach mathematical concepts, calculators were once the primary tools, now robots. To teach students how to program, "toy" problems were given, now students are designing games. There are several technological tools that can be easily incorporated into computer science curriculums to aid in the teaching/learning process. These tools are fun and engaging and can be useful in reigniting interest in the discipline. Tools include (1) Greenfoot (a 2D programming environment that allows users to develop games and simulations) and (2) Alice (a 3D programming environment that allows users to create animations, play games or create videos). These graphical environments allow students to "play", build virtual environments, experiment and at the same time learn.

09.08

11:20 IMPROVE STUDENT LEARNING OUTCOME AND REDUCE INSTRUCTIONAL COST USING INFORMATION TECHNOLOGY- A CASE STUDY IN COLLEGE ALGEBRA

Lixin Yu, Marchetta Atkins, Chunmun Trivedy, Satya Redla, Ravinder Kumar, Murali Pingili, Venkata Polavarapu

Alcorn State University

Alcorn State University participated in a course redesign practice led by the Mississippi Institutions of Higher Learning (IHL) and National Center for Academic Transformation (NCAT). This study presents the data of the College Algebra classes before and after course redesign, which features larger



classes, less classroom meeting time, and more lab hours with the help of computers. Even though a pilot study in Spring 2008 did not show improvement in student learning outcome, the midterm score of the classes in Fall 2008 and the student lab attendance record have shown improvement in student learning. The study compares the participating rate of students taking online tests in traditional classes and course-redesign classes; analyzes test score differences between tests in paper version and online version; studies differences in student lab attendance data; demonstrates different patterns for students' doing homework; and investigates correlation between students' success and class attendance. The study also illustrates the importance of Math Center in the course redesign practice and describes the collaboration between the Math Center and the faculty. The result shows that it is possible to achieve improved student learning outcome and reduce the instructional cost at the same time by making use of the information technology.

09.09

11:40 USING VRML TO VISUALIZE 3D OBJECTS IN ANALYTIC GEOMETRY

Myron Lott

Mississippi Valley State University

In the textbook of Analytic Geometry, there are conic curves (parabolas, ellipses and hyperbolas) and 3D objects. However, it is difficult to visualize them from different points of view. In this presentation, we use VRML (Virtual Reality Modeling Language) to visualize those conic curves and quadric surfaces (spheres, cylinders, ellipsoids, hyperboloids, elliptic paraboloids, hyperbolic paraboloids). Mathematica is used to generate VRML codes.

THURSDAY AFTERNOON

Lamar 1

09.10

1:20 VISUALIZATION OF THE CRESIS GREENLAND DATA SETS

Shaketia McCoy

Mississippi Valley State University

The Center for Remote Sensing of Ice Sheets (CReSIS) has been compiling Greenland ice sheet thickness data since 1993. The airborne program utilizes a 150 MHz radar echo sounder to measure the ice thickness. The data is currently available on the CReSIS web site in various formats including PDF, Matlab, and plain text files. These formats are not

readily usable in the classroom environment as a visual representation of the ice depth is not available for each expedition. During the Undergraduate Research Experience in Ocean, Marine and Polar Science 2009 program, the Greenland Data Visualization Team took the CReSIS data and created a 4-D visualization consisting of depth, time, latitude, and longitude. This visualization was created utilizing HTML, JavaScript, and PHP. Microsoft Excel was used to filter the raw data downloaded from the CReSIS site. The team then statistically analyzed the Greenland ice sheet thickness data for calculated, missing, and actual depth readings. The goal of this project was to present the CReSIS data via the web in a visual format to elementary, undergraduate, and graduate students for research and education. This visualization package and corresponding data will eventually be migrated to the Elizabeth City State University Polar Grid High Performance Computing System. The research that follows involved converting plain text files to comma separated values to be used by PHP and JavaScript to produce data visualizations in Google Maps and HTML pages.

09.11

1:40 REFINING THE DIGITAL FORENSICS HIERARCHY

F. Chevonne Dancer, David Dampier

Mississippi State University

Smartphones are increasing in popularity due to functionality, portability, convenience and affordability. Because of this, examiners must acquire and analyze these devices when criminal activity is suspected to have occurred. In order to obtain this information, it has to be extracted in a way that is repeatable and testable. There are several process models available for use, but the ad-hoc approach is on the rise. The dilemmas are that ad-hoc approaches and the forensic investigative process models available are not well suited for the examination of such devices. These approaches may cause the validity of investigator skill and methods to fall under scrutiny.

To address this, there is a need for an investigative framework tailored to the unique qualities of smartphones. To accomplish this, the hierarchy of digital forensics should be understood. "Computer forensics" and "digital forensics" are used synonymously in literature, but wrongfully so. This paper highlights the differences in computer forensics, digital forensics, computer crime, and digital crime while proposing a revised hierarchy of the forensics discipline.

09.12

2:00 ACTIVE CYBER FORENSICS USING SPLUNK AND ATTACK GRAPHS

Christopher Lanclos

Mississippi Valley State University

Anti-forensics has become an issue in the world of cyber security. Anti-forensics is the removal of data to hide illegal activity. Cyber forensics, the counter part of anti-forensics, is being overrun by the constant growth of anti-forensics. It seems like there is a new anti-forensics tool being developed or modified daily. This research combines a newly developed IT search engine called Splunk, with a widely used attack graph theory to monitor USB (Universal Serial Bus) activity. With the combination of the two, it will allow the notification of an attack. The focus on USB is the stepping-stone for a network wide capability using this combination to detect other intruders. Splunk is a constant running database that has the capability to recording almost every action of a computer or network. In addition to recording the data, it has the ability to organize it in a way that can be beneficial to the cause of cyber forensics. Splunk's real time capability gives cyber forensics an upper hand. The ability to record the activity of a computer or network in real time does not allow the use of anti-forensics tools and/or techniques without them being record already. The result is to have the required data to seize and prosecute hackers. This research is a step in the transition from retro-forensics to pro-active forensics.

2:20 Break

09.13

2:40 ON THE PROBABILITY OF K-CONNECTIVITY IN MOBILE AD HOC NETWORKS UNDER DIFFERENT MOBILITY MODELS

Natarajan Meghanathan and Sireesha Gorla

Jackson State University

A network is said to be k-connected if there are at least k edge disjoint paths between any pair of nodes. A mobile ad hoc network (MANET) is a wireless network of mobile nodes formed impromptu without any fixed infrastructure. Several mobility models are available in the literature to characterize the movement of nodes. In this research, we evaluate the k-connectivity of MANETs under the following three commonly used mobility models: Random Waypoint model, City Section model and the Manhattan model. All the three mobility models assume the nodes to move independent of each other. Using the mobility profile generated for the nodes under a mobility model over a simulation time period, we construct an ad hoc network at different time instants of the simulation. For each

such static graph, we run the Ford-Fulkerson algorithm between every pair of nodes in the graph to determine the number of k-edge disjoint paths between the nodes. The probability of k-connectivity ($1 \leq k \leq 40$) for a given condition is determined using the results collected for 100 repeated runs of the simulation. For each mobility model, we conducted simulations under different node velocities and network densities. For a given mobility condition and network density, the Random Waypoint model yielded a larger probability of k-connectivity compared to the other two mobility models. The City Section model yielded a larger probability of k-connectivity compared to the Manhattan model.

09.14

3:00 A STUDY OF THE LEACH PROTOCOL AND ITS EXTENSION TO A GRID-BASED NETWORK

Jonathan Henderson

Mississippi Valley State University

Wireless sensor networks have tiny sensor nodes dispersed throughout it to monitor, collect, and transmit data. The sensors are inexpensive, simple, and their power source is irreplaceable. The wireless nodes are dispersed in very large quantities so the data collected can be the most accurate. It also takes energy to transmit and receive data. Knowing the sensors' power levels cannot be restored, many protocols have been developed to make collecting, transmitting and receiving data more energy-efficient. LEACH (Low-Energy Adaptive Clustering Hierarchy) one of the protocols developed is a clustering based protocol. In this paper, we use LEACH to identify the most efficient cluster head percentage and transmission range for square, rectangle, and circle networks with the metrics of connectivity, lifetime, and energy lost per round. We propose having a high transmission range with a high cluster head percentage; lifetime would be low because of the amount of energy consumed. We also study an extension to a Grid-Based Network to identify an efficient block length for the regions. We propose having a high transmission range with a high cluster head percentage so that the percentage of connectivity will be high. Simulations show that a higher transmission range and cluster head percentages were not efficient and a low cluster head percentage with a high transmission range is preferred.

**O9.15**

3:20 DEVELOPMENT OF THE MULTICAST FLOW ORIENTED ROUTING PROTOCOL FOR MOBILE AD HOC NETWORKS

Ebony Addison¹, DeMarcus Thomas³, Natarajan Meghanathan²

¹Elizabeth City State University, Elizabeth City, NC,

²Jackson State University, ³Mississippi Valley State University

Various stable path routing protocols have been proposed for unicast and multicast communications in Mobile Ad hoc Networks (MANETs). In a unicast communication, a source node communicates with a destination node; whereas, in a multicast communication, a source node communicates with a group of receiver nodes. In this research, we develop the multicast extension of FORP (referred to as M-FORP) for MANETs. M-FORP was implemented using a modified version of the Dijkstra algorithm to solve the Largest Bottleneck Path Problem. M-FORP predicts the lifetime of a link between two nodes using the velocity and direction of movement of the two nodes (LET). The expiration time of a route is the minimum of the LETs of the constituent links of the route. M-FORP connects the source with each of the receivers on paths that have the maximum RET. The set of all paths constitutes the multicast tree. We compared the performance of M-FORP with that of the Multicast extension to the Node Velocity-based Stable Path (M-NVSP) routing protocol and the Bandwidth Efficient Multicast Routing Protocol (BEMRP). We measure the three critical multicast performance metrics: lifetime per tree, number of edges per tree and the hop count per source-receiver path. We observe a tradeoff between the performance metrics and none of the three protocols could simultaneously optimize them. M-FORP yields the most stable sequence of long-living multicast trees; M-NVSP incurs the smallest hop count per source-receiver path and BEMRP incurs the smallest number of edges per multicast tree.

FRIDAY MORNING Exhibit Hall C

Division Poster Session 9:00a-10:00a

P9.01

IMAGE SEQUENCE FUSION USING WAVELET TRANSFORMATION

Qiang He

Mississippi Valley State University

Because of the limitations of data collection in remote sensing and surveillance systems, the related

imagery can appear with low-contrast, blurring, and darkness from time to time. As a consequence, the visual performance of these image data is not in high-quality and then data analysis and processing of these kinds of images cannot be implemented successfully.

The image fusion technique is to recover useful information by integrating multiple low-resolution or low-quality images captured from the same scene. The image fusion can reconstruct a highly-resolved image of a scene from a series of low-resolution images based on image registration between different video frames. Here, we propose an image fusion approach to recover useful information in surveillance and remote sensing imagery by the fusion of spatially registered images from an image video sequence. The algorithm is based on a multi-scale strategy. The shift invariant discrete wavelet transform is introduced to implement image fusion between a fixed reference frame and every additional frame from the original video sequence. The wavelet-based multi-resolution fusion improves temporal stability and keeps consistency of the fused sequence in comparison with other fusion methods.

Experimental results on surveillance and remote sensing imagery show that our image fusion algorithm is effective in practice.

P9.02

REDESIGNING COLLEGE ALGEBRA AT JACKSON STATE UNIVERSITY: A FIRST YEAR EXPERIENCE

David Bramlett and Alicia Jefferson

Jackson State University

This poster session will discuss the process of how we redesigned College Algebra at Jackson State University (JSU) to work within our available resources as part of the Mississippi Course Redesign Initiative. The organization, challenges and solutions to implementation problems will be displayed and discussed along with the preliminary activities and initial investigations that one must undertake before embarking on course redesign. The JSU College Algebra Team selected the Replacement Model as the initial mathematical Redesign Model with the goal to gradually upgrade to the Emporium Model. The Replacement Model reduced the number of traditional sections taught per semester and increased the enrollment size per section. Each section now has one two hour in-class meeting per week and two hours per week in the computer lab. This model allows students to have equal contact hours with supervisory personnel in a laboratory setting and in a formal lecture setting. Additional information of the various types of redesign models that are currently being implemented across the nation will be made available.

P9.03

PROMOTER PREDICTION IN HALOTHIOBACILLUS NEAPOLITANUS C2 BASED ON STRESS-INDUCED DNA DUPLEX DESTABILIZATION

Aleksandra Markovets, Abigail S. Newsome, Charles Bland

Mississippi Valley State University 38941

In the post-genomic era when scientists can sequence the genomes of many organisms, one of the biggest challenges is the correct identification of promoter regions, which is essential for the understanding of gene regulation. Since wet-lab promoter prediction techniques are time consuming, in silico methods have been used to facilitate the process. Most of these traditional computational methods are based on motifs searching, which are insufficiently conserved to predict at a high level. To compensate for this shortcoming, DNA structural properties, such as curvature, stacking energy and stress-induced DNA duplex destabilization (SIDD), have been used. Of particular concern for this study was the prediction of promoters in the proteobacteria *Halothiobacillus neapolitanus* c2. We have implemented a method that predicts promoter sequences in this organism by using the DNA SIDD of the genome. Recent studies have shown that SIDD is a distinctive structural attribute of promoter regions. The SIDD predicted promoter-containing sites of this research can be used as targets for experimental verification or further bioinformatics investigation.

P9.04

INTEGRATION OF DIYA OUTPUT WITH GMOD STANDARDS

Inna Rytsareva, Charles Bland, Abigail S. Newsome
Mississippi Valley State University

Genome annotation is the process of embellishing raw DNA sequences with predictions of features such as genes and transcription factor binding sites. These assignments are necessary to identify important gene functions and to enable comparative analysis. GMOD is the Generic Model Organism Database project, a collection of open source software tools for creating and managing genome-scale biological databases. There are two general GMOD standards: GFF and Chado. GFF is a compact format for describing sequence and sequence annotations. Chado is an ontology-based modular schema for representing genome-associated biological information. DIYA, Do-It-Yourself Annotator, has been approved as an official GMOD project. It is a modular and configurable open source pipeline framework, written in Perl, used for the rapid annotation of microbial

genome sequences. The software is currently used to take nucleotide sequence contigs as input, either in the form of complete genomes or the result of shotgun sequencing, and produce an annotated sequence. The present study was designed to complete GFF3 and Chado compliance for DIYA output and hence immediate connectivity with GMOD databases and tools. The proposed approach will allow the generation of GFF files from DIYA output and the identification of any areas that need modification in order to increase compatibility with BioPerl libraries and Chado databases, according to gene ontology annotations. These modification will then be tested using the recently sequenced genome *Halothiobacillus neapolitanus* (Genbank CP001801).

P9.05

COMPARATIVE STUDY OF BHAKSHALI SQUARE ROOT ALGORITHM AND NEWTONS METHOD FOR FINDING SQUARE ROOTS OF ARBITRARILY LARGE INTEGERS

Krishna Aditya, Madhu Aditya

Alcorn State University

While implementing a software package for arbitrary precision arithmetic we did a comparative study of Newton Raphson method for square root finding and iterative adaptation of square root algorithm given in Bhakshali Manuscript. Experts agree that the algorithm for square root finding in Bhakshali Manuscript predates Newton's method by many centuries. According to some experts this work could be dated as far back as 2nd century BCE and others place this around 12th century AD. In our implementations we found that iterative adaptation of the Bhakshali square root algorithm for finding square roots of very large integers, gives substantial (30%) computational speedup over Newton's method. We did further studies comparing this algorithm with 2nd, 3rd and higher order Newton's square root finding algorithm and on analysis we found that computational complexity of Bhakshali algorithm is same as 2nd order Newton's method for finding square roots.

P9.06

ARES RISK AND KNOWLEDGE MANAGEMENT

Gabrielle Meeks

Mississippi Valley State University

Risk and Knowledge Management help improve design and planning of vehicles under the Constellation program. As the Ares rockets are designed, there is a need evaluate the risks associated with the design, building and launch of the vehicles. A description of each risk and the threat it poses to the Ares rockets is stored in the Integrated Risk

Management Application (IRMA) database. This database also includes a mitigation plan for resolving the risk and a schedule for when the resolution should be reached. Each mitigation plan is analyzed to ensure that it is being executed as scheduled. Although each risk stored in IRMA does not have a plan for improvement, [mitigation plans are also developed for these risks. Knowledge Management (KM) involves capturing and disseminating information that is generated through exchanges between team members at the completion of milestones or activities. Like Risk Management, this information is used for process improvement, issue resolution, and informed decision-making. I developed a prototype for the Ares Knowledge Management Website which will serve as a means for communicating this information for Ares team members and others. The Ares KM Website site will allow access to and understanding of the tools, techniques, and documentation relative to KM.

P9.07

WIRELESS AVIONICS TECHNOLOGY EVALUATION

Jenelle Coleman

Mississippi Valley State University

This research explores the use of wireless links in place of traditional wired connections on spacecrafts avionics systems. The use of wireless technologies has the potential to enhance the robustness, fault tolerance, testability, and extensibility of avionics systems while decreasing launch weight. The Optimized Link State Routing (OLSR) ad hoc protocol and ZigBee were the candidates of wireless technologies to be used. Four laptops were updated with OLSR. Each laptop represented a node. The operating system was first run using D-Link Wireless Xtreme™ Notebook Adapter (DWA 625). However, the wireless adapter created a problem and the built-in Wi-Fi had to be used. The packets were sent to each node using the ping command line. The results included the number of packets transmitted, the number of packets received, the packet loss percentage rate, and the round-trip time. There were a few problems that occurred during this project. This caused some of the nodes to become unreachable. The results then displayed, "Destination Host Unreachable". On the other hand ZigBee produced more reliable results. The ZigBee hardware where connect to a control node which allowed each node to connect to one another. This project requires additional work. Another software, ISA 100, will be tested to obtain the results. The results will then be compared to the results obtained from OLSR and ZigBee. If it is discovered that ISA 100 works and can return better results, this will be the next project to study.

P9.08

ESTIMATING THE DISTRIBUTION OF CO₂ PARAMETERS IN SURFACE WATER OF THE INDIAN OCEAN FROM TEMPERATURE AND SALINITY

Thaddeus Fairley, Kadarice Joyce, Candy Graves
Mississippi Valley State University

The distribution of CO₂ parameters in the ocean is important for understanding the fate of anthropogenic carbon emission and its effects on global climate change. Among the four essential parameters, pH, alkalinity (TA), pCO₂, and total inorganic carbon (Tco₂), any two of them are sufficient to fully define the aquatic CO₂ system. Traditionally, each CO₂ parameters has to be determined using either field sampling or in situ sensors which are inefficient. As a result, temporal and spatial variations of CO₂ system are poorly understood. Recently, linear correlations between CO₂ parameters and temperature, salinity, and concentrations of dissolved organic carbon (DOC) and particulate organic carbon (POC) of various surface waters have been developed (Lohronze and Cai 2006, Berryman et al. 2007, Small and Reid 2007, Yuan 2009). Since sea surface temperature (SST) can be determined from satellite sensors, concentrations of DOC and POC can be estimated from satellite data, and the satellite sensor for sea surface salinity will be launched soon, these correlations will enable estimation of global distribution of CO₂ parameters from satellite data. We have tested these linear equations by predicting CO₂ parameters from sea surface temperature and salinity along cruise transects in the Indian Ocean. We have compared our prediction with field measurements of CO₂ parameters and evaluated the potential of these linear equations for estimating CO₂ parameters. The final research paper presents our final results, which shows which formula could possibly be future ways of estimating the distribution of CO₂.

FRIDAY MORNING

Lamar 1

O9.16

10:00 PERFORMANCE STUDY OF FUNCTION MODULES AND WEB SERVICES IN SAP

Anil Vinjamur

University of Mississippi

Web Services are considered as the silver bullet or corner stone for future computational needs. Need for such services are more relevant to the enterprise-wide systems like SAP, Peoplesoft, Oracle, etc. This paper compares the processing times of basic

functionality of the SAP system using the traditional method like JCo (Java Connector) and compares it with the processing of Web Services directly exposed in SAP and via middleware processor of Web Services like SAP's PI (Process Integration) system. The pros and cons of different development parameters such as development time, available debugging tools, speed of execution, security, and other resources are studied to determine the efficacy of each method. Although SAP JCo seems to be a good candidate when performance speed is concerned, SAP Web Services also gives comparable performance along with the flexibility of developing clients in any language that can adhere to Web standards like XML, WSDL, SOAP, UDDI, etc. Developing client code is much easier with Web Services when compared to JCo method, which requires extensive domain knowledge in SAP. SAP PI system provides superior debugging and monitoring tools and a robust middleware environment.

09.17

10:20 A COMBINATION OF NEURAL NETWORKS AND GATING NETWORKS FOR HANDWRITTEN RECOGNITION

Ping Zhang

Alcorn State University

A novel ensemble classifier system with rejection strategies, which consists of three parallel Artificial Neural Network (ANNs) and three gating networks, is proposed to suppress the error rate, to reduce the rejection rate and to enhance the recognition rate simultaneously for the recognition of handwritten digits. The tradeoffs among error, rejection and recognition rates on an ANN classifier were analyzed. The fitness function of Genetic Algorithms (GAs) has been given to evolve the weights of the gating networks and to achieve an overall optimal performance. Experiments were conducted on the MNIST handwritten numeral database with promising results: a high reliability of 99.96% with a 98.28% recognition rate.

09.18

10:40 CUSTOMER TESTING FOR AUTOMATED CLEARING HOUSE NETWORK

Marcus Winn

Mississippi Valley State University

The ACH Network is a highly reliable and efficient nationwide batch-oriented electronic funds transfer system governed by the NACHA operating rules. It provides for the interbank clearing of electronic payments for participating depository financial institutions. The Federal Reserve and Electronic Payments Network act as ACH Operators, central clearing facilities through which financial institutions

transmit or receive ACH entries. The problem with transferring thousands and thousands of transactions daily is that the information can easily get changed and the file could become formatted incorrectly, especially when new files are added to the database. In order to make sure that the files had the correct information and that they were formatted correctly, my project was to manually bench the files then run them through a series of test on tandem based computers that tested the format and validity of the information in the file. By going through this process, I was able to confirm the file information and make sure that all financial institutions that used the ACH network transmitted and received all of their ACH entries.

11:00 Break

09.19

11:15 HOW I SELECT THE CORRECT STATISTICAL TEST FOR MY EXPERIMENT?

Elgenaid Hamadain, Hamed Benghuzzi

University of Mississippi Medical Center

Statistical data analysis can be a challenging issue for many investigators and graduate students because there are numerous available statistical tests to select from. Decision of how to evaluate data must be the most important first step in planning a study. This presentation starts with several questions to answer before selecting appropriate statistical method for testing a particular hypothesis. Remarks of important factors to consider before choosing a statistical test will be given. Factors such as: type of independent and dependent variables, scale of measurement for the variables under study, number of groups in the study, and the assumptions of the selected test have to be considered before selecting the test. Description of various variable types, scale of measurements will be discussed. Also, a broad overview of different available statistical procedures (parametric and non-parametric) with associated assumptions to help in the selection process will be demonstrated. Several useful websites are available to provide interactive step-by-step guides to choosing the correct statistical test based on the data characteristics and based on factors discussed in this presentation. Investigators and graduate students may need to communicate effectively with statisticians before the study so that the best way of handling the collected data is achieved.

FRIDAY AFTERNOON

Lamar 1

1:00 MCSR Advisory Board Meeting

1:45 Division Business Meeting

PHYSICS AND ENGINEERING

Chair: Michael Vera,
University of Southern Mississippi
Vice-chair: Shadow Robinson,
Millsaps College

**THURSDAY MORNING
Exhibit Hall B**
O10.01
8:00 APPLICATIONS OF EQUIVALENT-FLUID REPRESENTATIONS OF AN ELASTIC SEAFLOOR IN SIMULATING OCEAN-ACOUSTIC PROPAGATION

Michael Vera

University of Southern Mississippi

Acoustics is the dominant means of transmitting a signal in the ocean, particularly for ranges beyond a few hundred meters. Acoustic energy can be used for communications, tomography or target identification. Depending on the configuration of the source and receiver and on the propagation environment, successful simulation of sound propagation may require a treatment of acoustic interaction with the seafloor. A computation which incorporates the details of the conversion of acoustic energy into elastic shear modes in the solid seafloor can be unstable or computationally prohibitive, especially for long ranges and complicated environments. The use of equivalent fluids is intended to provide a numerically straightforward way of accurately estimating the reflection of acoustic energy back into the water column. The fluid parameters are manipulated in order to reproduce the bottom loss that, in the actual elastic solid, involves conversion into propagating shear modes. This concept has been applied to geoacoustic inversion, the determination of the parameters of the seafloor solid using reflected acoustic signals. During the Basin Acoustic Seamount Scattering Experiment near the Hawaiian island of Kauai, receptions were recorded from a bottom-mounted source at ranges from a few to a few hundred kilometers. Since simulation using equivalent fluids is far less computationally demanding than a combined elastic-acoustic treatment, a search can be readily performed for the equivalent fluid that best reproduces the data. Then, the elastic solid that best matches this equivalent fluid can be determined. This yields an estimate of the solid parameters that impact the acoustic reception.

O10.02
8:15 PRACTICAL CONSIDERATIONS CONCERNING THE ENERGY CONTENT OF IMPULSIVE SIGNALS IN THE PRESENCE OF NOISE

James Stephens

University of Southern Mississippi

In the analysis of the acoustic energy radiated by air guns we calculate a sound exposure as the integration of a squared pressure over time. We must choose an analysis window to include the signal. In signature analysis we are concerned with coherent acoustic energy from a source array, guaranteeing a high signal to noise ratio, and in this case 5% and 95% levels of the integrated flux are commonly chosen to define the window. In the analysis of signals with less optimal signal to noise levels the result becomes very sensitive to the choice of the analysis window, and we are faced with the need to compensate for the background power level when computing exposure levels. This paper develops a simple rationale to determine the sound exposure due to a transient pulse train in the presence of stationary background noise.

O10.03
8:30 TWO-DIMENSIONAL SIMULATIONS OF FLUID FLOW WITH AN ARBITRARY OBSTACLE

Bharath Kandula

University of Southern Mississippi

Detailed analysis of the aerodynamic properties of turbine blades can involve sophisticated three-dimensional dynamical simulations of the surrounding fluid flow. Studies of this kind have shown that overall power output was affected by changes in parameters including blade aspect ratio and pitch. Changes in these parameters can show a significant impact on the fluid flow. The possibility of examining this scenario with simpler, two-dimensional simulations is investigated. Computations have been performed for the steady-state flow fields using a finite-difference relaxation approach. These calculations must accommodate an arbitrarily shaped solid obstruction. The resulting fluid field indicates the nature of the flow around the solid object. Solid geometries analogous to turbine blades are considered. The simulations are used to distinguish amongst blade shapes based on fluid parameters.

O10.04
8:45 RADIAL OSCILLATION OF A GAS BUBBLE VIA CANONICAL PERTURBATION THEORY

James Stephens

University of Southern Mississippi

The oscillation of a gas bubble in a fluid is of interest in many areas of physics and technology. Lord Rayleigh treated the pressure developed in the collapse of cavitation bubbles and developed an expression for the collapse period. Minnaert developed a harmonic oscillator approximation to bubble oscillation in his study of the sound produced by running water. Rayleigh's period for the "total collapse" of the cavitation bubble is often cited as a good approximation for the period of an air bubble ejected from an air gun port. On the one hand, a bubble can be treated as a harmonic oscillator in the small amplitude regime, whereas even in the relatively moderate pressure regime characteristic of air guns the oscillation is strongly nonlinear and amplitude dependent. Is it possible to develop an analytic approximation that affords insight into the behavior of a bubble beyond the harmonic approximation of Minnaert? In this spirit, the free radial oscillation of a gas bubble in a fluid is treated as a problem in canonical perturbation theory. Several orders of the expansion are determined in order to explore the dependence of the oscillation frequency with bubble amplitude. The expansion to second order is inverted to express the time dependence of the oscillation.

O10.05
9:00 DISCRETIZING CONTINUOUS PROCESSES

Katja Schaefer, M. A. Novotny

Mississippi State University

We present a general method to map the dynamics of a continuous process onto a master equation with N discrete states. The method makes use of transition rates between adjoining states, and requires that only motion between adjoining states are allowed. This restriction allows an arbitrary way of defining the states itself, which we are going to demonstrate in theory and applications. The applications include stochastic dynamics over one and two dimensional energy-landscapes (smooth and rough) and the folding process of off-lattice toy-models of proteins subject to diffusive Brownian dynamics. The comparison of results (such as the mean first passage time or the mean folding time) as obtained from the master equation, direct measurements on Brownian motion processes and analytical or semianalytical solutions (whenever they exist) shows the high accuracy of the discretization procedure as well as its broad applicability.

O10.06
9:15 OPTICAL PROPAGATION THROUGH ATMOSPHERIC TURBULENCE USING PHASE SCREENS

Pushpa Raj Pudasaini¹, Michael Vera¹, Madhab Pokhrel²
¹*University of Southern Mississippi*, ²*University of Texas, San Antonio*

Propagation through turbulence in the atmosphere leads to fluctuations in an optical signal. Variability in the index of refraction of the air, largely related to temperature fluctuations, can be described using a spectrum developed by Kolmogorov. Rather than treat these perturbations throughout the atmospheric volume, their effect for a portion of the propagation range is usually addressed using a "phase screen". This modeling method alters the phase of the optical wave at a discrete series of locations, usually about thirty, in a way that corresponds to the cumulative impact of the fluctuations for a portion of the total range. Usually, in the interests of computational efficiency, simulation of optical travel proceeds by using a position-space representation of the wave function at the screen locations, then using Fourier methods to propagate between screens in a wave vector space representation. A related "split-step" Fourier technique has been shown to have important weaknesses in accurately simulating travel time and wave front geometry in ocean acoustics, another application of numerical wave propagation in random media. Therefore, alternate numerical methods are of interest. Simulations using an explicit finite-difference scheme, as well as a Crank-Nicolson approach, are shown to be numerically stable when applied to one and two dimensional optical wave functions propagating through the range direction. The parameters in these computations are motivated by an experimental scenario using a visible laser.

O10.07
9:30 MESON MASS SPECTRA PHENOMENOLOGY IN THE CONTEXT OF QUARK-ANTIQUARK BOUND STATES

Mallika Dhar, Charles Werneth, Khin Maung

University of Southern Mississippi

This work deals with the computation of meson mass spectra in the context of quark-antiquark bound states. Traditionally this bound state problem is treated by solving the Schrodinger equation in a position representation with a linear confining plus a Coulomb-type potential. This method works well for the mesons made with heavy quarks. For the case of a meson made of light quarks, relativistic kinematics is necessary. It is well known that the relativistic

kinematics cannot be treated easily in the position representation but can be handled easily in the momentum representation. On the other hand, linear and Coulomb-type potentials have singularities in momentum space. In order to deal with this dual conflict, we have developed a method to solve any Schrodinger-type equation with relativistic kinematics in a mixed representation where the kinetic energy term is treated in momentum space and the potential term is treated in position space. We have also added spin-dependent terms in our potential. Our results for meson masses are in excellent agreement with the experimental data for both heavy-heavy and light-heavy systems.

O10.08

9:45 USING THE SUCHER EQUATION FOR CHARMONIUM AND BOTTOMONIUM MESON SPECTRA

Charles Werneth, Mallika Dhar, Khin Maung
University of Southern Mississippi

Mesons are the bound states of quarks and antiquarks. Mesons participate in nucleon-nucleon interaction as exchange particles and are found experimentally in scattering and decay processes. To accurately predict meson mass spectra, one needs a model which includes both quantum mechanics and special relativity. An example of such a model is the Sucher equation. This Sucher equation is a fully relativistic equation which includes spin in its formulation. Although the Sucher equation has been used for the prediction of mass spectra for hydrogen, positronium, and muonium, it has not been used for meson mass spectra. We use the Sucher equation to calculate the meson mass spectra of the bottomonium and charmonium mesons.

10:00 Break

O10.09

10:15 MEASUREMENT OF ALPHA-INDUCED AIR FLUORESCENCE

Aubri Buchanan, Christopher Winstead
University of Southern Mississippi

Ionizing radiation that interacts with atmospheric molecules produces air fluorescence, the measurement of which can be accomplished using a photomultiplier tube and appropriate optics. Outside of the lab, this phenomenon is used to investigate cosmic rays in the upper atmosphere, as well as long distance detection of radioactive sources. It has been determined that factors such as atmospheric content and pressure affect the air fluorescence signal in these measurements. To quantify these effects, an automated atmospheric simulation chamber was developed in an

effort to precisely control the atmosphere contained in the vicinity of the alpha source. Experimental results produced utilizing this relatively simple method are in line with those obtained from much more complex experiments using accelerators.

O10.10

10:30 DESIGN AND IMPLEMENTATION OF A SYSTEM CAPABLE OF DETECTING CHEMICAL PRODUCTS PRODUCED BY AN ALPHA SOURCE

Tyler Reese, Christopher Winstead
University of Southern Mississippi

The intent of this research is to create a system that employs Cavity Enhanced Absorption Spectroscopy (CEAS) to detect chemical products produced by an alpha radiation source in various atmospheric conditions. Absorption spectroscopy is a common method of determining the chemical composition of an unknown sample. This method uses the fact that each chemical has a unique absorption spectrum that can be used for species identification and concentration measurement. Electromagnetic radiation is transmitted through the sample and the absorption is quantified as a function of wavelength. For a given species, each wavelength is absorbed by a predictable amount determined by the absorption cross-section. The absorption cross-section combined with the measured quantity of light absorbed and the interaction length between the light and the sample can then be used to calculate the concentration of the chemical in the sample. However, for trace concentrations of various chemical species, the amount of light absorbed over a length commonly available in a lab setting would not be sufficient for reliable measurement. CEAS uses an optical cavity comprised of two or more mirrors to extend the effective path length over which these interactions may occur. This presentation will discuss the implementation of an optical cavity in a vacuum chamber to allow measurements of the trace concentrations of a gaseous sample produced over an alpha source.

O10.11

10:45 PHOTOIONIZATION CROSS-SECTION MEASUREMENTS OF THE 5P3/2 STATE OF LASER-COOLED RUBIDIUM

Alina Gearba, Brad Crochet, Kileigh Peturis, Charles Young

University of Southern Mississippi

Photoionization is a fundamental problem in atomic physics. Tests of the theory require accurate cross-section measurements which are difficult to obtain in an absolute sense. We have performed

absolute photoionization cross-section measurements of the 5P3/2 excited state of rubidium. The measurements were performed in a rubidium magneto-optical trap using several lines from a mixed argon-krypton ion laser ranging from 457.9 nm to 476.5 nm. The photoionization rate was measured by monitoring the decrease in the trap fluorescence during exposure to the ionizing laser radiation. Our results were compared to other experimental measurements as well as existing theories.

O10.12

11:00 SIMULATION OF SPIN-DEPENDANT REACTION BETWEEN ULTRA-COLD NEUTRONS AND POLARIZED ^3He

Edward Leggett

Mississippi State University

Presently, preparations are underway for a new experiment to search for the neutron Electric Dipole moment (nEDM) at the Spallation Neutron Source (SNS) at Oak Ridge National Lab. This experiment offers a unique opportunity to measure a non-zero value of the neutron EDM, which would imply new sources of CP violation in nature that go beyond the mechanism in the Standard Model of particle physics. However, such a precise measurement represents a major engineering undertaking and requires substantial research and development in order to design a suitable apparatus. A collaborative effort between Boston University, California Institute of Technology, Massachusetts Institute of Technology, and Mississippi State University is currently underway to simulate the entire experiment. The measurement technique for this experiment relies on the spin dependence of the nuclear absorption cross section for $n + ^3\text{He} \rightarrow p + t + 764 \text{ KeV}$ to make a comparative measurement of the ultra-cold neutron (UCN) and ^3He precession frequencies. The Medium Energy Physics (MEP) group at Mississippi State has been charged with simulating the trajectories and spin propagation of both UCNs and ^3He through the apparatus and their interaction. This talk will provide an overview of the SNS nEDM experiment and the current status of the UCN and ^3He simulations. Currently, the trajectories and spins of the particles have been simulated, and calculations of bulk properties such as the transverse relaxation time will be presented.

O10.13

11:15 THE NUCLEAR STRUCTURE OF THE EVEN MASS ISOTOPES OF GERMANIUM

Shadow Robinson¹, Yitzhak Sharon², Larry Zamick²
¹Millsaps College, ²Rutgers University

There is a great deal of interest in the isotopes of Germanium both theoretically and experimentally. The unique parity g9/2 orbit is expected to play an

increasingly large role as we go to higher mass isotopes of germanium. The authors present large-scale shell model calculations for these nuclei using two different effective interactions. The model space includes the f5/2, p3/2, p1/2 and g9/2 orbitals for protons and neutrons.

The two interactions present competing pictures of the amount of g9/2 neutron occupancy required to understand the low-lying nuclear structure. We in particular look at the magnetic g-factors of the 2+ and 4+ excited states and see the different weightings given to the g9/2 orbit in the two interactions. These calculated results await more experimental data to distinguish which of the two effective interactions is to be preferred in this mass region.

O10.14

11:30 MULTIPLE EXCITED BANDS IN ^{154}Dy

Qurat Ul Ann Ijaz, Wenchao Ma, Hazem Abusara, Anatoli AFANASJEV

Mississippi State University

It has been known for a long time that most atomic nuclei have non-spherical shapes. These exotic nuclear shapes are produced by nuclear shell structures that minimize the energy without causing fission. Microscopic understanding of this motion can be explained by deformed shell model that predicts big shell gaps, or superdeformed magic numbers, analogous to spherical magic numbers. The first SD band was observed in ^{152}Dy with new shell gaps at $Z=66$ and $N=86$. The ^{154}Dy nucleus is located near the upper boundary of the region of superdeformation around the doubly magic SD nucleus ^{152}Dy . In order to further explore the limits of this SD island and to understand the evolution of the proton and neutron orbitals at superdeformation, a detailed study of SD structures in ^{154}Dy has been carried out through the $^{122}\text{Sn}(^{36}\text{S}, 4n)$ reaction. The gamma ray decay was measured with Gammasphere - currently the most powerful gamma-ray detector array in the world. The high statistics data set has allowed the identification of five new excited SD bands, in addition to the previously observed SD band. Detailed properties of the bands, including their transition energies, intensities, dynamic moments of inertia, decay patterns, the similarities and differences between these new bands and the SD bands in neighboring nuclei, as well as theoretical interpretation based on relativistic mean field calculations, will be presented. This work was supported by the U.S. DOE, Office of Nuclear Physics.

**O10.15****11:45 SPIN ASYMMETRIES OF THE NUCLEON EXPERIMENT (JEFFERSON LAB E07-003)**

Luwani NDukum¹, Oscar Rondon¹, Mark Jones¹, S. Choi¹

¹Mississippi State University, ²University of Virginia,

³Thomas Jefferson Lab, Newport News, VA,

⁴University of Seoul, South Korea

To learn about the proton spin structure functions, a measurement of the proton spin structure functions g_1 , g_2 and the spin asymmetry A_1 and A_2 is presented. This is done at four momentum transfer $2.5 \leq Q^2 \leq 6.5 \text{ GeV}^2$ and Bjorken x $0.3 \leq x \leq 0.8$ in a model independent fashion from the measurement of the two asymmetries, A -transverse and A -longitudinal, for two different orientations of the target magnetic field relative to the beam direction in deep-inelastic scattering (DIS). In conclusion, there is significant improvement in the measurement of A_1 , A_2 and g_1 , g_2 in DIS at high x . The experiment was performed with the 6.0 GeV electron beam at Thomas Jefferson Lab National Accelerator Facility at Newport News, Virginia.

THURSDAY AFTERNOON**Exhibit Hall B****O10.16****1:15 BAYESIAN NETWORK STRUCTURE DESIGN PROCEDURE FOR MEDICAL DECISION SUPPORT**

Jyotirmay Gadewadikar, Ognjen Kuljaca, Kwabena Agyepong

Alcorn State University

A Bayesian Network is a graphical model that represents relationships of probabilistic nature among variables of interest. This work presents Bayesian network Structure Design Procedure introduction towards implementation of an automated breast cancer detection support tool. The work presented extends, elaborates, and concocts wealth of knowledge with available open source tools, and the documentation available in the popular literature. The literature on efficient construction of Bayesian networks for complex domains is very limited. Moreover, it often overlooks the fact that in practice it is very desirable to be able to deliver a diagnostic tool of limited performance early in the design process and refine it progressively as more information becomes available. The available literature can be selected as a guide for construction of Bayesian Networks for Diagnostics, over many available, however, since most of the

available work deal with engineering systems diagnostics a fair amount of modifications needs to be done in order to make a Medical Diagnostics Systems. There is a wealth of knowledge in pure engineering diagnostic Bayesian Network domain because of the fact that it is more acceptable to automate a decision process in an engineering system as opposed to a system involving medical diagnostics. The key problem is to construct the model so that we capture all of the important aspects of system reality from the point of view of the diagnostic process. In this work examination and diagnostic process point of view is presented along with the Bayesian Network Model Structure Design procedure.

O10.17**1:30 MYSTERIOUS DARK NINETY SIX PERCENT OF THE UNIVERSE**

Amin Haque

Alcorn State University

In 1998 two groups found independently that the supernovas were dimmer than they should have been, and that indicated they were farther away than they should have been. The only way for that to happen was if the expansion of the universe accelerated. Riess' team studied the light from 42 of the most distant supernovae by Hubble Space Telescope observations, and Allen and his colleagues studied new observations from the Chandra X-Ray Observatory, measured the distances to galaxy clusters, and independently confirmed the existence of opposition to the forces of gravity, which is responsible for the accelerating expansion of the Universe. This mysterious invisible force is called Dark Energy. Einstein introduced his famous Cosmological Constant, a repulsive force, to balance the attractive gravitational force to account for a 'static universe'. Edwin Hubble discovered that the galaxies were moving apart from each other at close to the speed of light. He also found that the farther away the galaxy, the greater the recessional velocity. Using the combined data, astronomers have found that dark energy makes up about 75% of the Universe, dark matter about 21%, and visible matter about 4%. Thus, 96% of the universe we do not understand. Ordinary Baryonic matter, which is what makes up planets, stars, galaxies and even us accounts for only 4% of the total mass (energy density) of the universe. This has created quite a sensation in the fields of physics, astronomy and cosmology.

O10.18

1:45 A NEW QUANTITATIVE CLASSIFICATION OF SPIRAL GALAXIES

Lawrence R. Mead¹, Harry I. Ringermacher²
¹University of Southern Mississippi, ²General Electric Research Center, Schenectady NY

We have identified an equation with a single parameter which correctly classifies numerically any spiral galaxy: grand design, barred or even rare ring galaxies. The formula contains variable pitch, unlike currently used logarithmic spirals which have constant pitch. This classification scheme solves the 50 year mystery of why pitch angle and Hubble type do not correlate well.

O10.19

2:00 SEARCH FOR THE MYSTERIOUS DARK NINETY SIX PERCENT OF THE UNIVERSE

Amin Haque
 Alcorn State University

Dark energy, a repulsive force, began to dominate over the gravitational force and accelerated the expansion of the galaxies. Confirming the existence of dark energy and understanding its origin would have profound implications for our understanding of the universe. Scientists use four methods - the distances of supernovae from Earth, the large-scale clustering of galaxies, the abundance of massive galaxy clusters, and the bending of light caused by galaxies and clusters of galaxies - to determine how fast the universe has been expanding and the rate at which galaxies and clusters formed over cosmic time. The WiggleZ project, due to be completed by mid-2010, will allow astronomers to test different theories of dark energy by looking at much more remote parts of the universe. Brenna Flaugher and her colleagues at Fermilab are building a camera, called the Dark Energy Camera that will take pictures of the universe allowing scientists to see galaxies as they were when the universe was only a few billion years old. They will capture images of roughly 300 million galaxies to search for signs of dark energy. The electronics will process faint signals of light that traveled billions of years across the universe. The Dark Energy Survey is scheduled to operate in 2011. NASA and the US Department of Energy are planning to launch a Joint Dark Energy Mission in the middle of the next decade, which will hopefully advance our knowledge of matter, space and time.

O10.20

2:15 ELECTRONIC, VIBRATIONAL AND NMR STUDIES OF HYDROGENATED AMORPHOUS SILICON

Rajendra Timilsina, Parthaprati Biswas
 University of Southern Mississippi

We present a method to generate realistic models of disordered materials, for example hydrogenated amorphous silicon, for different concentrations. The first model consists of 7% hydrogen and it is a device quality model whereas the second consists of 22% hydrogen. We study structural, electronic and vibrational properties of the models and compare to the real materials. In addition, we study the local bonding structure of hydrogen, distribution of hydrogen in the silicon network, and the different phases of hydrogen such as an isolated, diluted and clustered phases. We compute the universal linewidths for both models. The models effectively reproduce aspects of the available experimental result.

O10.21

2:30 FUNCTION RECONSTRUCTION AS A CLASSICAL MOMENT PROBLEM: A MAXIMUM ENTROPY APPROACH

Parthaprati Biswas¹, Arun K. Bhattacharya²
¹University of Southern Mississippi, ²University of Burdwan, Burdwan, WB, India

We present a systematic study of reconstruction of probability density function (PDF) via maximum entropy approach from a knowledge of the moments of the function. Starting with a set of exactly known functions, we reconstruct the function via an iterative maximum entropy technique, and study the convergence of the method with different number of moments and iterations. We consider a number of functions including a distribution with sharp discontinuity, a rapidly oscillating distribution, a distributions with a singularity, and finally a distribution with several spikes with a fine structure that arises in the context of determining the natural invariant density of the logistic map. The global convergence behavior of the method is studied by comparing moments of the approximated function to the exact ones. Furthermore, we also study the local behavior of some approximated distributions, such as the divergence behavior at singular points within the interval with the number of moments. Finally, we discuss several applications in the context of electronic structure of large disordered and ordered solids using our method.

**O10.22****2:45 COMPUTER MODELING OF AMORPHOUS CARBON: A MONTE CARLO STUDY**

Jagannath Devkota, Parthapratim Biswas
University of Southern Mississippi

We perform structural modeling of amorphous tetrahedral carbon via Monte Carlo method using a number of empirical potentials. Starting from a completely random configuration, the total energy of the system is minimized to generate a set of amorphous configurations. The structural, electronic and vibrational properties of our model configurations are compared to the experimental data and to those obtained in earlier theoretical studies.

3:00 Break**O10.23****3:15 FIBER LOOP RINGDOWN CHEMICAL CORROSION SENSORS**

Chamini Herath, Chuji Wang
Mississippi State University

We introduce a method of monitoring corrosion process of optical fiber in a chemical solution. The corrosion of the cladding and core of the Single Mode Fiber etched in a 48% hydrofluoric solution was observed using the fiber loop ringdown (FLRD) technique. The corroded surface of the fiber was imaged by Scanning Electron Microscopy with a resolution of 5 nm at an accelerating voltage of 1 KV and, the precision of the fiber corrosion process was determined by the FLRD technique in real-time, in situ. This method can be further developed with a high precision to monitor and control chemical corrosion processes.

O10.24**3:30 MEASUREMENT OF HYDROGEN IN HELIUM FLOW**

Randy Buchanan
University of Southern Mississippi

Helium is used a purge gas for liquid hydrogen lines on rocket engine test stands at Stennis Space Center. Research was initiated to enable helium conservation through real-time measurement of H₂ concentration in the purge gas. A test fixture was designed and developed to allow for experimental testing and characterization of measurement sensors. A commercial H₂ sensor was installed within the test fixture for use during purge, providing an H₂ concentration measurement as an indicator of the effectiveness of the purging process. The test apparatus

consisted of 24 feet of 2-inch stainless steel pipe instrumented with temperature, pressure, flow rate, and hydrogen measurement capabilities. The flow rate will be controlled by input flow regulators and an automated cryogenic ball valve at the outlet. Tests will include the characterization of sensor performance while varying flow rate, composition, and temperature. Experimental data will be collected through a virtual instrumentation interface, analyzed, and presented. It is expected that this proof-of-concept apparatus will be able to perform near real-time measurements of hydrogen within helium during a purging operation. If successful, the findings of this research could be used to develop a comparable apparatus within the rocket engine test stand, and therefore enable the minimization of helium waste.

O10.25**3:45 GR03263 - TOOLS FOR ENHANCED MAPPING AND MANAGING POST-DISASTER DEBRIS**

Steven Bunkley, Randy Buchanan
University of Southern Mississippi

Hurricane Katrina devastated the Gulf Coast with torrential wind and record flooding. This project was designed to aid in the cleanup of natural disasters by predicting the wreckage that will be left behind. Originally the project relied on paperwork that would be filled out by a FEMA employee. But this endeavor was deemed insufficient due to inconsistency in the forms. This stage of the project is designed to nullify future discrepancies by automating the form filled out by the FEMA employee. By utilizing a mobile device with GPS functionality, it is possible to pinpoint the location of each site within some accuracy. All fields that can be filled automatically such as time and date will be removed from the users form to insure ease and accuracy. With proper utilization of this new technology, we can gather the necessary data required to make the predictions that could save the state significant time and money. Natural disasters cannot be prevented, but proper preparation can minimize its effect on the community.

O10.26

4:00 TEMPERATURE DEPENDENCE OF THE CURRENT-VOLTAGE CHARACTERISTICS OF Sn/PANI/p-Si/Al HETEROJUNCTIONS

Malik Kaya¹, Hidayet Cetin³, Behiye Boyarbay², A. Gok⁴, Enise Ayyildiz²
¹Mississippi State University, ²Erciyes University, Kayseri, Turkey, ³Bozok University, Kayaseri, Turkey, ⁴Suleyman Demirel University, Isparta, Turkey

Sn/PANI/p-Si/Al heterojunctions were fabricated by using an electropolymerization method that aniline was coated on chemically cleaned p-Si substrates. Measured current-voltage characteristics of the heterojunctions between temperature ranges of 140-280 K are presented and analyzed. Even though these devices were clearly rectifying, their I-V characteristics were non-ideal, which can be judged from the nonlinearity in the semi-logarithmic plots. The high values of the ideality factor n depending on the sample temperature may be ascribed to a decrease of the exponentially increasing rate in current due to space-charge injection into the PANI thin film at higher forward bias voltages. Careful analysis of the forward bias I-V characteristics on a log-log scale indicates that the space charge-limited current (SCLC) conduction controlled by an exponential trap distribution above the valence band edge dominates the current transport in the PANI/p-Si diodes at high voltages. Furthermore, current-voltage characteristics of obtained Sn/PANI/p-Si/Al diodes were compared with current-voltage characteristics of generated as reference Sn/p-Si/Al diodes.

O10.27

4:15 BEHIND GREEN

Pao-Chiang Yuan, Samson E. Empeakpor
Jackson State University

In the past few years, you have heard and read about the concepts such as "Green Technology" and "Green Chemistry". They primarily have a similar purpose: to improve our health and protect our environment. But after several years, they may face the same problems that current technologies have encountered. How do you dispose these technologies and avoid any unforeseen problems? How do you plan for the future dilemmas? Recently, there have been a number of reports in regards to the use of ethanol and solar panels for energy. Without a doubt, these developments not only save on energy costs but the solar power produced is clean. This paper will focus on solar photovoltaic cells from the sun, which is known to produce energy that is clean and renewable as well as growing and sustaining.

Currently, this is a more popular technology in Europe and China than in the United States. These solar panels are visible in those countries on rooftops everywhere. The primary components of solar cells consist of two layers of semiconductor materials using different chemicals which include crystalline silicon, gallium arsenide and different hazardous materials. This study will examine what types of solar cell emerging technologies are presently on the market, what the anticipated problems may be in the future, and how to properly handle the cell wastes when the generated life span has expired.

O10.28

4:30 GM ON DEATH BED! IT'S NOT PHYSICS! IS IT ENGINEERING? OR SOMETHING ELSE.

Kant Vajpayee

University of Southern Mississippi

GM has lost to the Toyota as the largest car company. Its situation -- lying on death bed -- is precarious in spite of the government bailout. What went wrong? It is not the lack of knowledge in physics that propels car making, because other companies are succeeding with the available physics knowledge. Is it engineering -- poor quality, lower value? On the surface it seems so. But again, how come Toyota and Honda are able to excel. Moreover, we do demonstrate our acumen of engineering/manufacturing in other industrial sectors, such as electronics and space exploration. What about the management of the enterprise? Here again, we do great in certain sectors of the economy, such as pharmaceuticals and computers. Therefore, it's not one reason or two. The demise of GM represents a systemic weakness. Some are domestic, here in the US. Some are global, beyond our control. Some of the constraints within which Detroit had been operating are beyond the control of auto industry leaders; for example, bargained comparatively higher wages, health care costs, short-term outlook of the financial market. But many are controllable. One important one is the fact that our emphasis on the business side of the enterprise undermines the importance of engineers. Engineers' prestige and earnings are laughable in comparison to their counterparts in management. No other country ignores their engineers and physicists as badly!

4:45 Division Business Meeting



**THURSDAY EVENING
Dodgen Poster Session
Exhibit Hall C**

Posters on display, 6:00p – 7:00p

Posters must be put up between 4:30p – 5:00p

P10.01

**HAND HELD ELECTRONIC DEVICE TO
MEASURE HEART RATE BASED ON PHOTO
PULSE PLETHESMOGRAPHIC
(PPG) PRINCIPLE**

Madhu Aditya¹, K. N. Maruthy², S. Sucharita², Sharada Rajanna¹

¹Alcorn State University, ²Sj John's Research Institute, St. John's Medical College and Hospitals, Bangalore, Karnataka, India

Heart rate is usually obtained from standard ECG recording. There are certain practical difficulties to record biosignals. These problems can be circumvented by using a simpler approach for acquiring heart-rate by photo plethysmography (PPG). The principle of PPG used in our device will be transmitting IR light through the ear lobe which was sensed on the other side of the ear lobe using suitable IR light detector. Fifteen (15) healthy male volunteers in the age group of 20-50 yrs were recruited. Lead II ECG from limbs and photo-pulse from the ear lobe were recorded simultaneously. This data was recorded using Biopac hardware MP30 and its professional version software. By applying the tools provided within the software heart rate intervals were obtained for both ECG and PPG. The RR and PP intervals were compared using a paired t-test for individual beat-to-beat interval as well as averaged beat-to-beat interval for 5 minutes. Results suggested that individual PPG to ECG wave-to-wave comparison had weak positive correlation with a mean R value of 0.4, SD ± 0.28 for PP/RR intervals, whereas the 5 min. averaged correlation was strong with R value of 0.988. It was observed that PPG might be used to monitor absolute HR (time averaged) for clinical purposes. However, this device cannot be used where beat-to-beat heart rate variability analysis is required. For further evaluation this device will be used in St. John's Clinical Graduate Research studies on the effects of 'Yoga' (Indian stretching and breathing exercises) among secondary school children. This International Health Research Training involving the first author was supported by NIH/NCMHD/ MHIRT # MD001532.

P10.02

**MOLECULAR DYNAMIC SIMULATION OF
ESTROGEN RECEPTOR (ER) AND ER-LIGAND
COMPLEXES TO OBTAIN SUITABLE
CONFORMATIONS FOR BINDING WITH
CALCIUM BINDING PROTEINS.**

Shawn Cole¹, P.K. Biswas¹, R. Rajnarayanan²
¹Tougaloo College, Tougaloo, ²University of Buffalo, Buffalo, NY

Estrogen Receptors (ER) are nuclear hormone receptors which activate the gene transcription through coactivator proteins bound to it. The gene transcription is further affected by the binding of estrogenic ligands to ER. Antiestrogenic ligands, when bound to ER, induce certain conformational changes in ER that prevent the gene transcription by blocking the binding of coactivator proteins. A detailed understanding of the conformational changes of ER and ER-ligand complexes is essential to finding appropriate drug candidates that can prevent coactivator binding in all form of tissues. Using atomistic Molecular Dynamics Simulations with an OPLS (Optimized Potentials for Liquid Simulations) force field, we have generated random conformations for ER and ER-ligand complexes. From these random conformations, we have selected around twenty conformations for studying their binding with Calmodulin - a Calcium binding protein known to bind to ER. We will present a comparative study of various conformations of ER and ER-ligand complexes that we are now using for binding studies with Calmodulin.

P10.03

**CHARACTERIZATION OF LABORATORY
GRADED AEROSOLS GENERATED FROM
METERED DOSE AEROSOL GENERATORS**

Courtney Johnson, Mohammed Ali
Jackson State University

Characterizing the mechanical properties of aerosol particles is very useful to understand their effects on environment or administration as pulmonary medicine. Aerosol can be defined as a suspension of solid or liquid particles in a gas. This gaseous substance does not only pollute environment but also useful as medicine in the treatment of respiratory illness like asthma. The electromechanical methods that govern the fate of aerosols in the environment or human lung are impaction, gravitational settling, Brownian diffusion, interception, and electrostatic force. Understanding these deposition methods require precise quantification and analysis of aerosol particle's size, which is referred as aerodynamic diameter in the literature. In this study we present the method of characterization and analysis of this vital mechanical property. Laboratory graded

aerosols were generated from commercially available metered dose aerosol generators, and measured the aerodynamic size of each particle real-time in the aerosol cloud by using the electronic single particle aerodynamic relaxation time (ESPART) analyzer. The ESPART works on the principle of Laser Doppler Velocimetry. Raw data was analyzed by adopting numerical methods. The normalized count median aerodynamic diameter and mass median aerodynamic diameter were found $2.99 \pm 0.08 \mu\text{m}$, and $3.93 \pm 0.09 \mu\text{m}$, respectively, which were comparable with the results reported by other investigators. Additionally it was found that the aerosol particles fraction per unit size distribution can accurately represent the aerodynamic size property. It is also concluded that scientists have taken a toxic chemical and made it useful to mankind over time.

P10.04

ADAPTIVE ELASTIC FUZZY LOGIC CONTROLLER

Ognjen Kuljaca¹, Jyotirmay Gadewadikar¹, Krunoslav Horvat²

¹Alcorn State University, ²Brodarski Institute, Zagreb, Croatia

We present an adaptive fuzzy logic controller that includes on-line tuning of the membership function centroids and spreads, as well as an additional parameter, the "elasticity". A novel membership function is introduced here that satisfies certain important properties, including an independent reaction when the elasticity is tuned. We provide architecture for an elastic fuzzy logic adaptive controller, using certain on-line tuning laws that are an enhanced form of backpropagation tuning. It is shown by simulation that the fuzzy logic controller that includes the new membership function and tuning of elasticity outperforms the standard adaptive fuzzy logic controller based on Gaussian membership functions. Adaptive fuzzy logic (AFL) systems are becoming more and more popular in control systems due to the ability to select initial membership functions (MFs) based on experience and intuition. However, the simulation results and practical application experience with AFL systems with Gaussian membership functions show that if the initial membership functions do not sufficiently cover the region where the initial states can be found, the learning process is relatively slow and sometimes a long time is needed to achieve small tracking errors. One possible solution for this problem is in the introduction of additional degrees of freedom in the controller design. An additional degree of freedom is achieved here by introducing the so-called "elasticity" in the definition of the membership functions. To allow

the fully effective use of elasticity, a novel membership function is introduced in which the centroid, spread and elasticity are three mutually independent parameters.

P10.05

THE EFFECTIVENESS OF BRUSHING IN THE REMOVAL OF LUNAR SIMULANT DUST FROM THERMAL CONTROL SURFACES IN A SIMULATED LUNAR ENVIRONMENT

Khrissaundra Journey

Mississippi Valley State University

The lunar regolith is a layer of unconsolidated debris on the lunar surface and is also known as lunar soil. Its thickness varies from about 5 meters on the mare surfaces to about 10 meters on the highland surfaces. Unlike the Earth's surface, the lunar surface is subject to constant micrometeorite bombardment, cosmic rays, and solar wind radiation, causing the regolith to break up into the particles that are referred to as lunar dust. The lunar dust caused major issues for astronauts on the Apollo missions because the dust contaminated equipment, irritated eyes and lungs, scratched and abraded surfaces, and comprised radiators and seals. The dust covered the surfaces of the radiators that cooled the batteries that operated the Lunar Rover Vehicle. This causes the radiators to become ineffective, and caused the batteries to exceed temperature limits. Dust removal methods using a nylon brush to brush the dust off were ineffective. High fidelity lunar tests are required to successfully design lunar exploration technology. To return to the moon by 2020, high quality thermal and vacuum tests need to be performed. The Lunar Dust Adhesion Bell Jar (LDAB) was created at NASA Glenn Research Center to provide a high fidelity lunar simulation facility to test the interactions of lunar dust simulant. The effectiveness of the brushing to remove the simulant dust is tested inside of LDAB by three thermal tests and then the samples are analyzed using a microscope that magnifies- 100 x.



PSYCHOLOGY AND SOCIAL SCIENCES

Chair: Sheree Watson,
University of Southern Mississippi
Vice-chair: Karen Christoff,
University of Mississippi

THURSDAY MORNING EXHIBIT HALL C

DIVISIONAL POSTER SESSION

8:30a-11:30a

Posters may be set up starting at 8:00a

Authors should be available with their posters to
answer questions between 8:30am and 10:00am.

P11.01

GROUP DELIBERATION AND WITNESS INVOLVEMENT IN THE CRIME AFFECT JUROR DECISIONS IN A MOCK SEXUAL ABUSE TRIAL

Amanda MacQuoid, Tera Mason, Kristine Jacquin
Mississippi State University

The present study aimed to determine whether juror decisions in child sexual abuse cases are impacted by group deliberation, the testifying child's age and involvement in the abuse, or mock juror gender. In a mock sexual abuse trial, the testifying child's age (5, 11, or 16) and involvement in the abuse (victim or bystander) were varied. Jury-eligible college students (N = 473) served as participants in the study. Participants were randomly assigned to either discuss the case with 5 others before making individual juror decisions, or to not discuss the case before making decisions. An ANOVA was conducted with age of the child witness, level of involvement of the testifying witness, deliberation condition (group or individual), and mock juror gender as the IVs and defendant guilt rating as the DV (paired comparisons used Bonferroni adjustments). A significant main effect was found for deliberation condition. Participants who discussed the case with other mock jurors gave the defendant significantly lower guilt ratings than mock jurors who decided the case without group discussion. In addition, a significant main effect was found for level of involvement. Specifically, when the bystander testified, the defendant was rated as significantly guiltier than when the victim was the only child who testified. Other results will be discussed in the presentation. Overall, the findings suggest that jurors are more convinced by the testimony of certain of child eyewitnesses and verdicts in child sexual abuse cases are impacted by group deliberation.

P11.02

DEFENDANT RACE AND JURY RACIAL COMPOSITION AFFECT DECISIONS IN A MOCK HOMICIDE TRIAL

Marilyn Brodeur St-James, Audrey Masilla, Sarah
Alford, Kristine Jacquin
Mississippi State University

A mock homicide trial was used to examine the influence of defendant race, juror race, and jury racial composition on juror decisions. Participants were 317 mock jurors who read a homicide trial summary, discussed the trial with 5 other jurors, and then made individual juror decisions. Jury racial composition (African-American or Caucasian majority) and defendant race (African-American or Caucasian) were manipulated. Significant main effects for defendant race showed that Caucasian defendants were given higher guilt ratings than African-American defendants and convicted African-Americans were given harsher sentences than convicted Caucasian defendants. An interaction between jury racial composition and defendant race revealed that jurors assigned harsher sentences to defendants who did not match the jury majority's race. A main effect for jury racial composition indicated that jurors in Caucasian majority juries assigned a harsher sentence to the defendant than did jurors in African-American majority juries. The results suggest that rather than jurors always favoring same race defendants, a more general bias was found against Caucasian defendants at the verdict stage (they received higher guilt ratings) and African-American defendants at the sentencing phase (they received harsher sentences). However, when jury racial composition was considered, the ingroup (i.e., racial majority) was more understanding of another ingroup members' (i.e., same race defendant's) behavior than the outgroup members' behavior. The majority ingroup was also able to influence the decisions of outgroup members.

P11.03

SEVERE WEATHER PHOBIA IN YOUNG ADULTS

Tera Mason, Kristine Jacquin, Andrea Stripling,
Marilyn Brodeur St-James
Mississippi State University

Despite the relatively high prevalence of severe weather phobia in the U.S. (3% lifetime), little research exists to describe this disorder. This study was designed to determine the prevalence of severe weather phobia in college students, and to better understand the characteristics of college students' fears and phobic reactions related to inclement weather. College students

from a large Southeastern university ($N = 946$) completed an anonymous online survey about their feelings, beliefs, and experiences related to severe weather. The results show that extreme fear of severe weather is relatively common among college students in the Southeast (24% endorse above average levels of fear). Participants were grouped according to their fear of severe weather and group ratings on fear-related items were compared using chi square and MANOVA. Participants were asked to estimate the risk of dying from a tornado; groups significantly differed (according to chi square analysis) in their tendency to overestimate risk, with highest fear levels associated with the greatest overestimation of risk. Those who report above average fear of severe weather also report other symptoms of phobia including anticipatory anxiety, avoidance, and distress about the fear. Severe weather phobia in college students is associated with feelings of helplessness during severe weather, overestimation of death risk from all types of severe weather, and childhood weather fears. Severe weather phobia in college students is not uniquely associated with experiencing weather-related trauma, or with having a first-degree relative with severe weather phobia or another anxiety disorder.

P11.04

ADOLESCENT OFFENDERS AND COLLEGE STUDENTS WITH AND WITHOUT INCARCERATED PARENTS

Audrey Masilla, Marilyn Brodeur St-James, Tiffany Atkins Howell, Lacey Leachman, Kristine Jacquin
Mississippi State University

This study compared adolescent offenders ($n = 26$) and college students ($n = 98$) with and without incarcerated parents. Participants completed a history and health questionnaire to assess experiences with violence, feelings of safety, and parental incarceration. One-fifth of adolescent offenders with incarcerated parents reported having been sexually assaulted or raped, but no adolescent offenders without incarcerated parents reported this experience, $\chi^2(1, n = 26) = 2.91, p = .09$. Similarly, more college students with a history of parental incarceration reported having experienced abuse (65%) than young adults without a history of parental incarceration (35%), $\chi^2(2, n = 98) = 16.55, p < .0001$. Half of the adolescent offenders with incarcerated parents reported witnessing their parents in a physical fight, whereas none of the adolescent offenders without incarcerated parents reported witnessing such fights, $\chi^2(1, n = 26) = 8.21, p = .004$. Similarly, college students with a history of parental incarceration reported more exposure to violence at home during childhood, $F(1, 95) = 10.85, p < .001$, and adolescence, $F(1, 95) = 11.90, p < .001$, compared to

college students without parental incarceration. College students with incarcerated parents differed from adolescent offenders with incarcerated parents in one respect: college students reported having experienced safety concerns at home and in their neighborhood when they were children and teenagers. This experience of fear could be a mediating factor in determining which children with incarcerated parents become offenders and which become successful young adults.

P11.06

THE RELATION OF THE NEO PI-R NEUROTICISM SCALE TO THE MMPI-2 RESTRUCTURED CLINICAL AND PSY-5 SCALES

Samuel Ochoa, Nicole Blazek, Randolph Arnau
University of Southern Mississippi

Neuroticism includes symptoms of nervousness, maladjustment, and becoming upset easily and has previously been related to anxiety and mood disorders (Malouff et. all, 2004). The present study examined the relation between the Neuroticism scale of the NEO Personality Inventory-Revised (NEO PI-R) and symptoms of psychological disorders and pathological personality traits, as measured on the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) Restructured Clinical scales (RC) and Psychopathology-5 scales (PSY-5). Participants were 147 undergraduate students (23 males and 124 females) at a Southern university, ranging in age from 18-41 (mean= 20.54, SD= 3.99), who completed paper and pencil versions of the MMPI-2 and NEO PI-R. Zero order-correlations were conducted and indicated a number of significant correlations between the NEO PI-R Neuroticism scale and the RC and PSY-5 scales of the MMPI-2, including demoralization (RCdem), dysfunctional negative emotion (RC7), and negative emotionality (NEGE). These results suggest that people who report higher levels of neuroticism also report experiencing more negative emotions and more symptoms of depression and anxiety.

P11.11

NEO-PI-R FACET SCALE CORRELATES OF THE SNAP HISTRIONIC PERSONALITY DISORDER SCALE

Brittani Plaisance, Nicole Blazek, Randolph Arnau
University of Southern Mississippi

Histrionic Personality Disorder (HPD), which is characterized by excessive attention-seeking behavior, high emotionality, and an overly seductive manner, has previously been associated with impulsivity, gregariousness, and warmth as well as lower levels of competence, self-discipline, self-consciousness and deliberation (Huprich, 2003; Rossier

& Rigozzi, 2008). The present study further explores the relation of HPD, as measured by the Schedule for Non-adaptive and Adaptive Functioning (SNAP), and Five Factor Personality Facets, as measured by the NEO-Personality Inventory-R (NEO-PI-R). Participants were 133 undergraduate students from a Southern university (19 men and 114 women) ranging from 18 to 41 years old (mean age=20.48, SD =3.92) who completed the NEO-PI-R, SNAP, and Minnesota Multiphasic Personality Inventory-2 in a group setting in a paper and pencil format. Zero-order correlations were conducted and revealed significant correlations between the SNAP HPD scale and a number of NEO facet subscales including Excitement Seeking, Gregariousness, Modesty and Straightforwardness. These results suggest participants who endorse higher levels of histrionic symptomatology were more likely to seek exciting activities, be socially outgoing and less likely to be agreeable, humble, and honest about their intentions. These results are consistent with previous research.

**P11.12
NEO-PI-R FACET SCALE CORRELATES OF
THE SNAP BORDERLINE PERSONALITY
DISORDER SCALE**

Jeanette S. Spring, Nicole L. Blazek, Randolph C. Arna
University of Southern Mississippi

Previous research has linked Borderline Personality Disorder (BDP) with impulsiveness, aggression, affective instability, and anxiety (Tragesser, & Robinson, 2009). The current study explored the relation between BPD, as measured by the Schedule for Non-adaptive and Adaptive Personality (SNAP), and facets of the Five Factor personality trait model, as measured by the NEO-Personality Inventory-Revised (NEO-PI-R). The participants were 133 undergraduate students from a Southern university (14% male, 85% female) with ages ranging from 18 to 41 years old (mean= 20.48, SD=3.92) who completed paper and pencil versions of the NEO PI-R, SNAP and Minnesota Multiphasic Personality Inventory-2. Zero-order correlations were calculated and results indicated that BPD was significantly related to angry- hostility, depression, assertiveness and impulsiveness. These results suggest participants who reported more BPD traits were more likely to report higher levels of anger, boldness and impulsivity as well as more symptoms of depression.

**P11.13
UNDERSTANDING THE COMPLEX
INTERRELATION OF PARENTING
PRACTICES AND CHILD BEHAVIOR: CHILD
INTERNALIZING SYMPTOMS AS A
PREDICTOR OF PARENTAL SATISFACTION
AND EFFICACY**

Lindsey Archer, Stephanie Smith, Blair Kux, Ferne
Pinard, Tammy Barry

University of Southern Mississippi

The complex interrelation between parenting practices and child behavior is important not only to minimize psychological symptoms in children but also to enhance parents' satisfaction and sense of efficacy. Thus, it is paramount in the field of child and family psychology. Based on previous literature, which underscores a bi-directional effect between parent and child variables, it is expected that child symptoms may contribute to parental satisfaction and efficacy above and beyond parenting practices alone. In the current study, conducted with 59 families from a community sample, positive parenting practices (i.e., parental involvement, praise, use of rewards) were positively correlated with parental satisfaction, $r = .44, p < .001$, and efficacy, $r = .47, p < .001$, whereas negative parenting practices (i.e., inconsistent discipline, poor monitoring, corporal punishment), child aggression/conduct problems, and child symptoms of anxiety/depression were negatively correlated with parental outcomes (ranging from $r = -.32, p < .05$, to $r = -.56, p < .001$). Regression analyses indicated that child symptom variables accounted for a significant amount of variance in parental satisfaction (i.e., above and beyond parenting practices), $R^2\Delta = .139, p < .05$, with anxiety/depression symptoms accounting for significant unique variance $\beta = -.348, p < .01$. A similar pattern was found for parental efficacy. These findings suggest that parents with children who show higher levels of internalizing symptoms may be particularly at-risk for low levels of satisfaction and efficacy in their role as a parent, even more so than when a child displays more traditionally disruptive behaviors.

**P11.14
ATTENTION-DEFICIT/HYPERACTIVITY
DISORDER AND ACADEMIC
UNDERACHIEVEMENT: AN EXAMINATION
OF PARENT AND TEACHER REPORT OF
SYMPTOMS**

Blair Kux, Stephanie Smith, Lindsey Archer, Ferne
Pinard, Tammy Barry

University of Southern Mississippi

As many as 30% of children with Attention-Deficit/Hyperactivity Disorder (ADHD) fail to achieve

academically at the level predicted by their age and IQ. It is imperative, therefore, to find ways to identify those children most at risk for underachievement. The present study examined the relation of ADHD symptoms and academic achievement among 60 children in a community sample (3rd-7th grade). It was expected that ADHD symptoms would relate negatively to academic achievement. Furthermore, the unique variance in academic *underachievement* accounted for by parent and teacher ratings of ADHD was explored. Parents and teachers completed a DSM-IV-TR ADHD Rating Scale of the 18 symptoms of ADHD for each child, with total scores calculated for each rater. Children were administered the Wechsler Abbreviated Scales of Intelligence and the Wechsler Individual Achievement Test (WIAT-Screener). As predicted, total achievement (reading, math, and spelling) on the WIAT-Screener was significantly correlated with both parent-rated ADHD symptoms, $r = -.37, p < .01$, and teacher-rated ADHD symptoms, $r = -.26, p < .05$. A regression analysis, controlling for Full Scale IQ on step 1 (i.e., examining academic *underachievement*), indicated that both parent- and teacher-rated ADHD symptoms (entered simultaneously on step 2) accounted for a significant amount of unique variance, $R^2\Delta = .069, p < .05$, with only parent-rated ADHD symptoms accounting for significant unique variance, $\beta = -.299, p < .05$. Thus, within a non-clinical sample, ADHD symptoms were related to academic underachievement, and parent report of symptoms was supported as a good predictor of school problems.

P11.16 HOW RECOGNITION IS AFFECTED BY VOICE TYPE AND ATTENTION LEVEL

Noruwa N. Agho, Melissa A. Lea
Millsaps College

A major function of attention is to identify important elements and events in the environment (Sternberg, 2009). Hearing multiple messages at once, people can track one message while ignoring the others (Cherry, 1953). This experiment will examine the extent that both voice type-monotone or excited and female or male-and attention level have on an individual's recognition performance following two dichotic listening tasks. In the first dichotic listening task, the left ear will hear words presented in an excited male or female voice. In the second task, the left ear will hear the words in an excited or a monotone male or female voice. In both tasks, the right ear will hear the words in a monotone male or female voice. After each dichotic listening task, participants will be asked to complete the recognition task. A questionnaire on sleep and the Stanford Sleepiness Scale (Stanford, 2000) will be used to determine participants' level of attention

based on sleeping patterns. Preliminary data indicates that when a participant is aware of physical characteristics this will enhance their recognition memory. Implications and conclusions will be discussed.

P11.17 COGNITIVE PROCESSING OF FOOD AND PERSONALITY TRAITS LINKED TO OVEREATING IN OBESE AND NORMAL POPULATIONS

Caroline H. Stroud, Victoria Sheppard, Melissa A. Lea
Millsaps College

This study sought to further understand the cognitive processing of food within obese, overweight, and normal populations. It also examined personality characteristics associated with overeating. Participants were recruited from the Millsaps College student body. Participants were also recruited from the Jackson Metro-Area through advertisements in the local newspaper. It was hypothesized that there would be no differences in the two populations of participants (i.e., students and non-students) in terms of personality characteristics and their influence on eating patterns. Furthermore, it was hypothesized that there would be differences in cognitive processing of foods between those considered to be obese and overweight to the processing of those considered to be "normal," regardless if students or not.

An Implicit Association Task (IAT) was designed to assess food associations within memory. The Overeating Questionnaire, which not only measures cognitive components of overeating, but emotional, behavioral, and social components, as well as used to determine additional cognitive factors that may influence behaviors. The final measure used was the NEO-FFI, which is a personality inventory based on the Five Factor Model. This was administered to correlate specific personality characteristics with specific eating patterns.

The results indicated a unique cognitive and emotional difference in the obese and overweight population. The differences that were discovered in this study will help in not only understanding the underlying factors associated with disordered eating (i.e. obesity), but can contribute to better intervention and therapy techniques for those afflicted with disordered eating.

P11.18 '¿QUE' HAY EN UN NOMBRE? FURTHER INVESTIGATION OF NAME STEREOTYPES

Lauren E. Vucovich, Melissa A. Lea
Millsaps College

Attributing names to faces is a process used in everyday activities. Recognizing friends, family, and

meeting people for the first time requires this ability (Bruce, 1982). In previous research (Lea, Thomas, Lamkin, and Bell, 2007), when asked to match 15 American names to 15 given faces it was found that participants will attribute one name to a particular face more often than another name for that same face. One possible explanation for this effect is that the sound of the name is associated with the shape of the face. For example, the name Bob was matched with the face that had more round features, thus round sounding names are associated with round looking faces. In continuation of this research to further test the hypothesis that there is a relationship between the sound of the name and the shape of the face, the current study had a sample of Millsaps College students match 15 Hispanic names to the same faces used in this previous research (Lea et al., 2007). It was hypothesized that the participants will associate one Hispanic name with one particular face more often than another name for that particular face and the relationship will be based on the sound of the name. Preliminary results indicate that the hypothesis will be supported, however interesting patterns emerged. Implications for learning names and naming children, as well as general conclusions will be discussed.

P11.20

NEO-PI-R FACET SCALE CORRELATES OF THE SNAP OBSESSIVE COMPULSIVE PERSONALITY DISORDER SCALE

Kersheil Williams, Nicole Blazek, Randolph Arnau
University of Southern Mississippi Minor Outlying Islands

Obsessive-Compulsive Personality Disorder (OCPD) has previously been associated with being rigid, overly controlling and difficulty relaxing (Ekselius, Tillfors, Furmark, & Fredrikson, 2001). The current study explores the relation of OCPD, as measured by the Schedule for Non-adaptive and Adaptive Personality (SNAP), and facet-level traits of the Five-Factor Model, as measured by NEO Personality Inventory-Revised (NEO-PI-R). Participants were 133 undergraduate students at a Southern university (19 males and 114 females), ranging in age from 18 to 41 (mean age = 20.48, SD = 3.92), who completed paper and pencil versions of the NEO-PI-R and SNAP, as well as the Minnesota Multiphasic Personality Inventory-2. Zero-order correlations were calculated and indicated the SNAP OCPD scale was significantly related to a number of NEO-PI-R facet scales including Competence, Hostility, Activity, Achievement striving, and Ideas. The results suggest that people who endorse higher levels of OCPD symptomatology also report a tendency

to experience more anger, a higher belief in their own self efficacy, a faster pace of living, a need for personal achievement and a desire to learn about new things.

P11.21

THE EFFECTS OF ETHNICITY ON PERCEPTION OF BODY WEIGHT

Lauren Cox, Lauren Flegle, Karen Christoff
University of Mississippi

The purpose of the present study is to ascertain the effects that ethnicity has on perception of body weight. It was hypothesized that African Americans will view larger bodied silhouettes as ideal when compared to those considered ideal to Caucasian females. A sample of seventy-six female undergraduate students (30 African Americans, 46 Caucasians) at the University of Mississippi completed a survey containing demographic information and a series of Body Image Silhouettes. A One-Way Analysis of Variance (ANOVA) procedure was used to analyze the data. The silhouettes identified as overweight by African Americans were significantly larger than those identified as overweight by Caucasians ($p < .001$). The same difference was observed with male body image silhouettes ($p < .05$). When considering body image silhouettes of overweight children, a significant difference between the perception of African American and Caucasian females was found for female children ($p < .05$), but not for male children. This difference holds true in participants' perceptions of their own body size as well. In reference to the participants' usual appearance, African American females were found to consider themselves larger than Caucasian females, $p < .001$. It was also found that the ideal body weight for African American females is considerably larger than the ideal body weight for Caucasian females, $p < .001$. The findings of this study show that ethnicity plays an important role in perception of body weight.

P11.22

DOMESTIC VIOLENCE: THE EXAMINATION OF CULTURAL DEMOGRAPHICS ON TOLERANCE OF ABUSE

Barbara Martin, Porsche Colbert

Alcorn State University

Domestic abuse is a prominent and devastating occurrence in the United States today. This study, is designed to determine if the sanctioning of domestic violence is implicitly or explicitly reinforced depending on the cultural demographics of the observer and victim. One hundred undergraduate participants were asked to respond to a tolerance questionnaire after reading vignettes involving cross-cultural and monocultural abuse. The two predictions of this study

are 1) an observers attitude toward an act of domestic violence will be more desensitized if their cultural demographics match that of the victim and observer 2) an observers attitude toward an act of domestic violence will be more sensitive if their cultural demographics match that of the victim but not the abuser.

THURSDAY AFTERNOON
Lamar 2

O11.01

**1:30 A TALE OF TWO CITIES: THE
NEGOTIATION OF COMMUNITY, ETHNIC
IDENTITY AND MIGRATION HISTORY OF
TWO GULF COAST
VIETNAMESE ENCLAVES IN RESPONSE TO
HURRICANE KATRINA.**

Vy Dao

Tulane University

In the aftermath of Hurricane Katrina there has been a strong interest in how communities of color responded to and recovered from this singular disruption of their neighborhoods.

This study compares two ethnic enclaves located along the hurricane corridor of New Orleans, Louisiana and Biloxi. These two predominately Vietnamese communities provide us with insight as to whether factors commonly attributed to ethnic communities such as language, native culture symbolism and social networks have made the occurrence of Hurricane Katrina a uniquely "Vietnamese Experience" for its residents.

Research consists of in-depth, face-to-face interviews with Vietnamese residents of Biloxi and New Orleans, LA as well as representatives and volunteers of local Vietnamese organizations serving these communities. Participant observation at cultural and social events will provide opportunities to observe day-to-day activities and contribute to an ethnographic representation. Also, recovery profiles are compiled from federal findings, state and local sources in order to contextualize each Vietnamese community within the larger framework of state and city recovery.

The comparative study reveals emergent themes across both communities in the areas of immediate response to the storm (evacuation, initial supply distribution, early communication) and in the later months, the communities diverge in the realms of community leadership, trust and distrust, intergenerational perceptions, physical recovery, social justice mobilization and interpersonal relationships among residents.

O11.02

**1:45 WALKING THE SUBTLE PATHS OF
ETHNOGRAPHIC CHANGE**

Denise DeSadier

University of Southern Mississippi

This study takes an in-depth look at and discusses some methods and approaches used in fieldwork based ethnographies. In addition, it addresses the importance of ethnographic project design flexibility and the unexpected changes that can and will happen during fieldwork studies. This analysis developed as the result of several obstacles associated with an undergraduate ethnography project. The original study was an attempt to analyze patterns of fictive kin networks as they operate within an African American church community. These networks seem to manifest as a grass roots socio-cultural phenomenon and are applied in various forms. However, this project did not come to fruition; hence the need for the analysis. After evaluating the situations and events that occurred in the original field study, the results show that there was a significant inequality between the class room perception of methods and procedures and the actuality of "doing" ethnographies. By looking at the assumptions and various problems inherent in ethnographic field work from the perspective of both the ethnographer and the studied group, an ethnographer can readily make workable adjustments to their project design to suit the new conditions presented them. By understanding how to navigate through these shifts and changes, an ethnographer can find invaluable information even if the data were not what they initially expected to discover.

O11.03

**2:00 RESEARCH THAT BUILDS
TEACHERS' CAPACITY TO DECREASE THE
ACHIEVEMENT GAP IN MATHEMATICS**

Lecretia Buckley

Jackson State University

Professional development in mathematics education has often embraced an effective model; yet, this model may be limited in addressing issues of equity. Equity issues in mathematics education are paramount given the persistent achievement gap. An equity centered model of professional development which employs collection or group inquiry may be more effective in enhancing student learning as teachers confront their expectations for mathematics learning for all students. Collection comprises four components: collective, deliberative, critical, and transformative. In this session, the presenter outlines a research design to employ collection in mathematics professional development. This design engages mathematics teachers in inquiry-oriented sessions in which they



examine their beliefs about students and student learning through video clips and examples of students' work. Insights from this research address foundational issues in mathematics education about who can learn mathematics and whether positive teacher beliefs about students can be nurtured.

2:15 Break

O11.04

2:30 HAND REACH EFFICIENCY FOR PREY CAPTURE IN GARNETT'S BUSHBABY (OTOLEMUR GARNETTII).

David Hanbury, Kyle Edens, Clare Legg, David Bunch, Sheree Watson

University of Southern Mississippi

Twelve Garnett's bushbabies were tested for reaching success in a prey capture task requiring the subjects to forage for mealworms. Handedness data obtained prior to this experiment were used to determine whether bushbabies were more successful in capturing prey with their dominant hand. There were seven left-handed and five right-handed bushbabies. Subjects were placed in a 86cm. d. X 86cm. w. X 166cm. l. cage and were presented with a small container (9.60cm. diameter, 8.96cm. deep) with five mealworms buried in cornmeal filled 3cm. deep. The container was placed on the ground beneath a 9.60cm. x 9.60cm. square opening in the cage floor. Bushbabies made 50 reaches beneath the cage floor to retrieve the worms. A worm was added to the cup after each capture. The results of the experiment showed that four of 12 bushbabies used their dominant hand exclusively.

Out of a group total of 600 reaches, 505 occurred with the dominant hand. For the dominant hand, the average individual success rate for prey capture was 47.87%, but only 46.00% for the non-dominant hand. The left hand was used 53.17% of the time with an average individual success rate of 54.86%. The right hand had an average individual success rate of 38.75%. The left hand was significantly more efficient than the right, $z=2.91$, $p<.01$. These data suggest that, regardless of hand preference, the left hand is more specialized for prey capture in bushbabies. Further research with more trials and subjects will be necessary to substantiate these findings.

O11.05

2:45 FORELIMB ASYMMETRIES DURING FOOD RETRIEVAL IN BUSHBABIES (OTOLEMUR GARNETTII): A CASE STUDY

Alen Hajnal, Sheree Watson, Kyle Edens, David Hanbury

University of Southern Mississippi

Little is known about motor control and forelimb dexterity in nocturnal primates. The present research is a case study of one right-lateralized adult male bushbaby's reaching behavior during repeated food retrieval. The study involved one daily session of feeding over 12 days. Six days were spent testing reaches with the dominant (right) forelimb, and the remaining six days using the left forelimb to retrieve food. The results showed that the dominant forelimb was faster at the beginning of feeding sessions than the left forelimb. These findings are in contrast with Carnahan (1998) for human reach and grasp where no speed difference was found between left and right hand. The bushbaby moved its forelimb faster in early trials compared to later trials, irrespective of lateralization. Within a single trial the comparison of peak speeds just before and after grabbing the food revealed no differences. We concluded that forelimb movements were fairly symmetric in terms of magnitude of movement speed. We also analyzed timing of forelimb movements. No temporal difference between left and right forelimb was observed with respect to when peak speed was reached after grabbing the food item. Interestingly, peak speed was reached earlier before catch in late trials, suggesting that movements became more preprogrammed over trials (possibly as a result of motor learning). Across all trials, the left forelimb reached peak speed earlier in the reaching-out phase than the right. We concluded that left and right forelimb speed profiles differ in timing, but not amount of maximal achieved speed.

O11.06

3:00 INTIMATE PARTNER ACCEPTANCE, REMEMBERED PARENTAL ACCEPTANCE, AND PSYCHOLOGICAL ADJUSTMENT OF BANGLADESHI ADULTS IN ONGOING ATTACHMENT RELATIONSHIPS

Shaila Khan

Tougaloo College

Relationships between perceived intimate partner acceptance and psychological adjustment of 164 Bangladeshi adults, along with possible mediating effects of remembered maternal and paternal acceptance were explored in this study. Results showed significant positive correlations between men's and

women's psychological adjustment and perceived partner acceptance as well as remembered maternal and paternal acceptance in childhood. Simple multiple regression analyses, however, showed that only remembrances of maternal acceptance in childhood were significantly and uniquely associated with men's psychological adjustment. Both perceived partner acceptance and remembered maternal (but not paternal) acceptance were significantly and uniquely associated with women's adjustment.

3:15 Division Business Meeting

FRIDAY MORNING Garden Room

SYMPOSIUM: *RESEARCH IN RECONSTRUCTING MISSISSIPPI'S PAST*

O11.07

9:00 MUSCULOSKELETAL MARKERS AND DEGENERATIVE JOINT DISEASE AS INDICATORS OF OCCUPATIONAL STRESS IN THREE SKELETAL SAMPLES AND THE DIFFERENECE SHOWN IN THOSE SAMPLES

Morgan Devlin

University of Southern Mississippi

Through the analysis of musculoskeletal markers (MSM) and degenerative joint disorders, such as osteoarthritis and osteophytosis, the difference in occupational stress from different populations can be determined. In order to demonstrate the type and degree of occupational stress that can be seen, two skeletal collections, one from the late prehistoric agricultural Humber site in the Mississippi Delta (N=18) and another consisting of Mexican War era soldiers buried on Greenwood Island in Pascagoula (N=3), were assessed compared, and the findings then compared to published data (Hawkey and Merbs 1995) on the Thule culture (Alaskan Inuit/Eskimo). Using both metric (Weiss 2004) and non-metric (Hawkey and Merbs 1995) scoring techniques, occupational stress was evaluated to evaluate both individual and population level work loads. The individuals at Humber exhibited higher rates of degenerative joint disease which was most likely the result of an increase in repetitive motions required by agriculturalists and increased MSM of the upper limbs as compared to the soldiers, who displayed far more development of lower limb MSM, which likely is related to the amount of walking; the Thule culture has high rates of musculature on both the upper and lower limbs that is likely the result of heavy workloads associated with fishing, whaling and, in later time periods, the extensive

journeys required to get to appropriate sites to undertake this work type. From the analysis, it is clear that the different populations, and individuals within the population, have significantly different bone morphology as a result of differential occupational stress.

O11.08

9:15 RECONSTRUCTION OF YELLOW FEVER MORTALITY RATES IN NINETEENTH CENTURY NATCHEZ: A CASE STUDY

Nicole Musselwhite

University of Southern Mississippi

This presentation will assess epidemiological patterns of yellow fever in Natchez during the 1800s. The South where the *Aedes aegypti* mosquito thrived was especially prone to frequent yellow fever outbreaks that disturbed commerce and flared racial tensions. Using the sexton records of the Natchez City Cemetery, information on over 5000 deaths between 1865 and 1890 was analyzed by age and race in order to examine two yellow fever outbreaks in 1867 and 1871. While these two outbreaks did not see a high mortality rate as seen in the 1850s, they do represent the typical racial disparities exhibited in Southern yellow fever epidemics, especially concerning virulence rates. Yellow fever accounted for less than 10% of the total deaths in 1867. However it accounted for more than a quarter of those who died in 1871. In the earlier epidemic, the majority of yellow fever deaths occurred after the age of 25, but in 1871 the deaths spanned equally over the ages. Conversely, 50% more African-American children and adolescents died in 1871 than those over 25, but 19.6% more White adults died in 1871 than children and adolescents. In addition, Black deaths accounted for less than 15% of the total number of deaths from yellow fever in both outbreaks, which helped propagate racial tensions. These findings will be discussed in light of patterns of yellow fever death seen in other regional cities, including Vicksburg and New Orleans.

O11.09

9:30 THE MORAN SITE (22HR511): TEMPORAL EVOLUTION OF SITE FUNCTION FROM CEMETERY TO RESIDENTIAL OCCUPATION

Barbara Hester

University of Southern Mississippi

The Moran Site (22HR511) is a French colonial cemetery that lies just north of the landmark Biloxi lighthouse. Thus far 26 burials have been recovered. As suggested by both Carbon-14 dating, as well as osteological data, this cemetery appears to contain the remains of some of the unfortunate victims

of John Law's efforts at massive colonization of Louisiana between 1717 and 1720. In conformity with religious customs and tradition of burying in consecrated ground, the site's function would have been restricted to burial alone, at least as long as the cemetery was known to exist. The few artifacts found in association with the graves are typical mortuary items, specifically a crucifix, shroud pins, and coffin nails, all assignable to the early eighteenth century. Archaeological evidence at a superimposed stratigraphic level and assignable to the early nineteenth century and later, such as ceramics, window glass, machine-made bottle glass, and machine-cut nails, indicates that at some point, most likely during the early 1800s, the site began a history of residential occupation. These dates are further supported by archival information, including chancery records and genealogies. This paper will discuss the approximate dates for the cessation of use of the site as a cemetery, the length of its intervening period of disuse, and the onset of its residential function, especially as it correlates with other historical events on the Mississippi Gulf Coast.

O11.10

9:45 REASSESSING DENTAL PATHOLOGIES OF THE HUMBER SITE IN COAHOMA COUNTY

Amanda Harvey

University of Southern Mississippi

An advantage to examining teeth from a bioarchaeological perspective is a high degree of preservation, but as with most types of analyses, scoring methods have changed over time. This paper will analyze how this change may affect interpretations made from the data. The Humber site in Coahoma County is a ceremonial and political center dating to AD 1400-1700. In 1976, Mitchell evaluated dental defects in the skeletal collection recovered at Humber using the Dental Code sheet for Osteological Data from the University of Colorado Mesa Verde Research Center. The method only notes the presence or absence of defects such as enamel hypoplasias, abscesses, caries, crowding or impacted teeth, without allowing for assessment of severity. Using more recently developed standards including The Federation Dentaire International for Developmental Defect of Enamel (FDIDDE) as well as those of Hillson (1986) and Buikstra and Ubelaker (1994) that include more detail concerning defect assessment, the mandibular and maxillary incisors and canines of eighteen individuals were assessed. Initial results indicate more developmental lesions are recognized using these newer standards. Enamel hypoplasia especially are identified

at a greater rate since four different severity levels (mild, severely mild, moderate, and severely moderate) are used. Rates of caries, however, did not change significantly. These findings will be used to reassess the pattern of nutritional stress periods experienced by the population, which may reflect that the people at Humber were more heavily dependent on maize than initially concluded by Mitchell.

O11.11

10:00 LITHIC DEBITAGE ANALYSIS OF THE CLARKE LAKE SITE-A SMALL SCALE MIDDLE WOODLAND SETTLEMENT

Michelle Hammond

University of Southern Mississippi

The majority of research conducted within the Middle Woodland period focuses on ceramic analysis on large scale settlements. Very little research has been conducted in the area of lithic debitage from this period especially at small sites. This paper will focus on the lithics recovered from the Clarke Lake Site, a small scale Middle Woodland settlement located at the very southern end of the Yazoo Basin in Mississippi. Preliminary analysis of the artifacts recovered indicates occupations beginning during the Issaquena Phase and continuing into the Lake George II phase (from circa 200-1500 A.D.). One of the unique features of this assemblage is an unusually large amount of debitage (560/648 flakes) recovered from one particular unit. An attribute analysis of the debitage found in this particular unit will provide evidence for the nature of the activities within the site particularly concerning site function at small scale Middle Woodland settlements in the Mississippi Valley.

10:15 Break

SYMPOSIUM ON FORENSICS

O11.12

10:30 SKELETONS BELOW THE AUDITORIUM: AN EXAMINATION OF COMMINGLED REMAINS FROM MEMPHIS, TENNESSEE

Stephen Davis, Nicholas Herrmann

Mississippi State University

In the spring of 2000, the Memphis Regional Forensic Center (MRFC) assisted in the recovery of commingled human remains from below the old Ellis Auditorium in downtown Memphis, Tennessee. Analysis of these remains initiated at Mississippi State University Department of Anthropology and Middle Eastern Cultures in the spring of 2009. The goals of the analysis focused on the determination of the Minimum

Number of individuals (MNI), assessment of biological ancestry, documentation of trauma and pathology, and the construction of a biological profile for the collection. These data are used to develop an “osteobiography,” the life history events as evidenced by the skeletons, enabling us to hypothesize the collection’s origin and composition based on contextual and osteological clues.

Various current forensic anthropological techniques were employed to construct the “osteobiography” of these remains. An inventory resulted in the identification of over 400 individual bones. The MNI estimate is based on repeated and paired elements, accounting for age and size variation. Furthermore, refitting of vertebral elements was conducted to assess pathological conditions. Current forensic anthropological computer applications including FORDISC 3.0 and ADBOU were used to determine ancestry, stature, and age ranges of individuals. These applications use modern and historic osteological data along with current mathematical approaches to provide appropriate ancestry and age determinations based on post-cranial morphology and craniometrical data. Finally, pathological and taphonomic signatures were recorded for all elements in the sample. Although these remains are likely discarded anatomical specimens, they do provide a unique glimpse into historic Memphis.

O11.13

10:45 EFFECTS OF CREMATION ON ANALYSIS OF CRANIAL GUNSHOT WOUNDS

Jessica Manriquez, Stacy Scott

University of Southern Mississippi

This paper examines the effects of differential exposure to burning on the appearance and interpretation of cranial gunshot trauma. Two fleshed, untreated, and decapitated skulls were exposed to projectile trauma, one using a shotgun and the other a Meridian Police Department standard issue Glock. They were then placed in a recent model car with a high plastic composition, the former skull on the floor of the front passenger area and the latter skull on the back seat. The car was then set afire and allowed to burn out naturally. Skull #1, which had been shot in the right parietal, had an entrance wound measuring about 30 mm in diameter located above the tip of the mastoid. Surrounding the wound were the classic concentric rings of unburned bone, partially burned bone, and charred bone. It ended in calcinated bone of the right parietal. Skull #2 had an entrance wound approximately 17 mm in diameter in the occipital. The wound exhibited radiating fractures from the trauma along with some heat fractures but showed no color banding. There was notable delamination present on the internal surface of the skull surrounding the

entrance wound that was a result of the charring affects from the fire. It will be discussed how the damage seen in each of the skulls reflects not only the damage done by the type of projectile used, but also how various placements within the car, and thus degree and length of exposure to the fire, affected the projectile trauma.

O11.14

11:00 FATAL FIRE MODELING: REPLICATING ENVIRONMENTAL AND HUMAN FACTORS ASSOCIATED WITH THE RECOVERY AND ANALYSIS OF BURNED HUMAN REMAINS

Elayne Pope

Forensic TV, Pensacola

A year ago, a report by the National Academy of Sciences called for higher standards and increased accuracy of scientific research in the forensic sciences. Experimental replication of known and realistic conditions is but one of several solutions that forensic anthropologists can use to address these concerns. Traditionally, our investigation of burned human remains begins in a laboratory setting, which is far removed from the in situ context of the taphonomic changes that originally produced the skeletal burn patterns used in our analysis. This presentation will show that just as each fire scene is unique, so are the burn patterns produced on the body, which directly result from being exposed to different types of environmental conditions during and after the fire. Replicative modeling of structural and vehicular fires provides forensic scientists with the opportunity to identify specific variables that are directly correlated with the production of burn patterns, which serves to improve the overall accuracy and reliability of our analysis of burned human remains. Results from these documented structural and vehicular fires will be presented to illustrate the how each kind of fire environment produces different types of burn patterns and should be considered when analyzing burned human remains, along with postmortem changes from human factors during recovery.

O11.15

11:15 DIFFERENTIATING PERI- AND POSTMORTEM FRACTURES IN BURNED POSTCRANIAL REMAINS

Elayne Pope, Heidi Davis, Ashley Shidner
University of West Florida

The classic characteristics of perimortem and postmortem fractures are relatively easy to determine in skeletonized long bones, however this distinction becomes more difficult to assess in burned human remains. When bone is exposed to heat, it undergoes systematic biochemical and structural changes from

pyrolysis that can result in charring, calcination, heat-related fractures, and fragmentation, all of which makes it very brittle during and after the fire. This presentation examines how preexisting skeletal trauma alters the normal heat-related changes of the soft and skeletal tissues, causes limb deformation, and produces characteristic burn patterns in the bone.

Perimortem Skeletal Trauma Characteristics

It takes a considerable amount of external force to produce fractures in living and green bone, especially while being protected within soft tissues. Long bones of the appendicular skeleton have been shown to fracture predictably based on variable of area and amount of force, cortical and trabecular thicknesses, injury types, and other biomechanical factors (Galloway 1999). This study found that additional factors contribute to the heat-related changes of perimortem trauma in burned postcranial remains. One of the biggest influences was the anatomical arrangement of muscle and soft tissues around the bone itself.

11:30 Break

O11.16

11:45 FROM "IN THE FIELD" TO IN THE MORGUE - A STUDENT'S PERSPECTIVE OF FORENSIC ANTHROPOLOGY

J. Lynn Funkhouser

University of Southern Mississippi

This presentation is intended to provide students considering work in forensic anthropology an overview of what to expect "in the field", from the perspective of a fellow student. Observations are made based upon work done under the direction of Dr. Hugh Berryman from the fall of 2006 until the spring of 2008 in the recovery of human skeletal remains from crime scenes and their subsequent analysis in the Nashville Medical Examiner's Office. Included are rules to follow when working a case, a brief overview of field recovery techniques including line searches, handling the press, morgue work, and dealing with what one sees. Also discussed will be the qualifications necessary to work in this aspect of the discipline, including having a background in human osteology, the forensic sciences, and archaeological field techniques. Discussion will be supplemented by discussion of specific cases, including handling "floaters," experiencing gallows humor, and managing a close encounter with Voodoo.

O11.17

12:00 SILENCED VOICES AND FORGOTTEN CASES: THE MISSING AND UNIDENTIFIED CASES SITUATION IN MISSISSIPPI

Stacy Scott

University of Southern Mississippi

Resolution of cold cases in the United States has increased tremendously due to better technology and data sharing. The NCIC in 2005 reported that there were only 19 unidentified cases reported in Mississippi, but this number is likely much lower than the actual number. Juvenile Doe cases are the only ones required by federal law to be reported to the NCIC and because Mississippi has no state legislation requiring cases involving adults to be reported to the NCIC or any other federal or state database the actual number of unidentified cases is unknown. Skeletal remains are especially likely to have simply been stored in closets or back shelves in coroners and law enforcement offices, and many have remained there for decades with no further analysis conducted, due to lack of time and funds. Therefore, there is a great need in Mississippi for a centralized lab designed for the purpose of reanalyzing unidentified remains, which has led to the organizing of such a lab at University of Southern Mississippi. There is already a physical anthropology lab in existence with the necessary equipment and comparative samples to properly analyze cases and a standard operating procedure manual complete with chain of custody and security protocols have been developed. Networking attempts to gain support and cases is a slow ongoing process but the goal is to re-evaluate cases to obtain new leads and then enter the results in national databases such as the NCIC and NamUs.

O11.18

12:15 THE STUDY OF MULTIPLE DIFFERENTIAL DNA EXTRACTIONS WITH LOW DNA QUANTITIES

Nicole Thompson, Thomas Pittman, Dean Bertram,
Kuppareddi Balamurugan

University of Southern Mississippi

The goal of this study is to demonstrate the recovery of additional quantities of DNA from sexual assault samples by performing subsequent DNA extractions of a substrate that has been extracted once. Forensic casework requires that a sufficient quantity of DNA be recovered from evidence samples; unfortunately, samples collected from sexual assault victims may only contain trace amounts of spermatozoa, making it difficult to compare DNA profiles. Multiple extractions of samples may provide additional quantities of DNA to supplement the DNA

obtained from the first extraction. Studies performed in our laboratory using the samples containing 0.1 μ L of semen showed DNA recovered from the second and third extractions together yielded an additional 25% of DNA compared to the first extraction. This substantial increase in DNA recovery may be critical in some cases and can be a valuable tool for forensic DNA analysis when trace DNA is encountered. In addition, a complete STR DNA profile has been obtained using less than 1 ng of DNA recovered from the second extraction alone, making this procedure potentially very valuable for forensic science. Using this technique, more DNA can be isolated from rape kit samples that contain trace spermatozoa and the chances of obtaining a complete STR profile are increased, increasing the probability of solving the crime. This multiple extraction technique may also be used for non-sexual assault samples for even greater potential application in forensic DNA analysis.

O11.19

12:30 THE SIGNIFICANCE OF WHOLE GENOME AMPLIFICATION IN FORENSIC SCIENCE

Jennifer Hammons, Dean Bertram, Thomas Pittman, Kuppareddi Balamurugan
University of Southern Mississippi

The goal of this study is to demonstrate the increase of the quantity of high molecular weight DNA from smaller amounts of starting DNA material. Whole genome amplification (WGA) is a technique that is being considered as a tool to improve the results obtained when encountering trace or degraded DNA samples. In this study, we employed a REPLI-g WGA kit to amplify a range of 5 ng - 0.1 ng of genomic DNA templates. The resulting amplified genomic DNA was quantitated using agarose gel electrophoresis and human DNA quantitation using a Quantifiler human DNA detection kit. One ng of DNA from the WGA amplified samples was used to study the DNA STR profiles using an AmpflSTR Identifier DNA typing kit. All concentrations tested generated an increased yield of human DNA. Increases from 143- to 2507-fold in genomic DNA recovery were achieved by whole genome amplification. The total DNA recovered ranged from 17 ng to 993 ng. A complete DNA profile (32 alleles) was obtained from samples that contained 0.5 ng to 5 ng templates for whole genome amplification. WGA-amplified templates using 0.4 ng and 0.3 ng of DNA yielded partial profiles with 30 or more alleles. WGA amplified templates using 0.1 and 0.2 ng of DNA yielded partial profiles with 25 or more alleles. This data suggests that the REPLI-g WGA kit can be successfully used to generate STR profiles from trace DNA quantities, but stochastic effects and allele

dropouts must be considered before making final allele calls.

SCIENCE EDUCATION

Chair: Johnny Mattox,
Blue Mountain College
Vice-chair: Jacob Blickenstaff,
University of Southern Mississippi

THURSDAY MORNING

Lakeview 1

O12.01

8:00 THE COMPUTATIONAL STUDY OF IONIZATION EFFECTS ON URACIL DERIVATIVES

Colby Michael, Susan Bender
Jim Hill High School

Ionization is harmful to your DNA, because the ionization mutates the DNA bases by the addition of free electrons. Ionization has effects on Uracil derivatives, with the addition of electrons. However, all the derivatives will not have the same effect with the addition of electrons. The aim of the study was to determine the susceptibility of Uracil derivatives to free radical derivatives. These compounds were studied using the method B3LYP and the basis set of 6-31g*. The vertical electron affinity and the adiabatic electron affinity were calculated. The relative trends between the five molecules are presented.

O12.02

8:20 THE EFFECTS OF OVER THE COUNTER PAIN REMEDIES ON THE HEART RATE OF DAPHNIA MAGNA AND ITS IMPLICATIONS TO HUMAN CARDIOLOGY

Angshylea Jones, Kayla Coleman, Susan Bender
Jim Hill High School

Throughout the experiment three methods were used. Method one: use different concentrations of each pain reliever. Method two: compare body weight to dosages by creating equations that would equal out to a normal amount taken by a human. Method three: solve equations to find which dosage given to the daphnia would be most accurate to human beings. Following through the experiment some Daphnia died because of too many high concentrations of medicine, environment was interrupted, and toxicity to the anatomy.

- Method one: Concentrations were broken down from low dose to high dose. The concentrations were as followed: .025g, .25g, and 2.5g. The powder substances of the

medications were diluted in 100mL spring water in labeled baby food jars. The water was warmed (2minutes) so the powdered medications can be completely dissolved.

- Method three: After finding the correct body weight and dosages for a Daphnia Magna, we compared it to a natural human dosage and body weight to observe how the lethal dosage affects the cardiac cells, muscles, blood pressure, and other bodily organs.

This project establishes that in addition to the dosing requirements indicated by the manufacturer body weight and metabolic rate must be taken into consideration. Over the counter pain remedies increase heart rate in Daphnia magna and by inference human heart rate will be increased as a result of these medications.

O12.03

8:40 ENHANCEMENT OF ACHIEVEMENT IN COLLEGE BIOLOGY THROUGH PARTICIPATION IN STUDY GROUPS

Johnny Mattox

Blue Mountain College

Research has shown that cognitive gains can result from peer learning among students. Students in the summer biology class Human Anatomy and Physiology I were encouraged to organize themselves into study groups during the summer session of 2009. The study groups were lead by a student who had previously completed the course. Study groups met for study sessions three to four times per week. Scores for students who participated in study groups were compared to those who did not attend the study sessions. Scores for those students who did participate were 11% higher than the scores for students who chose not to attend. Results of this study encouraged additional students to participate in peer learning groups during Human Anatomy and Physiology II.

O12.04

9:00 A TEXT CONTENT ANALYSIS OF THE NEW EARTH SCIENCE LITERACY PRINCIPLES: IMPLICATIONS FOR GEOSCIENCE INSTRUCTION

James Wandersee¹, Renee Clary²

¹*Louisiana State University*, ²*Mississippi State University*

Context: The NSF's new Earth Science Literacy Principles [ESLP] document (2009) focuses on the big ideas of Earth science and understanding them well.

Research Question: How can a computer-based text content analysis of the ESLP inform geoscience instructors about how to use this new document to design Principles-based lessons?

Methods: Our systematic, mixed methods study involved qualitative and quantitative computer analyses of the ESLP using a suite of 6 applications we modified, resulting in an informative content and language profile..

Summary of Results: Our ESLP profile reveals the underlying hierarchy of its 12 most embedded concepts; (b) 9 salient parameters of its writing style; and (c) 6 of the document's readability factors.

Conclusion: Our computer-generated ESLP profile has the potential to help today's geoscience instructors translate this new science education reform document into appropriate and well-aligned lessons.

O12.05

9:20 HISTORY OF GEOLOGY AND DISTINCTIVE TRACE FOSSILS: 'A COPROLITIC VISION' FOR SCIENCE EDUCATION

Renee Clary¹, James Wandersee²

¹*Mississippi State University*, ²*Louisiana State University, Baton Rouge, LA*

William Buckland (1784-1846) was the first scientist to identify and scientifically study coprolites in the early 1820s. Several of his contemporaries did not look favorably upon Buckland or his research, and some alleged that Buckland's interest in fossilized feces was more gimmick than authentic scientific interest. Even Henry De la Beche, Buckland's friend and geological colleague, constructed the scientific caricature "A Coprolitic Vision" as a humorous attempt to poke fun at Buckland's curiosity in fossilized excrement. However, Buckland's early experiments attempted to reproduce coprolite structures, and in so doing advanced the sciences of paleoecology and taphonomy.

We noted that the incorporation of eccentric coprolite stories from the history of geology, coupled with coprolite specimens, resulted in students' spirited reactions in informal presentations. Therefore, we investigated whether coprolite introduction in traditional Earth Science classrooms had potential for meaningful learning.

Practicing Earth Science teachers (N = 28) enrolled in an online paleontology course researched coprolites, and designed activities with coprolites for their individual K-12 classrooms. Resulting projects were diverse and creative, and incorporated investigations into fossilization processes, paleoenvironments, food chains, and geologic time. Teachers' anonymous survey

responses indicated that their students' interest in coprolites would be high. We propose inclusion of coprolites and their history in Earth Science classrooms as a means to hook students' interest, springboard to additional scientific topics, and promote meaningful learning.

O12.06

9:40 COASTAL HABITATS: MISSISSIPPI'S NATURAL TREASURES, A GULF OF MEXICO ALLIANCE FUNDED PROJECT FOR UNDERREPRESENTED AND UNDERSERVED POPULATIONS

Shelia Brown¹, Jennifer Buchanan², Kimberly McMillan³

¹J. L. Scott Marine Education Center, Gulf Coast Research Laboratory of Southern Mississippi, ²Grand Bay National Estuarine Research Reserve, Moss Point, ³Moss Point School District, Moss Point

The presentation will consist of basic information on the *Coastal Habitats: Mississippi's Natural Treasures* project to include implementation strategies. The project was funded through the Barataria-Terrebonne National Estuarine Program for the Gulf of Mexico Alliance. The focus of the program was to provide underrepresented and underserved populations of the Moss Point School District experiential learning environmental education opportunities. Fourth grade students of three Moss Point elementary schools were the active participants of the project. Evaluation data from the two school visits and three field trips were significant with p values less than 0.01 for four activities and less than 0.02 for one activity. A short video of photographs taken during the instructional events will reveal the field based experiential learning activities at four venues, Moss Point Schools, J. L. Scott Marine Education Center, Gulf Island National Seashore, and Grand Bay National Estuarine Research Reserve.

O12.07

10:00 THE BEGINNING OF A FIELD GUIDE: FLORA OF THE NATURAL HABITATS OF THE MISSISSIPPI GULF COAST COMMUNITY COLLEGE COUNTY CAMPUS, GAUTIER

Kevin Mapes¹, Citlalin Morales¹, Jousha Brick¹, Shelia A. Brown²

¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²J.L. Scott Marine Education Center, Gulf Coast Research Laboratory of Southern Mississippi, ³The National Aeronautics and Space Administration, Stennis Space Center

The purpose of this project was to begin the process of creating a field guide that contains

descriptions of the natural flora and habitats of Mississippi Gulf Coast Community College's Jackson County Campus. The location for the project is the Environmental Education Center property to include the walking trails and Mary Walker Bayou. Three students worked together with the staff of the J.L. Scott Marine Education Center to initiate the overall objectives of this project. The objectives include: photographing representative species of flora, acquiring information about each species, and developing text and format for the field guide. The presentation will be based on a select group of species and habitat descriptions being developed for the field guide.

10:20 Break

O12.08

10:40 DISTRIBUTION OF TEACHING AIDS ON THE RESPIRATORY, DIGESTIVE, REPRODUCTIVE SYSTEMS AND GENETICS

Jonathan Russell¹, Scott McCrimmon¹, James Baggett¹
¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²The National Aeronautics and Space Administration, Stennis Space Center

Currently, in most community and four-year colleges, classes are becoming more non-traditional than traditional. There are different student needs and expectations that should be addressed. Therefore, this project focused on making notes, graphics, videos, and practice quizzes available through the use of student computer technology. The primary goal was to create Compact Discs (CDs) to be made available for students to "check out" and use in the learning labs and in the library, followed by creating access through the internet at a later time. After selecting the desired information for each CD (information and lectures on the human respiratory, digestive, reproductive systems and genetics and Physiology I or II notes, graphics, videos, and CD study quizzes), master CDs were created (burned). Copies were then burned using the master CD; labels and case covers were designed. The CDs were then released to the Learning Lab and Library. The overall purpose in the creation and distribution of the CDs was to provide an additional study source for traditional and non-traditional students who wanted to review the material. Or, if a class laboratory had been missed, students wanted to acquire the Anatomy and Physiology I and II information.

**O12.09****11:00 CREATING A THIRD GRADE SCIENCE LESSON THAT TEACHES APPLICABLE LESSONS THROUGH HANDS ON LEARNING AND CUSTOM-CONSTRUCTED**

Andrew Taylor¹, Lorie Amato², Adelle Register²
¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier,* ²*Students and the Ocean Springs School District-Pecan Park Elementary School,* ³*The National Aeronautics and Space Administration, Stennis Space Center*

The purpose of this project was to give third grade students lessons on global warming, the water cycle, and the Earth's structure that are in accordance with the current *Mississippi Science Frameworks*. These lesson plans were designated to strengthen the students' mental image of their overall impact on the world. The lessons were also formatted give students hands-on activities, thereby providing a better grasp of the concepts. Pre- and posttests were administered to the elementary students to analyze their enhanced content knowledge during the presented activities.

O12.10**11:20 IMPORTANT PREREQUISITES FOR FUTURE NURSING STUDENTS**

Tabetha Jones¹, Joan Hendrix², Nancy Robasciotti², Debra Buie², Angela McConn², Denisa Harte²
¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier,* ²*The Associate Degree Nursing (ADA) Program Gulf Coast Community College-Jackson County Campus, Gautier,* ³*The National Aeronautics and Space Administration, Stennis Space Center*

Basic assumptions, adequate reading, writing, and math skills are essential when applying to an ADN nursing program. Prerequisite courses enhance factors. The purpose of this project was to list some of the key concepts and or factors deemed necessary for a successful entry into Level One of the MGCCC-JC-ADN program. The information was attained from in-person and over-the-phone interviews with the instructors of the nursing program. The nursing faculty agreed the most important prerequisite is Human Anatomy and Physiology. In-depth knowledge of the cardiovascular, respiratory system, and appropriate medical terminology are essential as prerequisite courses.

11:40 Division Business Meeting**THURSDAY AFTERNOON****Lakeview 1****O12.11****1:00 SAFETY AND ENERGY DISCUSSIONS WITH OCEAN SPRINGS SCHOOL DISTRICT, TACONI ELEMENTARY SCHOOL STUDENTS**

Devyn Hill¹, Allison Yarrow², Vanessa McKee²
¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier,* ²*Ocean Springs School District, Taconi Elementary School,* ³*The National Aeronautics and Space Administration, Stennis Space Center*

The purpose of this project is to introduce and strengthen certain chemical concepts to three, fourth-grade, gifted classes attending Taconi Elementary School Mississippi. The students investigated basic safety and communication skills utilized by war torn populations which could be incorporated in our time. The students duplicated the invisible ink process used by the United States Government during World War II. Safety precautions were stressed as the students participated in and analyzed the Carbon Dioxide Cannon Experiment. Students were encouraged to develop a safety plan for home and community. Pre- and posttests on safety were administered.

O12.12**1:20 COOPERATIVE LEARNING ONLINE AND IN TRADITIONAL CLASSROOM**

Allison Duckworth, Kenneth J. Curry
University of Southern Mississippi

New technology for delivering courses totally online challenges many aspects of traditional education, and is particularly difficult for cooperative learning that relies heavily on intense face-to-face communication among students. This study is being conducted to compare cooperative learning in a traditional setting to that in a hybrid or online setting. We have developed a model for delivering a cooperative learning experience using concept maps within an upper division college course, History of Biology, as well as a hybrid version of the same course with the cooperative learning module run in a traditional class while the rest of the course remained online. A variation of this model is also being used to compare traditional and hybrid formats of introductory biology courses. Our model for cooperative learning online worked well for the majority of students. Preliminary results indicate that cooperative learning is equally successful regardless of the amount of face-to-face interaction. Students in the online version of this course were pleased with their

cooperative learning experience despite the absence of this interaction. Many stated that it helped them gain a deeper understanding of the material. It also provided students with an environment conducive to peer tutoring and social interaction which is often missing from many online experiences. This model, however, was very challenging for the instructor. The hybrid version of the course was much more user friendly than its fully online counterpart. This alternative method allows incorporation of cooperative learning relatively easily for both students and instructor.

O12.13

1:40 EDUCATING SECONDARY SCHOOL STUDENTS IN RECOGNITION OF VENOMOUS SNAKES NATIVE TO NORTHEAST MISSISSIPPI

Johnny Mattox, Brad Pressley
Blue Mountain College

In a continuing effort to educate secondary students of Northeast Mississippi in conservation of native snake species, the Department of Natural Sciences of Blue Mountain College presents programs emphasizing the recognition of three venomous snake species found in Northeast Mississippi. Specimens of these three species are presented at the secondary school programs along with several nonvenomous native species. The three species characterized include the southern copperhead, *Agkistrodon contortrix*, the cottonmouth, *Agkistrodon piscivorus*, and the timber rattlesnake, *Crotalus horridus*. A discussion is presented emphasizing the important role these organisms play in the ecosystems of nature and the degree of mistreatment that they endure. Since the species presented are all pit vipers, emphasis is placed on recognition of the pits or heat-sensitive organs they exhibit, along with the elliptical pupils of the eyes, and the possession of fangs for administration of venom.

O12.14

2:00 USING THE MINI-SESSION COURSE FORMAT TO TRAIN STUDENTS IN THE USE OF MODERN MASS SPECTROMETRY TECHNIQUES

Douglas Masterson, Dale Rosado, Tina Masterson
University of Southern Mississippi

We have made use of the mini-session course format at USM to train students in the use of ESI and MALDI mass spectrometry. Many universities and colleges simply can not afford to hire full time technical staff to train students in the use and power of modern mass spectrometry instrumentation. To resolve this issue at USM we have utilized the mini-session course format and developed a hands-on course designed to familiarize students with the instrumentation

available in our facilities. The course has a duration of one week and meets for eight hours each day. The course has three components: 1) a short lecture component of ~ 2 hours each day to discuss the theory of the days topic, 2) a hands-on component where the students perform laboratory exercises on both the ESI and MALDI instruments, and 3) a project component where the student conducts a small project relevant to their thesis research during the subsequent semester. We will illustrate how we have utilized this format to train students and obtain useful scientific information for our research endeavours. We have been able to obtain data in this course which has found use in our published works illustrating the impact of such a course on both training and data gathering.

O12.15

2:20 THEME-BASED INSTRUCTION: MAKING CONCEPTUAL TIES WITH THE SICKLE CELL STORY

Sherry Herron, John Parr
University of Southern Mississippi

Material concerning sickle cell disease (SCD) was compiled and used in the development of a thematic unit for an undergraduate biology laboratory. Historically accepted teaching materials and other resources concerning the fields of bioinformatics and proteomics were used in the creation of the aforementioned course. It was later determined that other educators might find the sickle cell story useful in the coverage of multiple pedagogical and conceptual benchmarks. While developing course materials, the presenters became familiar with the ubiquitous, oversimplified, and often obsolete presentation of SCD in textbooks. As a disease of many "firsts", SCD has been incorporated into biology curricula for decades, but cartoon-like illustrations fail to communicate the vast amount of information that can be associated with the disorder. SCD offers introductory biology teachers at the secondary and college levels a valuable conduit for exploring fundamental topics ranging from cell structure to bioethics. From the previously described material, a workshop intended to display the benefits of the sickle cell story was developed. To evaluate the effectiveness of this workshop, the opinions of the currently practicing educators who attended were obtained and evaluated. Qualitative data revealed that the meeting provided valuable information and experiences. Teachers left with a greater understanding of sickle cell disease and how it can be incorporated into the biology classroom.

O12.16**2:40 SUMMER INSTITUTE FOR K-12 TEACHERS EMPHASIZING TECHNOLOGY ASSIMILATION IN SCIENCE CLASSROOM**

Babu Patlolla¹, Jan Duncan¹, Leroy Johnson¹, Latrona Gayten², Pamela Davis², Orisha Brown³
¹Alcorn State University, ²Alexander Junior High School, Brookhaven, MS, ³Jefferson County Junior High School, Fayette, MS

Department of Biological Sciences and Department of Education at Alcorn State University hosted a four-week summer institute for 18 in service teachers from surrounding school districts from July 1-29, 2009. Activities included technology integration (using podcast, Web-page design, Interactive science software programs), molecular biology techniques (DNA extraction, gel electrophoresis, Restriction enzymes, PCR) and teaching methods (critical thinking, team building, problem solving). Participants also visited NASA Stennis Space Center and Gulf Coast Research Laboratory in Biloxi, Museum of Natural Science and University of Mississippi Medical Center in Jackson. Two follow-up sessions will be held in the next academic year to discuss the implementation of the learned techniques at their local schools. Each participant received stipend, 2GB flash drives, school supplies and science software to take back to their schools and use in their classroom. Participants enjoyed the institute and were excited to share their new knowledge with their colleagues and students. (This project was funded by Mississippi Institutions of Higher Learning through No Child Left Behind Summer Institute for Teachers # 2009-131E)

Division Poster Session**Exhibit Hall C****3:00p-4:00p****Posters may be set up starting at 1:30p****P12.01****DR. ERVIN G. OTVOS AND THE HISTORY OF GEOLOGICAL RESEARCH AT THE GULF COAST RESEARCH LABORATORY**

Kodi C. Charbonnet¹, Madeline Trier-Rourke², Oliver S. Kuttner², Joyce M. Shaw²

¹Cooperative Internship Program between Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, Gautier, ²University of Southern Mississippi—Gulf Coast Research Laboratory, Gunter Library, ³The National Aeronautics and Space Administration, Stennis Space Center

The Gunter Library at the Gulf Coast Research Laboratory collects and maintains archival materials

related to the history of the Gulf Coast Research Laboratory (GCRL), its faculty, staff, students, and programs. Significant among the materials are newspaper clippings, reports, photographs, and publications generated by researchers at GCRL. As part of a 14-year effort to document and preserve the history of the GCRL, the project focused on the work of Dr. Ervin G. Otvos of Southern Mississippi Department of Coastal Sciences professor emeritus and the primary marine geologist the Gulf Coast Research Laboratory for over 30 years. Articles, reprints, geological guidebooks, newspaper clippings, and other historical materials were sorted and organized for preservation and conservation purposes. A list of Dr. Otvos' scientific publications was added to an existing bibliographic database. A poster was created for the 2010 Mississippi Academy of Sciences annual conference which highlighted Dr. Otvos' contributions to research, teaching, and service—including his work on the geology of Mississippi's barrier islands.

P12.02**PROCEDURES TO COMPLETE PHASE TWO IN RE-ESTABLISHMENT OF NOAA SCIENTIFIC LIBRARY AT THE NATIONAL MARINE FISHERIES SERVICE IN PASCAGOULA**

Ryan Mains¹, Ashley Seawright¹, LaGena Fantroy²
¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²The National Oceanic and Atmospheric Administration-National Marine Fisheries Service, Pascagoula, ³The National Aeronautics and Space Administration, Stennis Space Center

The purpose of this project was to re-establish a special library collection that supports the Mississippi research laboratories of the National Oceanic and Atmospheric Administration. This special collection is dedicated to protecting and preserving the nation's living marine resources by supporting scientific research staff within the state of Mississippi. In 2005, *Hurricane Katrina* destroyed a large portion of the Library's inventory. Roughly, 80% of the current collection was donated from libraries worldwide, as well as from many scientists' personal collections. Phase Two of the re-establishment of NOAA's scientific library consisted of evaluating and reducing the donated and salvaged material in preparation for reopening. Methods and procedures were developed to assist in the process. Phase Two concluded with all available materials being transferred from temporary locations and being shelved accordingly at the new NOAA facility where these resources will aid in future scientific research.

P12.03

INFORMING THIRD GRADE STUDENTS OF ENVIRONMENTAL ISSUES FOCUSING ON RECYCLING AND POLLUTION

Kelsey Hinkel¹, Anja Comerford²

¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier,* ²*The Ocean Springs School District, Magnolia Park Elementary School,* ³*The National Aeronautics and Space Administration, Stennis Space Center*

The primary objective of this effort was to inform third grade students of environmental issues such as recycling and pollution. This project was designed based on students' interest and level of understanding. The information was relayed to the students through the use of planned activities such as art projects, making recycled paper, and weekly lessons, approximately one hour, in duration. The lesson plans were maintained on file and were referenced for future lessons concerning the environmental topic.

P12.04

CHEMICAL FUN: INSTRUCTION OF GIFTED STUDENTS AT OAK PARK ELEMENTARY SCHOOL

Mandy Miller¹, Roma Flowers²

¹*Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier,* ²*The Ocean Springs School District-Oak Park Elementary School,* ³*The National Aeronautics and Space Administration, Stennis Space Center*

The purpose of this project was to instill appreciation and knowledge of the sciences, with a focus on chemistry, in the minds of second and fourth graders enrolled in the gifted program at Oak Park Elementary School in Ocean Springs. The project consisted of three smaller projects designed to capture the students' interest and provide a hands-on learning experience. Each of the three projects was tailored to fit the grade level of the students. Prior to the experiments, students took a pretest to document their previous knowledge of the topic. Upon the completion of the experiment, students were administered posttests to measure their increase in content knowledge. The first project illustrated the concept of acids and bases using cabbage as an indicator of the pH of various substances. The second project illustrated the principle of density using water and various objects. For the final project, students participated in Mole Day, a nation-wide event that took place on October 23, 2009. Mole day is celebrated in honor of Amadeo Avogadro and is designed to create interest in chemistry.

P12.05

DELTA STATE UNIVERSITY PROFESSORS HELP BOLIVAR COUNTY 4-HERS CONSTRUCT A BUTTERFLY/BEE GARDEN

Nina Baghai-Riding¹, Eric Blackwell¹, Malcolm McEwen¹, 'Buzzin' Garden' Group, Bolivar County 4-H²

¹*Delta State University,* ²*Bolivar County 4-H*

Butterflies and bees are important as pollinators and are critical to human health and ecosystem vitality. Many species of butterflies and honeybees, however, have been declining in recent years. Contributing factors may include insecticides use, introduction of invasive species, urban growth, and climate change. To help re-establish populations of these beneficial insects, Bolivar County 4-Hers created a butterfly and bee garden as this year's Community Pride Grant project. This project made 4-Hers aware of insect and plant interactions. The garden was built at the Delta State University Center for Science and Environmental Education (CSEE) in Merigold. 4-Hers selected various seeds, bulbs, and potted plants that would attract butterflies and bees including zinnias, verbenas, salvia, bee balms, rudbeckia, echinacea, and day lilies. Bolivar County 4-Hers conducted six butterfly surveys from February - August, 2009 at CSEE. By using field guides and handouts, 4-Hers identified eleven assorted species of butterflies. The same students participated and remarked on significant changes they observed: 1) residential species including the Clouded/Common Sulfur (*Colias philodice*), Acmon Blue (*Plebejus acmon*), Hackberry (*Asterocampa celtis*), Buckeye (*Junonia coenia*) were present throughout the year and 2) migratory species including the Giant Swallowtail (*Papilio cresphontes*) and Monarch (*Danaus plexippus*) were only sighted in late August. To enhance their conservation efforts, 4-Hers were taught the anatomy of flowers, life-cycle of butterflies, how to differentiate a moth from a butterfly, and how honey and bee wax are made.

P12.06

REBELS IN PHYSICS CLASSES

Christopher Sirola

University of Southern Mississippi

One of the current major movements in physics education is to place students together in structured groups in order to promote learning. However, not all students wish to work in such an environment, nor necessarily agree with the decisions of their respective groups. By way of cooperative group activities in college-level introductory physics classes, we examine the fraction of students that "rebel" against



their respective groups, and look at which students are most likely to rebel. Finally, does it pay to rebel?

P12.07

INFORMATION TECHNOLOGY EXPERIENCES FOR STUDENTS AND TEACHERS USING CATFISH AND THEIR ENVIRONMENT AS A MODEL

Louis Hall, Mack Felton, Abigail Newsome
Mississippi Valley State University

This project proposed to stimulate interest in STEM disciplines while improving student outcomes. Students and teachers were divided into cohorts to improve science test scores of ninth and sixth grade students while enhancing teacher effectiveness. A model, indigenous to the area, catfish farming, was used. The goals included: increase the use of information technology, increase the availability of technology based instructions, increase teacher capabilities for technology based learning and improve students' performance in science and mathematics. This study attempted to create a model that could exploit inquiry learning methods using a hands-on approach. Participants were exposed to selected topics: Algae, ELISA, Herbicides and Pesticides, Temperature and Disease Correlation, Microbiology, Computer Science and Careers in Science, Technology, Engineering, and Mathematics. Competencies from the Mississippi Science Framework were covered including: Utilizing critical thinking and scientific problem solving in designing and performing biological research, investigating the biochemical basis of life, investigating the transfer of energy, investigating the principles, mechanisms, and methodology of classical and molecular genetics, and investigating the interdependence and interactions that occur within an ecosystem. The Average/Mean of % change was 46.06 and 13.16 respectively for sixth and ninth grade students. The standard deviation of % change was 39.14 and 23.51 respectively. The range of % change was 188 for the sixth graders and 98 for the ninth graders. These data indicates that intensive hands on inquiry learning can improve test scores.

ZOOLOGY

Chair: Julius Ikenga, Mississippi Valley State University

Vice-chair: Alex Acholonu, Alcorn State University

THURSDAY MORNING Conference Room

Malaria in Africa Symposium

O13.01

9:00 TRENDS ON THE PREVALENCE OF MALARIA IN NIGERIA

Alex Acholonu, DeMore Patrick
Alcorn State University

Malaria is the leading cause of morbidity and mortality in Nigeria. It is actually believed to be the number one killer, far surpassing HIV/AIDS. The most prevalent species which causes malignant tertian malaria is *Plasmodium falciparum*. It is believed to account for about 90% of malaria infections in the country. Mostly the victims of malaria are young children and pregnant women. Malaria in pregnancy is the leading cause of maternal anemia and low-birth weight babies. Malaria is one of the major tropical diseases both in Nigeria and other countries south of the Sahara. At present efforts are being made globally to control or eradicate it. The purpose of this paper is to assess the trends of malaria in Nigeria. A review of available literature shows that malaria is still a problem of concern in Nigeria. The mounted control measures of getting people to use mosquito nets in their homes appears to be having some favorable impact in the prevalence of malaria in the country. It is reported that in Nigeria, about 14% of the people used mosquito nets in 2006. In 2008, the number increased to 21%. This gives signs of hope for successfully battling malaria and exterminating it in the future.

O13.02

9:15 TRENDS ON THE PREVALENCE OF MALARIA IN KENYA

Alex Acholonu, Jerilyn Owens
Alcorn State University

Malaria is a vector-borne infectious disease caused by a eukaryotic protist of the genus *Plasmodium*. People get malaria by being bitten by any an infected female *Anopheles* mosquito. The parasites multiply within red blood cells, causing symptoms such as light-headedness, shortness of breath, tachycardia, as well as other general symptoms such as fever, chills,

nausea, flu-like illness, and in some cases causes coma and death. In human malaria is caused by four major species of *Plasmodium* but like in various East African Countries, *Plasmodium falciparum* is the most prevalent and virulent. The purpose of this study is to determine the trends in the occurrence of malaria in Kenya. A review of literature shows that malaria is still a health problem in Kenya. Kenya has hilly areas. It is believed that in the high-altitude zone of western Kenya malaria has seasonal distribution. Malaria is usually more in children than adults. Like other countries in east Africa, there is high prevalence of malaria especially with respect to *Plasmodium falciparum*. It is stated in a study that in the arid areas of northeastern Kenya, where a major malaria epidemic occurred in 1998, more adults were infected. In general, malaria is still a health problem to be reckoned with and its occurrence appears to be seasonal and ecological.

O13.03

9:30 SYMPOSIUM ON MALARIA IN AFRICA: TRENDS ON THE PREVALENCE OF MALARIA IN GHANA

Alexander Acholonu, LaTanya Smith

Alcorn State University

Malaria is one of the most prevalent diseases in Sub-Saharan Africa, which includes Ghana, located in West Africa. Malaria is caused by a protozoan parasite in the genus *Plasmodium*. Of the species that infect human beings, *Plasmodium falciparum* is the most prevalent in Ghana and the most pathogenic. The purpose of this study is to find out if malaria in Ghana is increasing or abating. Available literature reveals that a lot of prevalence studies, among others, have been conducted on malaria in Ghana. Also several control measures have been taken in the past but to no appreciable progress. So malaria continues to be a concern in Ghana. But a recent report states that malaria prevalence in Ghana was declining. This was believed to be as a result of the launching of a Cuban-Ghanaian Project, which brought a decrease in prevalence by 62.2% in Ghana's Accra metropolis during a 10-month period following the implementation of the project. It is surmised that Ghana will achieve an 80% reduction of malaria "in the next 2 years". With this kind of information, it can be said that the prevalence of malaria in Ghana is waning. It is hoped that the Cuban-Ghanaian Project will achieve the desired goal of reducing the prevalence of malaria in Ghana significantly.

O13.04

9:45 TRENDS ON THE PREVALENCE OF MALARIA IN ZAMBIA

Alex Acholonu

Alcorn State University

Malaria is endemic in all nine provinces in Zambia. The public health burden posed by this disease especially *Plasmodium falciparum* malaria in Zambia as well as other sub-Saharan African countries is common knowledge. The health consequences include morbidity, mortality and disability. The purpose of this study is to assess the trend of malaria in Zambia located in southern Africa. Nationwide surveillance of malaria prevalence is key to monitoring the changing epidemiology of malaria in countries with the will to scale up coverage of malaria interventions. Available literature shows that the government of Zambia has made malaria prevention and control a national priority and is bent on reducing the burden of this disease on its people. Zambia has made noticeable progress in its fight to control malaria. This is evident by results from the country's 2008 malaria indicator survey (MIS). It is reported that in only two years, malaria parasite prevalence in children under five years has been reduced by 54% and severe anemia has been reduced by 69%. It is also reported that since 2000, malaria infection and illness in this very group have decreased substantially and the mortality rate for children under age five has dropped by 29%. Zambia is setting an impressive standard for malaria control and prevention and needs to be emulated by other countries in southern Africa and other regions.

10:00 Break

O13.05

10:15 OBSERVATIONS ON THE DIGENEAN PARASITES (PLATYHEMENTHES) UTILIZING *AMINICOLA LIMOSA* AND *LITTORINDINOPS PALUSTRIS* (GASTROPODA: HYDROBIIDAE) AS INTERMEDIATE HOSTS IN TIDAL OLIGOHALINE AND FRESHWATER HABITATS OF THE LOWER PASCAGOULA RIVER SYSTEM

Brian T. Goff¹, Stephen S. Curran², Richard W. Heard²

¹Cooperative Intern Program between Mississippi Gulf Coast Community College County Campus Honors Biology Students, Gautier, ²The Gulf Coast Research Laboratory, University of Southern Mississippi, ³The National Aeronautics and Space Administration, Stennis Space Center

During September and October 2009, observations were made on the larval forms of digenean parasites infecting two sympatric species of hydrobiid snails, *Aminicola limosa* and *Littoridinops palustris*.

Potential hydrobiid hosts were collected in the field using a fine mesh (0.5mm) net from submerged aquatic vegetation and bottom sediments in tidal freshwater habitats of the lower Pascagoula River System County. Adult specimens of both gastropod species were isolated and/or dissected to determine the presence of digenean asexual stages [i.e., sporocysts, rediae, and larval stages (i.e., cercariae, metacercariae)]. The results of our study confirm the presence of eight different digenean species, belonging to six different families. *Littoridinops palustris* serves as the first and/or second intermediate host for six different digeneans: *Barbulostomum cupuloris* (Apocreadidae) [asexual, cercarial, & metacercarial stages], *Thometrema lotzi* (Derogenidae) [asexual & mesocercarial infective stages], *Notocotylus* sp. (Notocotylidae) [asexual stages producing cercaria & metacercarial stages], a fish blood fluke (Aporocotylidae) [asexual stages producing cercariae], and *Ascocotyle* sp. and *Phagicola* sp. (Heterophyidae) [asexual stages producing cercaria]. *Amicola limosa* was observed shedding the cercariae of a small vergulate distome cercaria [Lecithodendriidae or Prosthogonimidae] and a large plain-tailed, distome type [Family unknown], which was observed encysting on hard surfaces (e.g., on bottom of glass dishes). Also, the metacercariae of *B. cupuloris* occurred in the tissues of *A. limosa* thus making it the only digenean observed infecting both snail species. The eight different deigning found in this study represent new occurrence records in their gastropod hosts.

O13.06

10:30 ASSESSMENT OF POLLUTANTS IN THE LOWER MISSISSIPPI RIVER IN THE AREA OF PORT GIBSON

Alex Acholonu and Amber Brown

Alcorn State University

Water quality is closely associated with the surrounding environment and land use. It can be affected by community uses such as agricultural, urban, and industrial use and use for transportation of goods and recreation. The Mississippi River is the longest river with a length of 2,320 miles (3,730km) from its source in Lake Itasca in the Gulf of Mexico. This study was initiated to determine the presence of pollutants in the Mississippi River and to find out if the river meets the Water Quality Criteria of Mississippi (MSWQC). During the month of September (Summer) and October 2009 (Fall), water samples were collected from three different sites from the Mississippi River in the Port Gibson area and in three replicates at one week intervals. The samples were taken to the laboratory and were tested according to the methods indicated in the

LaMotte Water Pollutants Detection Kits. There were ten parameters tested and the average readings recorded. Based on the results, the Mississippi River met the MS Water Quality Criteria of Mississippi with the exception of carbon dioxide, chloride, and phosphate.

O13.07

10:45 ASSESSMENT OF WATER SAMPLES COLLECTED FROM THE DEEP WATERS OF THE MISSISSIPPI RIVER IN THE AREA OF VICKSBURG

Alex Acholonu and Rachae' Martin

Alcorn State University

Is the water safe for drinking? Can fish and other aquatic life thrive in streams and lakes that are affected by human activities? What is the water quality? Water quality can be thought of as a measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics. The purpose of this study was to determine the presence of pollutants in the deep waters of the lower Mississippi River in the area of Vicksburg and to find out if the river meets the Mississippi Water Quality Criteria (MSWQC). On October 1, 2009, the Ecology Class of Alcorn State University went on an ecological tour of the Mississippi River. Water samples were collected at three different sites, about one hundred meters apart. They were taken to the laboratory and tested according to the directions of the manufactures of LaMotte pollution test kits. The chemical parameters tested and recorded in parts per million (ppm) were alkalinity, ammonia-nitrogen, carbon dioxide, chlorine, dissolved oxygen, water hardness, nitrate, pH, phosphate, sulfate, and sulfide. To assess the microbial content, coliform and *Escherichia coli* tests were performed. The results were recorded, analyzed and compared with the Mississippi Water Quality Criteria. Based on the results, the Mississippi River met the Mississippi Water Quality Criteria with the exception of, carbon dioxide, water hardness and phosphate. Also, coliform and *Escherichia coli* levels in the River were above minimum level. This investigation adds to the previous studies conducted on the Lower Mississippi River.

11:00 Break

O13.08

11:15 SEASONAL DISTRIBUTION OF CONTAMINANTS IN THE YAZOO RIVER IN YAZOO CITY

Alex Acholonu and Meosha Eubanks

Alcorn State University

The Yazoo River is one of the tributaries of the Mississippi River. It starts from the west central area of Greenville and flows approximately 190 miles southwest to drain into the Mississippi River, in the Vicksburg Area. The purpose of this study was to obtain seasonal distribution of pollutants in the Yazoo River and compare it with previous studies. It is also to find out if it meets the Mississippi Water Quality Criteria (MSWQC). During the months of May 2008 to July 2009 water samples were collected from different locations from the Yazoo River in Yazoo City at about fifty meters apart. The samples were taken to the laboratory at Alcorn State University and tested according to the methods of the LaMotte Water pollution detection kits. Seventeen different parameters were tested and the average readings were taken, recorded, and analyzed. The data obtained were next compared with the findings of previous investigations and with the Mississippi Water Quality Criteria. The carbon dioxide, hardness, nitrate, iron, and pH exceeded those of the previous studies and the MWQC.

In the winter, calcium, hardness, iron, and phosphate pollutants exceeded the MWQC as well. The summer and fall seasons produced the lowest concentrations with respect to ammonia-nitrogen and zinc. During the fall, winter, spring, and summer seasons silica concentration was low and thus met the MWQC. Based on the results overall obtained from this study, ten out of seventeen parameters exceeded the MWQC and gives cause for concern.

O13.09

11:30 A REVIEW OF THE VERTEBRATE FOSSIL RECORD FROM LATE PLEISTOCENE ("ICE AGE") DEPOSITS IN MISSISSIPPI

George Phillips¹, John Kaye², John Connaway³

¹Mississippi Museum of Natural Science, ²Mississippi State University, ³Mississippi Department of Archives & History

Although very fragmentary and incomplete, the Late Pleistocene vertebrate fossil record in Mississippi is rich and diverse, amounting to at least 95 terrestrial and freshwater species. Two physiographic regions within the state produce this diversity-the Black Prairie belt in the northeast quarter of the state and the Lower Mississippi River Valley, including the Loess Hills. The species diversity within these two regions includes 10 bony fish, 3 anurans, 15 chelonians, 4 large birds, and 58 different mammals. The turtle

composition includes two recent cool temperate extralimnals (*Emydoidea* and *Glyptemys*) and two warm temperate tortoises (*Hesperotestudo* and *Gopherus*). The avian composition includes the turkey (*Meleagris*) and three aquatics (*Anas*, *Branta*, and *Ardea*). The mammals include 13 small rodents, 7 felines, 4-5 canines, 3 bears, 4 deer, 2-3 species of horse, and the earliest Americans. The taxonomic composition is not identical between the Black Prairie (BP) and Mississippi River-Loess Hills regions (ML); there are important noteworthy biogeographic differences. Like the distribution of their living counterparts, Late Pleistocene map turtle (*Graptemys*) fossils of the *pulchra*-group are found in the BP and those of the non-*pulchra* group (e.g. *geographica* and *pseudogeographica*) in the ML. The extinct American lion (*Panthera atrox*) and jaguar (*P. onca*) are found in the ML but not the BP. The musk ox (*Bootherium*) and the stag-moose (*Cervalces*) are also present in the ML but not the BP. Perhaps more a function of habitat preservational bias, alligator, large aquatic birds, and large fish are rare to nonexistent in the BP.

11:45 Division Business Meeting

FRIDAY AFTERNOON Lamar 2

TICK AND TICK-BORNE DISEASES SYMPOSIUM

Organizer: Shahid Karim, University of Southern Mississippi

1.00 Introduction

1.05 TARGETING THE DISEASE VECTOR IN POST-GENOMIC ERA

Shahid Karim, *University of Southern Mississippi*

1.30 EVIDENCE OF TICK-BORNE DISEASE AGENTS IN TICKS AND (OTHER) ANIMALS FROM MISSISSIPPI

Andrea Varela-Stokes, *Mississippi State University*

1.55 FROM FOOTNOTE TO FOREFRONT: THE RECOGNITION OF RICKETTSIA PARKERI RICKETTSIOSIS IN THE WESTERN HEMISPHERE

Christopher Paddock, *Center for Disease Control*

2.20 DETERMINANTS FOR TICK TRANSMISSION OF RICKETTSIA

Kevin Macaluso, *Louisiana State University*

2.45 Break

3.00 TICK-BORNE DISEASES IN MISSISSIPPI

Thomas Dobbs, *Mississippi Health*

3.25 INFLAMMATION IN LYME DISEASE

Mario Philip, *Tulane University*

O13.10

3.50 DISTRIBUTION OF *RICKETTSIA PARKERI* IN SELECT TISSUES OF EXPERIMENTALLY-INFECTED AND FIELD-COLLECTED GULF COAST TICKS (*AMBLYOMMA MACULATUM*)

Kristine Edwards, Jerome Goddard, Andrea Varela-Stokes

Mississippi State University

O13.11

4.05 MOLECULAR CHARACTERIZATION OF THE GULF COAST TICK, *AMBLYOMMA MACULATUM* (ACARI: IXODIDAE) SALIVARY SECRETORY GENES

Parul Singh, Shahid Karim

University of Southern Mississippi

O13.12

4.20 THE ROLE OF SMALL ANIMALS IN THE NATURAL HISTORY OF *RICKETTSIA PARKERI*

Gail Moraru, Jerome Goddard, Andrea Varela-Stokes

Mississippi State University

O13.13

4.35 DETECTION OF *RICKETTSIA PARKERI* IN THE GULF COAST TICK, *AMBLYOMMA MACULATUM* KOCH, IN MISSISSIPPI

Flavia Girao, Jerome Goddard, Andrea Varela-Stokes

Mississippi State University

4.50-5.00 pm: Concluding remarks

Tick Symposium Abstracts:

O13.10

DISTRIBUTION OF *RICKETTSIA PARKERI* IN SELECT TISSUES OF EXPERIMENTALLY-INFECTED AND FIELD-COLLECTED GULF COAST TICKS (*AMBLYOMMA MACULATUM*)

Kristine Edwards, Jerome Goddard, Andrea Varela-Stokes

Mississippi State University

Salivary glands, midgut, Malpighian tubules, and ovaries were dissected from reared *Amblyomma maculatum* (Gulf Coast ticks) injected with either *Rickettsia parkeri* or phosphate-buffered saline (PBS); similar tissues were dissected from hemolymph-

positive, field-collected ticks. All ticks were analyzed by indirect-fluorescent antibody (IFA). The PBS-injected ticks were IFA negative while spotted fever group (SFG) rickettsiae were detected by IFA in 100% of the salivary glands and ovaries and 78% and 75% of midgut and Malpighian tubules, respectively of *R. parkeri*-injected ticks. Nearly 22% (10/46) of the field-collected ticks were hemolymph positive. Of those, SFG rickettsiae were detected by IFA in 80% of the salivary glands, 67% of the ovaries and 60% in the midgut and Malpighian tubules. This is the first study to assess the distribution of *R. parkeri* in select tissues in *A. maculatum* ticks.

O13.11

MOLECULAR CHARACTERIZATION OF THE GULF COAST TICK, *AMBLYOMMA MACULATUM* (ACARI: IXODIDAE) SALIVARY SECRETORY GENES

Parul Singh, Shahid Karim

University of Southern Mississippi

Arthropod-borne diseases are significant public health concerns worldwide. Ticks are obligate ecto-parasites that rank second only to mosquitoes as vectors of infectious agents to humans. Tick-borne infectious diseases are caused by a heterogeneous array of organisms, including rickettsiae, ehrlichiae, spirochetes, tularemia, other bacteria, viruses and protozoa. Tick salivary glands serve as the organ of osmoregulation in ticks and are critical to the biological success of ticks both during extended periods off the host and also during the feeding periods on the host. The salivary glands are the sites of pathogen development and saliva is the route of transmission. Tick saliva has a plethora of pharmacologically active components with anti-complement, anti-inflammatory and anti-histaminic activities as well as a variety of other factors that inhibit the host immune response. The Gulf Coast tick (*Amblyomma maculatum*) is a hard tick found in coastal areas of southern United States. *Rickettsia parkeri*, a member of the spotted fever group rickettsiae, is transmitted by this tick species to humans. We developed transcriptome profiles of the Gulf Coast tick (*Amblyomma maculatum*) by constructing normalized complementary DNA libraries from unfed and partially fed salivary glands. We randomly sequenced 1000 clones of each normalized cDNA libraries and annotated all the newly identified ESTs. We further investigated the physiological role of newly identified secretory salivary genes in tick feeding using RNA interference. A detailed transcriptomic and RNA interference results will be discussed.

O13.12

THE ROLE OF SMALL ANIMALS IN THE NATURAL HISTORY OF RICKETTSIA PARKERI

Gail Moraru, Jerome Goddard, Andrea Varela-Stokes
Mississippi State University

The Gulf Coast tick, *Amblyomma maculatum*, is the vector of the pathogenic bacterium, *Rickettsia parkeri*; however, the natural history of *R. parkeri* in the Gulf Coast tick is poorly understood. In a study of *A. maculatum* host preference, larvae or nymphs were given a choice of host, among anoles, cotton rats, and quail; we recorded the number of engorged ticks from each host. To evaluate feeding success, we placed ticks directly on each animal and allowed them to feed until engorged. We recorded the number that engorged, successfully molted, and weights of engorged nymphs. To study *R. parkeri* infection, four quail and four rats were injected with organism; one of each species received uninfected media as a control. We collected blood samples during the study to test for antibodies and rickettsial DNA; we also put larvae and later, nymphs on the animals to evaluate acquisition of organism by ticks.

Because numbers were so low, no significant difference in host preference between quail and rats could be seen. More engorged ticks were recovered from quail in the feeding success study, but those from rats weighed significantly more. We found no ticks that fed successfully on anoles, thus, anoles were not used in the infection study. Both quail and rats exposed to *R. parkeri* seroconverted by day post-infection 11, but none became rickettsemic. These results support a role for quail and rats in the natural history of *R. parkeri*, but the true extent of their role is still unclear.

O13.13

DETECTION OF RICKETTSIA PARKERI IN THE GULF COAST TICK, AMBLYOMMA MACULATUM KOCH, IN MISSISSIPPI

Flavia Girao, Jerome Goddard, Andrea Varela-Stokes
Mississippi State University

Amblyomma maculatum Koch is currently reported in most of the southern United States. *A. maculatum* vectors *Rickettsia parkeri*, a recently recognized human pathogen. Reports of *R. parkeri* infection in humans described an eschar at the bite site, fever, fatigue, headaches, muscle pain and generalized rash typically a week after the tick bite. In this study, adult Gulf Coast ticks were collected from nine sites in Mississippi from July to September of 2008 and 2009. The objective was to determine the percent of Gulf Coast ticks carrying *R. parkeri* in Mississippi. We extracted DNA from the 350 ticks collected in 2008 and 194 in 2009, a total of 544 ticks encountered in

Mississippi. A 300-bp region of the tick mitochondrial 16S ribosomal RNA gene and a 540-bp region of the gene for rickettsial outer-membrane protein A were amplified by nested PCR. Tick DNA was successfully amplified for 349 ticks collected in 2008 (99.7%) and 71 ticks (20.34%) were positive for *Rickettsia* spp. DNA has been extracted from ticks collected in 2009 and PCR analysis is currently in progress. Although this tick may carry an endosymbiont, the majority of positive samples are suspected to be *R. parkeri* until sequencing, due to its higher prevalence in these ticks, compared to the endosymbiont. Physicians and health authorities should be aware of *R. parkeri* and include it in differential diagnosis for a patient presenting the above symptoms. Further study is needed to better understanding of the ecology and epidemiology of this vector and *Rickettsia parkeri*.

Index of Authors

Key to Index:

O = Oral Presentation

P = Poster Presentation

1st number is Division

- | | |
|----|--|
| 1 | Agriculture and Plant Science (pages, |
| 2 | Cellular, Molecular, and Developmental Biology |
| 3 | Chemistry and Chemical Engineering |
| 4 | Ecology and Evolutionary Biology |
| 5 | Geology and Geography |
| 6 | Health Sciences |
| 7 | History and Philosophy of Science |
| 8 | Marine and Atmospheric Sciences |
| 9 | Mathematics, Computer Science, and Statistics |
| 10 | Physics and Engineering |
| 11 | Psychology and Social Sciences |
| 12 | Science Education |
| 13 | Zoology and Entomology |

2nd number is Abstract Number within oral presentations or poster session

Eg. O3.04 = oral presentation (O) number 4 in the division of Chemistry and Chemical Engineering (3)

		Ali, Mohammed	P10.03	P3.13, P3.14, P3.15, P6.19	
Abusara, Hazem	O10.14	Ali, Sarah A	O2.16	Atkins Howell, Tiffany	
Acholonu, Alex	O13.01,	Allgood, David	O4.06	P11.04	
O13.02, O13.03, O13.04,		Allred, Anna	O3.08	Atkins, Marchetta	
O13.06, O13.07, O13.08		Alm, Steve	O2.05	O9.08	
Adah, Felix	O6.08,	Amato, Lorie	O12.09	Aydin, Adnan	O5.12
P6.08		Ambinakudige, Shrinidhi		Ayyildiz, Enise	O10.26
Adams, Melissa	O2.07,	O5.09		Baggett, James	O12.08
P2.02		Ameera, Haamid	P3.05	Baghai-Riding, Nina	
Addae, Cynthia	P1.02	Anderson, LaShunda		P12.05	
Addison, Ebony	O9.15	O1.01		BAin, JL	P6.13
Aditya, Krishna	P9.05	Anderson, Marquissa		Baker, Austin	P3.20
Aditya, Madhu	P10.01,	P6.16, P6.36		Balamurugan, Kuppareddi	
P9.05		Angel, Laurence	P3.19, P3.22	O11.18, O11.19	
Afanasjev, Anatoli				Balof, Shawna	O3.14
O10.14		Apeitos, Angelos	O8.00	Banerjee, Souvik	O3.16
Afonso, Domingos		Arbneshi, Tahir	P3.11	Bardon-Albaret, Agnes	
O3.15		Archer, Lindsey	P11.13,	O8.00	
Agho, Noruwa N	P11.16	P11.14		Barnes, LaEsha	O4.07
Agyepong, Kwabena		Archie, Oriundria	P6.22	Barry, Tammy	P11.13,
O10.16		Arnau, Randolph	P11.06,	P11.14	
Ahmed, Hanaa	O3.13	P11.11, P11.20		Basco, Maria	O2.06
Albritton, Hannah		Arnau, Randolph C		Bass, Chancey	P2.08
P6.14		P11.12		Basuri, Charan Kumar	
Alford, Mac	O4.01	Arroyo, Norman	P1.07	P6.38	
Alford, Sarah	P11.02	Arslan, Zikri	O3.02,	Bateman, Andrew	
Ali, Laila	P2.06	O3.07, O3.15, O8.02, P3.12,		P3.02	

Bates, Eileen	O1.16	Bramlett, David	P9.02	Cannon, Gordon C	
Baxter, Lane	P6.01	Branch, Dewayne	O4.07	O2.01, O2.16, P2.03	
Baytak, Sitki	O3.02,	Brandon, Lauren	O2.03	Cartagena, Jose	O1.06
O3.15, P3.12, P3.13, P3.14,		Brick, Jousha	O12.07	Carter, Gregory	O5.07
P3.15		Brinkman, Katie	O2.27	Caskey, Curtis	P6.13
Beecham, Rachel	P8.07	Brodeur St-James, Marilyn		Cason, Zelma	P6.10, P6.31
Beeman, Rilondricks		P11.02, P11.03,			
O1.14		P11.04		Caston, Rhonda	P6.18
Bello, Abiodun	O1.11	Bronner, Jaunice	O3.19	Cetin, Hidayet	O10.26
Bender, Susan	O12.01,	Brooks, Mieu	O2.25	Chakraborty, Samuijwal	
O12.02		Brooks, Teonte	O2.14	O2.08, O2.26	
Benghuzzi, Ham	O6.08,	Browder, Jenna	P6.44	Chambliss, Aimie	P8.02
O6.09, O9.19, P6.09, P6.10,		Brown, Adell	O1.01	Charbonnet, Kodi C	
P6.16, P6.20, P6.21, P6.22,		Brown, Amber	O13.06	P12.01	
P6.23, P6.24, P6.28, P6.29,		Brown, Brittany	P6.26	Chen, Bang-Yuan	
P6.30, P6.31, P6.36, P6.41,		Brown, Orisha	O12.16	O1.05, O1.08	
P6.42, P6.43, P6.44, P6.46		Brown-Peterson, Nancy		Chen, Weiwei	P1.04
Benghuzzi, Hamed		O8.00		Choi, S	O10.15
		Brown, Shelia	O12.06	Christoff, Karen	P11.21
Bennett, Richard	O5.05	Brown, Shelia A	O12.07	Chu, Arthur	P6.15
Benny, S	P6.03	Brunson, Claude	P6.33	Chukwuma, Franklin	
B.E.N., Sanjeeva	P6.37	Buchanan, Aubri	O10.09	O1.17	
Bentley, Joseph	O3.17	Buchanan, Jennifer		Clark, Gabriella	P6.19, P6.25
Beroya, Mary	O5.12	O12.06			
Bertram, Dean	O11.18,	Buchanan, Randy	O10.24,	Clark, Kenosha	P6.20
O11.19		O10.25		Clarkson, Marguerite	
Berutti, Tracy	P4.05	Buchanon, Jonathan		O6.02	
Bhattacharya, Arun K		P2.11		Clary, Renee	O12.04,
O10.21		Buckley, Lecretia	O11.03	O12.05	
Biber, Patrick	O1.12,	Buie, Debra	O12.10	Colbert, Porsche	P11.22
O5.07		Bunch, David	O11.04	Coleman, Jenelle	P9.07
Bickle, John	O2.10	Bunkley, Steven	O10.25	Coleman, Kayla	O12.02
Biesiot, Patricia	P8.04	Burks, Arkon	O1.10	Cole, Robert	O1.01
Biswas, Parthapratim		Burks, Stephanie	P6.27	Cole, Shawn	P10.02
O10.20, O10.21, O10.22		Busby, Kenneth	P2.05	Collins, Margret	O1.16
Biswas, PK	P10.02	Butler, Katherine	O4.03	Comerford, Anja	P12.03
Black, David	P6.43	Butler, Kathy	O2.04	Connaway, John	O13.09
Black, Joshua	P6.14	Butler, Kenneth	O6.04,	Conway, Marianne	
Blackwell, Eric	P12.05	O6.05, P6.04, P6.05		P2.14	
Bland, Charles	P2.09,	Byrd, Charlotte	O5.08	Cooley, Rachelle	P4.05
P9.03, P9.04		Byrd, Sylvia	P6.06, P6.07	Corbitt, Melody	O1.03
Bland, Hilliary	O6.06			Corrao, Irene	O3.08
Blazek, Nicole	P11.06,	Cai, Fei	O2.16	County 4-H, Bolivar	
P11.11, P11.20		Cain, Antia	P1.06	P12.05	
Blazek, Nicole L	P11.12	Caldwell, Scott R	O1.12	Courtney, Shavelle	
Blossom, Gabriel	O5.07	Cameron, Joseph	P6.43	P6.41	
Boler, Patrick	O6.04,	Cameron, Joseph A		Cox, Lauren	P11.21
O6.05		P6.16, P6.19, P6.25, P6.34,		Criss, Alan	O5.07
Bolton, Michelle	P6.01	P6.35, P6.36		Crochet, Brad	O10.11
Booker, Justin	P6.39	Campbell, Jinx	P8.01, P8.02	Crossley, Davida	O2.29
Booz, George	O2.13			Crump, Cedric	P2.07
Borre', Donna F	P6.11	Campbell, Naomi	P2.08	Curran, Stephen S	
Boyarbay, Behiye		Candice, Perry	P3.11	O13.05	
O10.26		Cannon, Gordon	O2.02,	Curry, Ann	O5.05
Bradley, Emily	O1.13	O2.15, O2.28, P2.07		Curry, Kenneth J	O1.04,

O12.12, O5.05, O7.01, O7.08, O7.10, O7.11	Dykes, Keshia P2.08	Funchess, Karla P6.19, P6.25
Curry, Woods P3.17, P3.20	Edens, Kyle O11.04, O11.05	
	Edward. J, Valente P3.05	Funkhouser, J Lynn O11.16
Dai, Xiaolin P6.33	Edwards, Kristine O13.12	Gadewadikar, Jyotirmay O10.16, P10.04
Dampier, David O9.11	Elasri, Mohamed O2.09, O2.24, O2.25	Gayten, Latronda O12.16
Dancer, F Chevonne O9.11	Elasri, Mohamed O O2.06	Gearba, Alina O10.11
D'Angelo, William P2.04	Ellender, RD O2.20, O2.21	Ghosh, Preetam O9.03
Dao, Vy O11.01	Ellis, Jasmine P6.43	Giachelli, Linsey P3.01
Dasary, Samuel O3.19	Ellzey, Margaret P6.01	Gibson, Antonio O1.10
Dass, Amala O3.11, P3.19, P3.21, P3.22	Emerick, Nick P8.03	Girao, Flavia O13.10
Davis, D Kenneth O5.04	Empeakpor, Samson E O10.27	Goddard, Jerome O13.10, O13.12, O13.14
Davis, Heidi O11.15	England, Barry O6.08	Goel, Sameer P3.17
Davis, Kendrick P6.09	Epperson, William O6.07	Goff, Brian T O13.05
Davis, Pamela O12.16	Eriator, Ike P6.33	Gok, A O10.26
Davis, Stephen O11.12	Estep, Jasen P6.01	Golanov, Olga P6.28, P6.43
Deaton, Emily P6.14	Eubanks, Meosha O13.08	
DeJean, Jessica P8.04	Evans, Murphree P1.08	Gorla, Sireesha O9.13
Denton, Anne P1.05	Fairley, Thaddeus P9.08	Gouda, SP P6.39
DePew, Steve P1.08	Fantroy, LaGena P12.02	Graves, Candy P9.08
DeRussy, Bernadette O4.02	Farah, Ibrahim P6.19, P6.25, P6.45	Greenwald, Neva P6.08
DeSadier, Denise O11.02	Farrell, Sean P8.06	Griffith, Jerry O5.10
Devkota, Jagannath O10.22	Faruque, Shukla P6.41	Griffitt, Joe P8.05, P8.06
Devlin, Morgan O11.07	Felton, Mack P12.07, P2.16	
DeWeese, Dane P1.08	Finley, GeNita P3.17	Griffitt, Kimberly P4.03, P4.04
Dey, Kalpana Rani P3.08, P3.09	Fitzgerald, Michael J O7.07	
Dhar, Mallika O10.07, O10.08	Flegle, Lauren P11.21	Grimes, D. Jay P4.03, P4.04, P4.05
Dharmaratne, Asantha P3.21, P3.22	Fleming, John Andrew S O5.08	Gryn'ova, Ganna P3.07
Dillon, Megan P6.31	Fletcher, Amanda O3.19	Gundersen, Kjell O2.22
Dixon, David O3.04	Fletcher, Desmond O9.06	Gunter, Barak O2.13
Dixon, Travis O9.02	Flood, Christopher O2.20, O2.21	Guo, Laodong P8.08
do Carmo, Jussara O6.01	Flowers, Roma P12.04	Guo, Yan-Lin O2.08, O2.11, O2.26
Dockery III, David T O5.03	Floyd, Stephanie P6.17	Gwaltney, Steven O3.21
Dodge, Michael O7.09	Fountain, Brent P6.07	Haamid, Ameera P3.04
Dodla, Bhaskar Rao P8.09	Fox, Steven O5.12	Hajnal, Alen O11.05
Douglas, Jessica O5.05	Fronczek, Frank P3.04	Hall, Cedric O4.07
Doyle, Jeff J O2.14	Fronczek, Frank R P3.08	Hall, John O6.01
Duckworth, Allison O12.12	Fuller, William P6.23, P6.24	Hall, Louis P12.07, P2.16
Duhe, Roy O2.13		Hamadain, Elgenaid O9.19, P6.08
Duncan, Jan O12.16		Hammond, Michelle O11.11
Dyer, Christopher O7.03		Hammons, Jennifer O11.19
		Hanbury, David O11.04, O11.05
		Haney Foster, Brittany O5.07
		Hannah, Antonio P6.10

Haque, Amin	O10.17,	P3.09	
O10.19		Horton, Dorothy	O3.06
Haque, Zee	O1.07,	Horvat, Krunoslav	
O1.13		P10.04	
Hardy, Rebecca	P3.19	Hossain, Alamgir	P3.08, P3.13
Harmon-Pratte, Erika			
O2.03		Hossain, Md Alamgir	
Harrell, Andrew	O7.04,	O3.09, P3.07, P3.09, P3.10	
O7.06, O9.01			
Harris, James B	O5.08	Howard, Carolyn B	
Harris, Matthew	P6.01	P6.17	
Harte, Denisa	O12.10	Huang, Faqing	O2.11
Harvey, Amanda	O11.10	Igbokwe, Patrick	O1.09,
Hassan, Mohammad		O1.10, O1.14, O1.17	
O3.13		Ijaz, Qurat Ul Ann	
Haymer, Andre	P6.33	O10.14	
Heard, Richard W		Iliescu, Radu	P6.40
O13.05		Izevbigie, Ernest	P6.17
Hearn, Laura	P6.10	Jackson, Brittany	P3.10
Hedgar, Justin	P1.06	Jackson, Jacqueline	
Heifetz, Yael	O2.04,	O9.07	
O4.03		Jackson, Shannon	P6.34
Heinhorst, Sabine	O2.01,	Jackson, Virgil	O3.04
O2.02, O2.15, O2.16, O2.28,		Jacquín, Kristine	P11.01,
P2.03, P2.07		P11.02, P11.03, P11.04	
Henderson, Jonathan		Jawor, Jodie	P4.06
O9.14		Jayroe, David	O2.18
Henderson, Nicole		Jefferson, Alicia	P9.02
P2.16		Johnson, Courtney	
Hendrick, Jr., Ronald L		P10.03	
P4.02		Johnson, Crystal	P4.03, P4.04
Hendrix, Joan	O12.10		
Hendrixson, Brent		Johnson, Leroy	O12.16
O4.02		Johnson, Martha	P2.08
He, Qiang	P9.01	Johnson, Roger	P6.13
Herath, Chamini	O10.23	Johnson, Trevor	O1.12
Herrmann, Nicholas		Johnson, Ver Geshia	
O11.12		O3.17	
Herron, Sherry	O12.15	Jones, Angshylea	O12.02
Hester, Barbara	O11.09	Jones, Mark	O10.15
Hill, Alma	P6.06	Jones, Scott	O3.22
Hill, Devyn	O12.11	Jones, Stephanie	P6.24
Hill, Melanie	P1.01	Jones, Tabettha	O12.10
Hinkel, Kelsey	P12.03	Jordan, Jamessa	O9.04
Hinton, Daniel	O2.01	Joung, DongJoo	O8.04
Hoard, George	P6.09	Journey, Khriisaundra	
Hogan, Alison	P6.01	P10.05, P8.07	
Holder, Alvin	O3.06	Joyce, Kadarice	P9.08
Holder, Alvin A	O3.23	Jung, Yean-Sung	O1.05,
Holdiness, Amber		O1.08, O1.15, P1.03	
O6.04, O6.05		Kalluri, Jhansi	P3.11
Holt, David	P5.01	Kamenkovich, Vladimir	
Holton, Meagan	P6.14	O8.01	
Ho, Meng-Hsuan	P2.01	Kandula, Bharath	O10.03
Horne, Toyketa	O3.06,	Kanizay, Lisa	P1.01, P1.01
		Kar, Bandana	O5.02
		Karim, Shahid	O13.13,
		O2.05, P2.04, P2.05, P2.06	
		Kaya, Malik	O10.26
		Kaye, John	O13.09
		Kelley, Michele	P8.04
		Kelly, Melissa K	P11.19
		Kenduzler, Erdal	O3.07
		Ken. S, Lee	P3.05
		Khan, Sadia	P3.11
		Khan, Shaila	O11.06
		Kianian, S	P1.06
		Kianian, Shahryar	
		P1.05	
		Kidd, Jeannie	P3.24
		Kim, Taejo	O1.03,
		O1.05, O1.08, O1.15, P1.03,	
		P1.04, P1.07	
		Kingery, Billy	P1.08
		Kirk, Pia Chatterjee	
		P6.01	
		Kneitel, Jamie	O4.06
		Kramer, Wolfgang	
		O3.08, P3.17, P3.18, P3.20	
		Krick, Thomas	P3.21
		Krieser, Brian	O1.04
		Kuebler, Joy	P6.08
		Kuehn, Kevin	O4.06
		Kuljaca, Ognjen	O10.16,
		P10.04	
		Kumar, Amit	P3.02, P3.06
		Kumar, Eswara	P6.37
		Kumar, K Eswar	P6.39
		Kumar, Ravinder	O9.08
		Kumar, S Arun	P6.39
		Kunwar, Bidhya	P3.23
		Kuttner, Oliver S	P12.01
		Kux, Blair	P11.13,
		P11.14	
		LaMarca, Babbette	
		P2.13	
		LaMarca, Babette	P2.12
		Lanclos, Christopher	
		O9.12	
		Lantz, Brian	P6.44
		Lassiter, Brooke	P3.17
		Leachman, Lacey	P11.04
		Leal, Sandra	P2.10, P2.11
		Lea, Melissa A	P11.16,
		P11.17, P11.18	

LeCompte, Malcolm O4.07	O12.14, P3.03, O3.16	Menon, Balaraj B P2.03
Lee, Chiquita P1.05	Masterson, Tina O12.14	Merrill, David P2.11
Legg, Clare O11.04	Masters, Rebecca O6.02	Miao, Wujian O3.01, O3.05, O3.23
Leggett, Edward O10.12	Ma, Tangeng P6.33	Michael, Colby O12.01
Lemus, Jason O8.00	Matta, Frank O1.06, P1.04	Mikel, Benjy O1.07
Leszczynski, Jerzy P3.07	Matteo, Lauren P2.02	Milam, Jenifer O2.02
Lewis, Nerissa O3.06	Matthews, Anberitha O1.02	Miller-Butler, Melinda O1.04
Lewis, Veshell P6.45	Mattox, Johnny O12.03, O12.13	Miller, Mandy P12.04
Lidell, Shiela A P3.06	Matus, Myrna O3.04	Mills, Christopher O3.18
Ling, Yan O3.18	Maung, Khin O10.07, O10.08	Minor, Deborah O6.04, O6.05, P6.05
Lin, Peng P8.08	Mauritz, Kenneth O3.13	Mlsna, Todd O3.12, P3.23, P3.24
Liyanapatirana, Chamindu O3.21	Ma, Wenchao O10.14	Moffett, Erick O3.23
Li, Yao O8.06	Mawson, Anthony O6.04, O6.05	Moore, Jamaris O9.05
Lockhart, Kenneth P6.21	McAfee, Dalton O1.01	Moore, Mazzeran P6.23
Lott, Myron O9.09	McConn, Angela O12.10	Moore, Quincy P6.18
Lucas, Leroy P3.16	McCorkle, Samantha O2.27	Morales, Citlalin O12.07
Lu, Duanjun P8.09	McCormick, Charles O2.11	Moraru, Gail O13.14
Mack, Paul O2.04, O4.03	McCoy, Shaketia O9.10	Morgan, Jarrett O6.01, P6.14
MacQuoid, Amanda P11.01	McCrimmon, Scott O12.08	Morgan, Sara P3.06
Ma, Din-Pow P2.01	McDonald, Ambria P2.14	Mosley, Thomas P6.04
Maestri, Thomas O3.01	McDonald, Andrea O3.22	Muller, Sam P2.10
Mains, Ryan P12.02	McDonnell, Harris P8.05	Musselman, Zachary A O5.08
Majors, Lance P3.22	McDuffy, Wanaki P3.14	Musselwhite, Nicole O11.08
Manandhar, Erendra O3.23	McEwen, Malcolm P12.05	Naftel, JP P6.13
Manning, Melissa O6.02	McHenry, Melanie O3.07, O8.02	Nagarajan, Vijayaraj O2.09
Manriquez, Jessica O11.13	McKee, Vanessa O12.11	Naik, Sapna P6.14
Mapes, Kevin O12.07	McLean, Tim O2.18, O2.19	Namataka, Helen O2.19
Marcelin, Glendie O6.06	McMillan, Kimberly O12.06	Nash, Justin P6.03
Mario, Vaz P6.02	Mead, Lawrence R O10.18	NDukum, Luwani O10.15
Markovets, Aleksandra P9.03	Meadows, Angela P6.14	Nechaev, Dmitri O8.01, O8.03, O8.06
Marquart, Mary P2.15, P6.18	Meeks, Gabrielle P9.06	Neely, Adria P3.11
Marshall, Donna P1.04	Meghanathan, Natarajan O9.13, O9.15	Newsome, Abigail P12.07, P2.16
Martin, Ashley R P11.19	Mendy, John S P3.08	Newsome, Abigail S P2.07, P2.09, P9.03, P9.04
Martin, Barbara P11.22	Menon, Balaraj O2.02, O2.28	Newsom, Steven P8.01
Martin, Malachi O7.02		Nix, Maria P6.22
Martin, Rachae' O13.07		Norcross, Erin P6.18
Maruthy, K N P10.01		Noriea III, Nicholas P4.03
Masilla, Audrey P11.02, P11.04		Noriea, Nicholas P4.04
Mason, Tera P11.01, P11.03		Novotny, M A O10.05
Masterson, Douglas		Nyguen, Phuong P6.19

Obi, Chinwendu	O1.11	P6.02	Rush, Terrance	P6.26
Ochoa, Samuel	P11.06	Pressley, Brad O12.13	Russell, George	P6.08,
O'Driscoll, Kieran		Pudasaini, Pushpa Raj	P6.23, P6.24	
O8.01		O10.06	Russell, Jonathan	O12.08
Oguhebe, Anna	P2.15	Pulikanti, Radhakrishna	Rutland, Sarah	P2.12
O'Keeffe, Shawn	O9.06	O1.02, O1.11	Rytsareva, Inna	P9.04
Olaivar, Jason	O3.06	Purser, Christine P6.26	Saeed, Musabbir	P3.07,
Omweri, Keith	O5.09	Purvis, Victoria P3.20	P3.10, P3.13	
Orcutt, Karen	O2.22,	Pyla, Rajkumar O1.05,	Saeed, Musabbir A	
O3.10, O3.22		O1.08	P3.08	
Owens, Jerilyn	O13.02	Quinn, Whitney P3.10	Sahukhal, Gyan	O2.24
Pan, Chudong	O8.03	Quintana, Angela P8.01	Saillant, Eric	O8.00,
Panicker, Girish	O1.17	Ragab, Ashraf O6.09	P8.03	
Parajuli, Suman	O3.05,	Rajanna, Bettaiya P6.32,	Salamone, Amy	P8.01
O3.23		P6.37, P6.38, P6.39	Samel, Michael	P3.02
Parr, John	O12.15	Rajanna, Sharada P10.01,	Sanders, Melissa	P6.18
Paslay, Lea C	P3.06	P6.02, P6.03, P6.32, P6.37,	Sandifer, LC	P6.13
Patel, Alkesh	P6.40	P6.38, P6.39	Sandlin, David	P3.18
Patel, Pritesh S	P3.06	Rajan, Suja O2.08,	Schaefer, Katja	O10.05
Patil, Chetan	O2.13	O2.26	Schanz, Hans	O3.14
Patlolla, Babu	O12.16	Rajnarayanan, R P10.02	Schanz, Hans J	O3.20
Patrick, DeMore	O13.01	Rangachari, Vijay	Schwartz, Antony	
Peebles, Edgar	O1.02,	P3.02, P3.06	O2.09, O2.24, O2.25	
O1.11		Ray, Paresh P2.09, P3.11	Scott, Stacy	O11.13,
Peeples, Emilee	P6.12		O11.17	
Penman, Alan	P6.04	Redla, Satya O9.08	Scott, Victoria	O6.09
Pennington, Jack	P6.07	Reese, Tyler O10.10	Seawell, William	O3.23
Pesrson, Becca	P6.08	Register, Adelle O12.09	Seawright, Ashley	
Peterson, Daniel	P1.01	Remata, Suseela Reddy	P12.02	
Pettigrew, Benjamin		P8.09	Self, Jeral	O3.08
P6.29		Ren, Shanshan O2.22	Sellers, Michael	P2.04
Peturis, Kileigh	O10.11	Rice, Rebekah P3.06	Sessums, Joey	P6.01
Phillips, George	O13.09,	Richards, Latoya P6.31	Shan, Xueyan	P1.01
O5.01, O5.11		Richardson, Rhea P6.28, P6.43	Sharon, Yitzhak	O10.13
Phillips, Paige	O3.13		Shaw, Joyce M	P12.01
Pierce, Christine W		Rich, Ashley O4.01	Shearer, Glen	O2.07,
P6.42		Richmond, Christopher	O2.29, P2.02	
Pinard, Ferne	P11.13,	P6.14	Sheffield, Shelby	O6.02
P11.14		Ringermacher, Harry I	Shelby, Jasma	P6.21
Pingili, Murali	O9.08	O10.18	Sheppard, Victoria	
Pitcher, Kristopher		Robasciotti, Nancy	P11.17	
O4.05		O12.10	Sherman Broyles, Sue	
Pittman, Lindsey	P4.01	Roberts, Evan O2.28	O2.14	
Pittman, Thomas	O11.18,	Robinson, Shadow	Shidner, Ashley	O11.15
O11.19		O10.13	Shiller, Alan	O8.04,
Plaisance, Brittani		Robinson-Taylor, Kendra	O8.05	
P11.11		P6.38	Shim, Moo-Joon	O8.05
Pokhrel, Madhab	O10.06	Rondon, Oscar O10.15	Shiratuddin, Dr Mohd Fairuz	
Polavarapu, Venkata		Rosado, Dale O12.14	O9.06	
O9.08		Rose, LaKeysha P6.16, P6.36	Shorter, Marcus	O1.09
Pope, Elayne	O11.14,		Shukla, Sunil	P2.09
O11.15		Rosenfield, David	Silva, Juan	O1.03,
Pope, Samantha	O3.20	O8.01	O1.05, O1.08, O1.15, P1.03,	
Powell, Douglas	P3.07	Rossado, Dale Jr O3.16	P1.04, P1.07	
Pradeep, Johnsons		Rush-Pugh, Janet O6.03	Sims, Jr., Clyde	O9.03

157



O9.04		Yee, Donald	O4.04,	Zaman, Md S	P1.02
Xia, Kang	O3.21	O4.05, O4.06		Zamick, Larry	O10.13
Xiang, Lusha	P6.23-.24	Yerramilli, Anjaneyulu		Zereen, Fahmida	P3.12
Xunyan Ye	O2.17	P8.09		Zhang, H	P6.13
Yallapragada, Prabhakara Rao		York, Adam	O2.11	Zhang, Jin	O2.13
	P6.38	Young, Charles	O10.11	Zhang, Ping	O9.17
Yaremchuk, Maksim		Young, Jarrod	P6.35	Zhang, Yilin	O2.11
O8.03		Yuan, Pao-Chiang		Zhang, Yong	O3.18
Yarrow, Allison	O12.11	O10.27			
Yedjou, Clement	P6.34, P6.35	Yu, Hongtao	O3.19		
		Yu, Lixin	O9.08		