

MISSISSIPPI ACADEMY OF SCIENCES



SEVENTY-NINTH ANNUAL MEETING

February 26-27, 2015

**University of Southern Mississippi Thad Cochran Convention Center
Hattiesburg, MS**

Sponsors

Mississippi INBRE
University of Southern Mississippi
(Annual Meeting Sponsors)

University of Mississippi Medical Center
School of Health Related Professions
(Mississippi Academy of Sciences Sponsor)

Journal of the Mississippi Academy of Sciences

Volume 60

January 2015

Number 1



Contents

Editor

Michelle Tucci
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

Ham Benghuzzi
University of Mississippi Medical Center

Program Editor

Kenneth Butler
University of Mississippi Medical Center

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 (non-student) 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 2014–2015

4 GENERAL SCHEDULE

5 DIRECTIONS TO CONFERENCE CENTER

6 SUSTAINING MEMBERS

7 LIFE MEMBERS

8 EXHIBITORS

9 DODGEN LECTURE

10 SPECIAL PRESENTATIONS

16 OVERVIEW OF DIVISIONAL PROGRAMS

ABSTRACTS

41 Agriculture and Plant Science
47 Cellular, Molecular and Developmental Biology
67 Chemistry and Chemical Engineering
85 Ecology and Evolutionary Biology
89 Geology and Geography
91 Health Sciences
122 History and Philosophy of Science
126 Marine and Atmospheric Sciences
130 Mathematics, Computer Science and Statistics
134 Physics and Engineering
141 Psychology and Social Sciences
146 Science Education
149 Zoology and Entomology
154 AUTHOR INDEX



OFFICERS OF THE MISSISSIPPI ACADEMY OF SCIENCES

President	Zelma Cason
President-Elect	Hongtao Yu
Immediate Past-President	Stanley Smith
Executive Officer	Hamed A. Benghuzzi
Journal Editor	Michelle Tucci
Directors	Kenneth Butler
	Felicia Tardy
	Mary Tan
Executive Assistant	Gerri Wilson
Administrative Assistant	Barbara Holmes

Division Chairs 2014–2015

AGRICULTURE AND PLANT SCIENCE

Melinda A. Miller-Butler, USDA

CELLULAR, MOLECULAR AND DEVELOP. BIOL.

Melissa Adams, Copiah Lincoln Community College

CHEMISTRY AND CHEMICAL ENGINEERING

Douglas Masterson, University of Southern Mississippi

ECOLOGY AND EVOLUTIONARY BIOLOGY

Paul Mack, Mississippi University for Women

GEOLOGY AND GEOGRAPHY

Omar Harvey, University of Southern Mississippi

HEALTH SCIENCES

Denise Krause, Univ. of Mississippi Medical Center
Stacy Hull Vance, Univ. of Mississippi Medical Center

HISTORY AND PHILOSOPHY OF SCIENCE

William Suttle, Independent Scholar

MARINE AND ATMOSPHERIC SCIENCES

Remata Reddy, Jackson State University

MATHEMATICS, COMPUTER SCI. AND STATISTICS

Jamil Ibrahim, Univ. of Mississippi Medical Center

PHYSICS AND ENGINEERING

Pradip Biswas, Tougaloo College

PSYCHOLOGY AND SOCIAL SCIENCE

Shaila Khan, Tougaloo College

SCIENCE EDUCATION

Ryan Walker, Mississippi State University

ZOOLOGY AND ENTOMOLOGY

M. S. Zaman, Alcorn State University



GENERAL SCHEDULE

MISSISSIPPI ACADEMY OF SCIENCES Seventy-Ninth Annual Meeting February 26-27, 2015

WEDNESDAY, FEBRUARY 25, 2015

TIME	EVENT	<u>LOCATION</u>
2:00 PM to 5:00 PM	Registration	Lobby
5:00 PM to 7:00 PM	Board of Directors Meeting	Ballroom I

THURSDAY, FEBRUARY 26, 2015

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:30 AM to 5:00 PM	Registration	Lobby
8:00 AM to 3:00 PM	Exhibits	Lobby
5:00 AM to 8:00 PM	Exhibits	Lobby
8:00 AM to 3:15 PM	Divisional Programs	See program for rooms
8:45 AM to 12:00 PM	Population Health Symposium	Ballroom II/III
9:30 AM to 12:00 PM	BioInformatics Symposium	TC 214
3:30 PM to 5:30 PM	2015 Dodgen Lecture & Presentation of Awards	Ballroom II, III
5:30 PM to 7:30 PM	Reception and Poster Session	Ballroom I

FRIDAY, FEBRUARY 27, 2015

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:15 AM to 8:15 AM	Past-Presidents' Breakfast	TC 231
8:00 AM to 2:00 PM	Registration	Lobby
8:00 AM to 2:00 PM	Exhibits	Lobby
8:00 AM to 5:00 PM	Divisional Programs	See program for rooms
10:00 AM to 12:00 PM	Graduate Symposium, Sponsored by Mississippi INBRE	Ballroom II, III
12:00 PM to 1:00 PM	Mississippi INBRE & Millsaps/HHMI Howard Hughes Boxed Lunch	Ballroom I
1:00 PM to 3:00 PM	Undergraduate Symposium, sponsored by Millsaps/HHMI	Ballroom II, III
2:30 PM to 4:00 PM	Panel Discussion (History and Philosophy and Ecology Divisions)	TC 228
4:30 PM	MAS Business Meeting	Ballroom I



Thad Cochran 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:

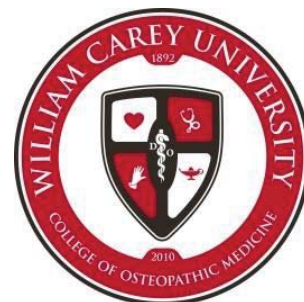
Take Highway 98 to I-59
Take I-59 North to Exit 67A
Take Hwy 49 south to first traffic light
Take left at first traffic light

SUSTAINING MEMBERS

Alcorn State University
 Belhaven University
 East Central Community College
 Holmes Community College
 Itawamba Community College
 Jackson State University
 Millsaps College
 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

2015 DIAMOND EXHIBIT SPONSORS





LIFE MEMBERS

- Francis Achike, Hattiesburg, MS
 Alex D. W. Acholonu, Alcorn State, MS
 Junius G. Adams, III, Gaithersburg, MD
 Charles C. Alexander, University, MS
 Vernon L. Asper, Stennis Space Center, MS
 Wellington Ayensu, Jackson, MS
 John Bailey, Hattiesburg, MS
 Rodney C. Baker, Jackson, MS
 Robert Bateman, Hattiesburg, MS
 Nacer Bellaloui, Stoneville, MS
 Ham Benghuzzi, Madison, MS
 Parthapratim Biswas, Hattiesburg, MS
 John D. Bower, Jackson, MS
 Carolyn R. Boyle, Starkville, MS
 John A. Boyle, Starkville, MS
 Elizabeth Brandon, Clinton, MS
 Joseph M. Brown, Starkville, MS
 Charles T. Bryson, Stoneville, MS
 Ken R. Butler, Jackson, MS
 C. Eugene Cain, Jackson, MS
 Joseph A. Cameron, Jackson, MS
 Gordan Cannon, Hattiesburg, MS
 Charles T. Carley, Starkville, MS
 Steven T. Case, Jackson, MS
 Alfred P. Chestnut, Jackson, MS
 William G. Cibula
 Alice M. Clark, Oxford, MS
 Mary Collins-Landon, Utica, 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
 David C. Cross, Mississippi State, MS
 Suman K. Das, Jackson, MS
 Asok K. Dasmahapatra, University, MS
 Sean Didion, Jackson, MS
 Ralph Didlake, Jackson, MS
 Alice L. Douglas, Jackson, MS
 Ben H. Douglas, Jackson, MS
 B. H. Douglas, Ridgeland, MS
 Nell Douglas, Ridgeland, MS
 Roy J. Duhe, Jackson, MS
 Maria T. Earle, Starkville, MS
 Stephen Ekunwe, Clinton, MS
 Stella D. Elakovich, Purvis, MS
 Mohamed O. Elasri, Hattiesburg, MS
 Steven Elder, Starkville, MS
 Charles K. Eleuterius, Ocean Springs, MS
 Atef Elsherbeni, University, MS
 Ibrahim Farah, Brandon, MS
 Peter Fleischer, Stennis Space Center, MS
 Dionne Fortenberry, Columbus, MS
 Nava Gavini
 Barbara E. Graham-Evans, Jackson, MS
 D. J. Grimes, Ocean Springs, MS
 Sabrice Guerrier, Jackson, MS
 Gordon Gunter, Ocean Springs, MS
 Subin Guru
 Mary Lou Gutierrez-Mohamed, Jackson, MS
 Margot J. Hall, Hattiesburg, MS
 Burnette W. Hamil, Mississippi State, MS
 Robert G. Hamilton, Clinton, MS
 Ashton Hamme, Jackson, MS
 Andrew W. Harrell, Vicksburg, MS
 Portia Harris, Stennis Space Center
 Ghanshyam D. Heda, Columbus, MS
 Sabine Heinhorst, Hattiesburg, MS
 Thomas J. Herrin, Jackson, MS
 Huey-Min Hwang, Jackson, MS
 Jerome A. Jackson, Mississippi State, MS
 Ronald A. Javitch John Jones, Hattiesburg, MS
 Rajamohan Kaluru, Jackson, MS
 Shahid Karim, Hattiesburg, MS
 Phillip Kelly, Madison, MS
 Wolfgang Kramer, Jackson, MS
 Paul K. Lago, Oxford, MS
 Mary C. Landin, Utica, MS
 Ken Lee, Jackson, MS
 Jerzy R. Leszczynski, Jackson, MS
 Hui Li, Madison, MS
 Timothy C. Lockley, Gulfport, MS
 Marilyn Long, Jackson, MS
 Julia S. Lytle, Ocean Springs, MS
 Thomas F. Lytle, Ocean Springs, MS
 Lyman Magee, University, MS
 David H. Magers, Clinton, MS
 William C. Mahone, Itta Bena, MS
 Billy J. Martin, Hattiesburg, MS
 Harihara M. Mehendale, Jackson, MS
 L. Hollis Melton, Ocean Springs, MS
 Joan Messer, Sumrall, MS
 Jean-Pierre Montani, Fribourg, Switzerland
 Sarah Morgan, Hattiesburg, MS
 Lyle E. Nelson, Starkville, MS
 Clifford Ochs, Oxford, MS
 Ervin G. Otvos, Ocean Springs, MS
 Robin M. Overstreet, Ocean Springs, MS
 Girish K. Panicker, Lorman, MS
 Babu P. Patolla, Lorman, MS
 Dudley F. Peeler, Jackson, MS
 A. Louise Perkins, Bay St. Louis, MS
 John A. Pojman, Hattiesburg, MS
 Aaron D. Puckett, Jackson, MS
 Lisa Quinn, Hattiesburg, MS
 Zahir Qureshi, Memphis, TN
 Dero S. Ramsey, Starkville, MS
 James Rawlins, Hattiesburg, MS
 Paresh C. Ray, Flowood, MS
 LaToya Richards, Madison, MS
 Edward E. Rigdin, Jackson, MS
 Everett Roark, Hattiesburg, MS
 James T. Robbins, Stoneville, MS
 Robin W. Rockhold, Madison, 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
 Stanley Smith, Jackson, MS
 Troy J. Stewart, Sr., Lorman, MS
 Richard H. Sullivan, Jackson, MS
 Charles T. Swann, Oxford, MS
 David Swanson, Riverside, CA
 Mary Tan, Canton, MS
 Elizabeth Taylor, Verona, MS
 Robert D. Taylor, Houston, TX
 Shelby F. Thames, Hattiesburg, MS
 Joyce R. Titus, Madison, MS
 Salil C. Tiwari, Fayette, MS
 Tapan Tiwari, Lorman, MS
 Cory Toyota, Jackson, MS
 Warren E. Traub, Diamondhead, MS
 Gregory S. Tschumper, Oxford, MS
 Judy Turner, Hattiesburg, MS
 Suresh Tyagi, Louisville, KY
 S. Kant Vajpayee, Hattiesburg, MS
 Stacy Vance, Jackson, MS
 Paul Walker
 Rosa Lea Walker, Jackson, MS
 Sharon Walker, Ocean Springs, MS
 Robert Waltzer, Jackson, MS
 W. Lamar Weems, Jackson, MS
 Dennis A. Wiesenburg, Hattiesburg, MS
 Willa M. Williams, Alcorn State, MS
 John S. Williamson, Oxford, MS
 C. Arlie Wilson, Mississippi State, MS
 Hongtao Yu, Madison, MS
 M.S. Zaman, Alcorn State, MS
 Jeffrey D. Zubkowski, Brandon, MS

Exhibitors, 2015 Annual Meeting

Supporters of the Mississippi Academy of Sciences

DIAMOND BOOTH

1. Mississippi Center for Supercomputing
2. William Carey University,
College of Osteopathic Medicine
3. School of Health Related Professions, UMMC
4. Department of Chemistry, JSU
5. Mississippi INBRE
6. School of Health Related Profession,
Student Recruiter, UMMC
7. College of Science and Technology,
University of Southern Mississippi
8. PerkinElmer
9. Alcorn State University, Graduate Studies

STANDARD BOOTH

1. Vashaw Scientific
2. Department of Electrical and Computer Engineering,
Jackson State University
3. Forestry Suppliers, Inc.
4. Fisher Scientific
5. Movement is Life
6. USM School of Polymers and High Performance Materials
7. STEM, Mississippi College
8. SCIMETRICS, INC.
9. School of Graduate Studies, Jackson State University



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>.

2015 Dodgen Lecture

3:30 p.m.

Thursday, February 26, 2015



USM Research: Transforming Everyday Life into Infinite Possibilities

Given by

Rodney D. Bennett, EdD

President

The University of Southern Mississippi

Rodney D. Bennett serves as the chief executive officer and principle educational officer of The University of Southern Mississippi, a comprehensive doctoral and research-driven university with campuses in south Mississippi and along the Mississippi Gulf Coast. Appointed to the presidency by the Board of Trustees of the State Institutions of Higher Learning, he is responsible for every facet of institutional operations and must shape the University's educational policy and academic standards in cooperation with the State Commissioner of Higher Education.

As proven leaders in innovation, the University's faculty and students conduct transformative research that translates into real-world solutions, and its Center for Undergraduate Research affords students meaningful research opportunities. Since 2006, Southern Miss students have collected seven Goldwater Scholarships, three Truman Scholarships and 10 National Science Foundation Graduate Research Fellowships. The University is also recognized as one of a select number of institutions in the nation accredited in art, dance, music and theatre.

Under Dr. Bennett's leadership, the University has invested in new faculty positions and worked to increase access to quality education and research programs to serve the needs of the state of Mississippi and beyond. His commitment to the Gulf Coast region and support for its research potential is demonstrated by recent investments in academic leadership positions at the University's Gulf Park Campus in Long Beach and successful lobbying efforts for legislative support for the University's Gulf Coast Research Laboratory (GCRL) in Ocean Springs. USM's Department of Marine Science, housed at the John C. Stennis Space Center, recently acquired an \$11 million grant from the Gulf of Mexico Research Initiative (GoMRI) to conduct scientific studies of the impacts of oil on the Gulf's ecosystem and public health.

Dr. Bennett holds a Doctor of Education Degree in Educational Administration from Tennessee State University in Nashville and a Specialist in Education Degree, a Master of Education Degree in Educational Administration, and a Bachelor of Science Degree in Mass Communication from Middle Tennessee State University in Murfreesboro.

Graduate Symposium

Sponsored by

Mississippi INBRE

Friday, February 27, 2015

10:00 AM to 12:00 PM

Chair: Glen Shearer, Ph.D.

Coordinator: Jamie Allen

Keynote Speaker: Subrata Saha, Ph.D.

Research Professor & Director of Musculoskeletal Research

Suny Downstate Medical Center

The symposium, sponsored by Mississippi IDEa Network of Biomedical Research Excellence (INBRE), is intended to promote and recognize meritorious research conducted by graduate students in the fields of science, medicine and engineering. Although housed at the University of Southern Mississippi, Mississippi INBRE is a network of colleges and universities throughout the state. The goal of Mississippi INBRE is to improve the research infrastructure in Mississippi through biomedical research. With a scientific focus on obesity, cancer and STDs, their mission is to improve health in Mississippi and increase the research competitiveness of the state.

Millsaps/HHMI Undergraduate Scholars Symposium

Honoring Excellence in Science in Mississippi

Friday, February 27, 2015

1:00 PM to 3:00 PM

Chair: Timothy Ward, Ph.D.

This symposium is intended to expand the scope and depth of opportunities for undergraduate student researchers to meet other student researchers and their mentors as well as to provide a dedicated venue to disseminate and present their research activities.

Participation in undergraduate research increases self-confidence, independence, and critical thinking skills. Disseminating one's results by participating in conference symposia develops communication and presentation skills. These experiences create and foster a life-long quest for research and discovery. Howard Hughes Medical Institute (HHMI) is the largest private sponsor of education initiatives in the USA and seeks to strengthen science education at all levels of education and is dedicated to increasing the number of people who pursue science-related careers and to broadening access to science for all.

DIVISIONAL SYMPOSIA AND PANEL DISCUSSIONS

Thursday, February 26, 2015, Time 9:30-12:00, Location TC 214

Mississippi INBRE Bioinformatics Symposium *Big Data (BD2K) to Knowledge-Pitfalls, Progress, and Future*

This symposium will bring together scientist using bioinformatics tools. The main goal of this symposium is to promote the utility of bioinformatics in big data by discussing original research and perspectives leading to excitement and new ideas in young computational biologists' especially new investigators, undergraduate and graduate students (See page 40).

HEALTH SCIENCES & PSYCHOLOGY AND SOCIAL SCIENCES

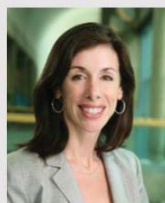
Thursday, February 26, 2015, Time 8:45-12:00, Location TC Ballroom II/III

"Improving Health Outcomes in Mississippi"

Featuring:



Mary Currier, MD, MPH
State Health Officer
Mississippi State Department of Health
"Health Status of Mississippi and the Effects of Policy Change"



Kristi Henderson, DNP, CFNP, CACNP, FAEN
Chief Telehealth & Innovation Officer
University of Mississippi Medical Center
*"How Telehealth Can Affect
Population Health in Mississippi"*



Michael Forster, PhD, MSW
Dean, College of Health
University of Southern Mississippi
*"Public Health-Related Implications
of Climate Change"*

Facilitator: Claude Brunson, MD- Dr. Claude Brunson is the Senior Advisor to the Vice Chancellor for External Affairs and Professor of Anesthesiology at the University of Mississippi School of Medicine. He is a native of Auburn, AL where he attended the Auburn public school system and graduated from Auburn High School. Dr. Brunson received his B.S. degree from the University of Alabama in Tuscaloosa, AL in 1983 after a four-year stint with the U.S. Navy as a Hospital Corpsman and Field Medicine Technician with the Fleet Marine Force. He completed his medical degree at the University of Alabama at Birmingham in Birmingham, AL in 1987. He completed an internship in Internal Medicine at Baptist Medical Centers in Birmingham, AL in 1988 and a residency in Anesthesiology at the University of Mississippi Medical Center. He joined the faculty in the School of Medicine in 1991. Dr. Brunson has been honored as the Chief Resident of his residency training program, recognition as Teacher of the Year on two occasions in the Department of Anesthesiology, and he serves on multiple committees at the Medical Center. He is active in his specialty and served as President of the Mississippi Society of Anesthesiologists in 1998 and now serves his specialty as a member of the Board of Directors of the American Society of Anesthesiologists. He has received regional and national recognition as one of "The Best Doctors in America" for multiple successive years. He is a member on the Board of Trustees for the Mississippi State Medical Association where he chaired its Council on Legislation, served on its Board of Trustees for 5 years, served as Chairman of the Board of Trustees in 2012-2013 before becoming the organization's President-Elect in 2013. Dr. Brunson serves on two Gubernatorial appointed boards: the Mississippi State Board of Medical Licensure (MSBML) and the Emergency Medical Services Committee. He is the appointed physician member to the Mississippi Board of Nursing. Dr. Brunson assumed the role as President of the Mississippi State Medical Association in August of 2014 when he became the Association's first African American President.

Mary Currier, MD, MPH- Dr. Mary Currier became Mississippi's State Health Officer in 2010 after serving as State Epidemiologist from 1993 to 2003, and again from 2007 to 2009. Prior to serving as State Epidemiologist, she was a medical consultant with the agency. Dr. Currier began her public health career with the Mississippi State Department of Health as a staff physician for the prenatal care, family planning, STD, and pediatrics programs.

Recent Publications:

1. Cantey, P. T., Stramer, S. L., Townsend, R. L., Kamel, H., Ofafa, K., Todd, C. W., Currier, M., Hand, S., Varnado, W., Dotson, E., Hall, C., Jett, P. L., & Montgomery, S. P. (2012). The USA Trypanosoma cruzi Infection Study: evidence for vector-borne transmission of the parasite that causes Chagas disease among USA blood donors. *Transfusion*, 52 (9), 1922-30.
2. Skarbinski, J., Jain, S., Bramley, A., Lee, E. J., Huang, J., Kirschke, D., Stone, A., Wedlake, T., Richards, S. M., Page, S., Ragan, P., Bullion, L., Neises, D., Williams, R. M., Petrucci, B. P., Vandermeer, M., Lofy, K. H., Gindler, J., Finelli, L., & 2009 Pandemic Influenza A H1N1 Virus Fall Hospitalizations Investigation Team. (2011). Hospitalized patients with 2009 pandemic influenza A (H1N1) virus infection in the USA--September-October 2009. *Clin Infect Dis*, 52 (Suppl 1), S50-9.
3. Clark, T. A., Slavinski, S. A., Morgan, J., Lott, T., Arthington-Skaggs, B. A., Brandt, M. E., Webb, R. M., Currier, M., Flowers, R. H., Fridkin, S. K., & Hajjeh, R. A. (2004). Epidemiologic and molecular characterization of an outbreak of Candida parapsilosis bloodstream infections in a community hospital. *J Clin Microbiol*, 42 (10), 4468-72.
4. Harrington, T., Kuehnert, M. J., Kamel, H., Lanciotti, R. S., Hand, S., Currier, M., Chamberland, M. E., Petersen, L. R., & Marfin, A. A. (2003). West Nile virus infection transmitted by blood transfusion. *Transfusion*, 43 (8), 1018-22.

Kristi Henderson, DNP, CNFP, CACNP, FAEN- Dr. Henderson is the Chief Telehealth & Innovation Officer for the University of Mississippi Medical Center (UMMC). She holds dual appointments in the School of Medicine and School of Nursing at UMMC. A few of her accomplishments include: 2013 Robert Wood Johnson Nurse Executive Fellow, the 2014 Nurse Innovator of the Year, 2012 Advanced Practice Nurse of the Year, and voted an "Edge Runner" by the American Academy of Nurses. Dr. Henderson has spent the last twenty years of her career as an administrator, educator, innovator, researcher and clinician. She designs and implements innovative solutions to transform the health care system for improved health outcomes, improved efficiency and a lower cost. She has led the development of a statewide Telehealth Program which is recognized as a top telehealth program in the U.S. Dr. Henderson has testified to the White House Domestic Policy Council and made numerous presentations on telehealth across the country. Dr. Henderson is regularly consulted by other state health care leaders, politicians, physicians, nurses, journalists and members of the academic community. Some of her leadership roles include service as the Executive Director of the Mississippi Telehealth Association, Chair of the American Telemedicine Association's Institutional Council, and Mississippi Health Information Network's Board of Directors. She received her Doctorate of Nursing Practice degree from the University of Alabama at Birmingham, her master's degree in nursing, from the Mississippi University for Women, and her bachelor's degree in nursing from Mississippi College. She maintains national certification as a family and acute care nurse practitioner.

Michael Forster, PhD, MSW- Dr. Michael Forster is dean of the College of Health and professor of social work at the University of Southern Mississippi. Before joining the university in 1994, he served for fourteen years as a direct service social worker, supervisor and administrator in Chicago child welfare organizations. Forster is co-founder of the Family Network Partnership, a delinquency prevention and family counseling agency serving disadvantaged youth and families on Hattiesburg's east side. He is author or co-author of more than sixty academic publications over the past twenty years, and Principal Investigator on more than \$15 million in externally-funded grants and contracts. Forster holds degrees from Louisiana State University, the University of Massachusetts, and the University of Illinois.

OPERATION CHANGE – CHICAGO

Lynne C. Jones, Yashika Watkins, Duanny Alva, Verona Brewton, Thomas Mason

Movement is Life Caucus

Introduction In the USA, it is estimated that over 13.9% of adults aged 25 years and older and 33.6% of those 65 years and older have osteoarthritis (OA) [1]. There is a 'vicious' cycle which exists between osteoarthritis and limited

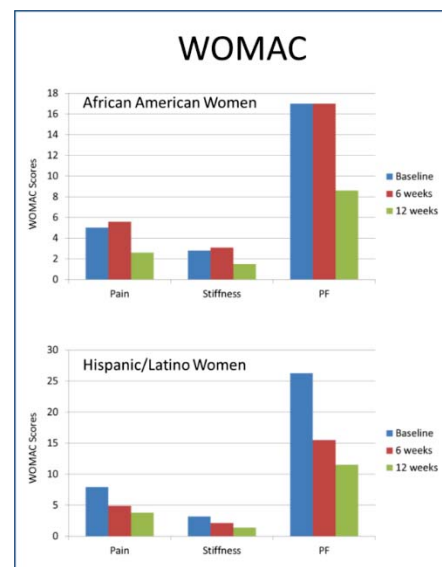
mobility, pain, obesity and other related comorbidities [2]. Arthritis burden and obesity are particularly problematic for African-American (AA) and Hispanic/Latina (H/L) women. The Operation Change program presents a new paradigm addressing behavior change and musculoskeletal health disparities; it is community-based, culturally sensitive, involves shared decision making, and is focused on movement and physical activity. The goal of this study was to determine the feasibility of this program.

Methods There were 72 participants (42 AA; 30 H/L women). The mean age was 61 years (range 41-75) for AA and 52 years (range 45-66) for H/L women. The mean BMI was 37 +/- 8.56 for AA and 35.62 +/- 5.56 for H/L women. The 12-week program was held at two community locations (Church: H/L, YMCA: AA). Programming encompassed presentations, motivational interviewing, individual goal setting, and planned activities. Presentations included: osteoarthritis, diabetes, movement as medicine, depression, and eating healthy. Discussions during motivational interviewing involved setting/meeting personal goals, developing a web of support, and determining progress. Activities included walking, group activities (games), low impact aerobics, and complementary/alternative medicine activities. Assessments were performed at baseline, 6 and 12 weeks. Assessments included: participant demographic questionnaire, physical assessments (weight, height, BP, resting heart rate), Timed 50' Walking Test, WOMAC, SF-36, PHQ8 Depression Scale, and patient interviews. statistical analyses were performed using JMP statistical software version 10 (SAS, Cary, N.C.). **Results** There were no significant changes in the systolic and diastolic pressures or pulse rates over the 12 week period. While both groups demonstrated a statistically significant decrease in weight ($p=0.04$), there was considerable variability between individuals. Based on a threshold of 2% body weight, 13 AA women and 9 H/L lost weight. There was a significant decrease in 50 ft. walking time for the H/L women ($p<0.0001$) and a trend to decreased time for the AA women ($p=0.0759$).

For the WOMAC, there were significant decreases in pain ($p<0.0001$), stiffness ($p<0.0001$) and physical functioning ($p<0.0001$) for both groups. These corresponded to the findings for the SF-36 questionnaires. Regarding the PHQ-8, the H/L women demonstrated a significant decrease in the scores ($p<0.0001$); there was a trend towards a decreased PHQ score over the 12 week period ($p=0.0771$) for the AA women. Participants scored the motivational interviewing highly.

Conclusions Operation Change was successful in educating and creating opportunities for increasing physical activity level of participants. The program focused on increasing mobility rather than weight loss. Significant changes in pain and function scores were observed. Further study is needed to evaluate sustainability. This study supports a new paradigm to behavioral modification enabling participants to take an active role in living with their arthritis in a program which is community-based, incorporates shared decision making, is culturally sensitive, and focused on movement and activity.

- [1] Lawrence RC, Felson DT, Helmick CG, Arnold LM, Choi H, Deyo RA, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the USA. Part II. Arthritis and rheumatism 2008;58:26-35.
- [2] Wluka AE, Lombard CB, Cicuttini FM. Tackling obesity in knee osteoarthritis. Nature reviews Rheumatology 2013;9:225-35.



HISTORY AND PHILOSOPHY OF SCIENCE

PRACTICAL AND THEORETICAL CONSIDERATIONS FOR METHODS IN BIOLOGY

Friday, February 27, 2015, Time 2:30-4:00, Location TC 228

Paula Smithka, Ph.D. - Associate Professor, University of Southern Mississippi,

Smithka has a doctorate and a master's degree in philosophy from Tulane University as well as a bachelor's degree in philosophy and a bachelor's degree in biology from the University of North Carolina at Charlotte. She specializes in philosophy of science with an emphasis in philosophy of biology; and has published articles in the area of social/political philosophy, particularly concerning war and peace issues. Dr. Smithka teaches courses in philosophy of science, epistemology, logic, and introduction to philosophy, including an Honors College section of the course. She developed a new course, Philosophy through Science Fiction, which was taught for the first time in the spring semester of 2012. She has a book out, edited with Courtland Lewis as part of Open Court Press' Popular Culture and Philosophy series—Doctor Who and Philosophy: Bigger on the Inside (December 2010). This book is fun and serious philosophy, addressing philosophical issues in the longest-running science fiction show in history, the British series Doctor Who. Author-contributors to the volume span the globe. Philosophical issues addressed in the book include: personal identity, philosophy of science, ethics, existential concerns, aesthetics, and the impact of Doctor Who on British culture in

particular, but human culture more generally. She also has another book, *Community, Diversity, and Difference: Implications for Peace*, edited with Alison Bailey from Rodopi Press (2002). This book contains chapters addressing nationalism, identity politics, multiculturalism, democracy, peace-making strategies, among other topics. Her present research interests include philosophy of biology, philosophy of mind, and, in the area of social/political philosophy, the issue of tolerance and war and peace issues. She enjoys travel, beaches, birds, and of course, science fiction.

Mac H. Alford - Associate Professor and Curator of the Herbarium, University of Southern Mississippi

Plant systematics and floristics are the two major areas of his research. In systematics, his research focuses on the tropical relatives of willows, poplars, and cottonwoods (Salicaceae and Samydaceae), trees and shrubs formerly placed in the heterogeneous family Flacourtiaceae. Delimiting and describing species, working out the nomenclature, and mapping distributions make up the classical aspects of these studies, and inferring relationships using phylogenetic techniques with data obtained from morphology, phytochemistry, anatomy, and DNA sequences make up the modern aspects. Although he studies the relationships throughout these family (and related families), his descriptive and exploratory research has been focused on neotropical members. Present interests include inferring the evolution of the reduced flowers of willows and reconstructing the biogeographical history of the family. In floristics, his research focuses on the state of Mississippi and the southeastern coastal plain. Mississippi currently lacks a manual, taxonomic keys, and county-level distribution maps of the known species of plants, and only recently has an electronic checklist of the species become available. Along with databasing the existing collections. He is actively collecting within the state to ensure that a complete checklist is prepared and that distribution maps reflect the actual distributions. He is also actively involved in the Flora Mesoamericana project, which covers plants that occur in southern Mexico to Panama. Students are welcome in both of these areas of research. Local floras, species complexes in both the southeastern U.S. and the tropics, and classical and modern taxonomic questions are topics ready for pursuit. He is also curator of the USM Herbarium. The collection presently consists of about 25,000 specimens and is an invaluable resource for the flora of Mississippi.

Brian R. Kreiser - Professor, University of Southern Mississippi

He is interested in the evolutionary forces that shape the geographic patterns of genetic variation within a species, and often this work blends into the areas of systematics and conservation. While much of the research in his lab focuses on fishes, his research program tends to be more question-oriented as opposed to organism specific. Currently his lab is working on projects that are focused on the biota of the southeastern USA (including freshwater fishes and gopher tortoises). Students working in his lab over the years have pursued a broad array of interests including blue crabs, pythons, anadromous fishes, freshwater turtles, Central American fishes and invasive plants. While the organisms are diverse, the common theme is the study of geographic patterns of genetic variation.

Representative Publications

- Schaefer, J.F., D.D. Duvernell and B.R. Kreiser. 2011. Ecological and genetic assessment of spatial structure among replicate contact zones between two topminnow species. *Evolutionary Ecology* 25:1145–1161.
- Matamoros, W.A., B.R. Kreiser and J.F. Schaefer. 2011. A delineation of Nuclear Middle America biogeographical provinces based on river basin faunistic similarities. *Reviews in Fish Biology and Fisheries* DOI 10.1007/s11160-011-9232-8.
- Ennen, J.R., J.E. Lovich, B.R. Kreiser, W.W. Selman and C.P. Qualls. 2010. Genetic and morphological variation between populations of the Pascagoula Map Turtle (*Graptemys gibbonsi*) in the Pearl and Pascagoula Rivers with description of a new species. *Chelonian Conservation and Biology* 9:98–113.
- Ennen, J.R., B.R. Kreiser and C.P. Qualls. 2010. Low genetic diversity in several Gopher Tortoise (*Gopherus polyphemus*) populations in the DeSoto National Forest, Mississippi. *Herpetologica* 66:91-98.
- Bowen, B.R., B.R. Kreiser, P.F. Mickle, J.F. Schaefer and S.B. Adams. 2008. Phylogenetic relationships among North American *Alosa* species (Clupeidae). *Journal of Fish Biology* 72:1188-1201.

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Thursday, February 26, 2015, Time 9:00-10:00, Location TC 229

STEM, PROJECT-BASED LEARNING: STRATEGIES AND EXPERIENCES IN THE CLASSROOM

Carl DeWitt¹ and Gail Dickinson²

¹Hinds Community College

²STEM Instructor, Germantown Middle School

Currently, an initiative exists globally to create a learning environment in which students can become sustainably proficient in Science, Technology, Engineering, and Mathematics (STEM). STEM education and how it relates to project-based learning must be understood. Project-based learning is an engaging classroom approach in

which students explore and solve real-world problems with concepts and ideas from STEM subjects. By using project-based learning, teachers bring excitement and creativity back into the classroom. The appropriate hands-on experiences give students the opportunity to successfully learn and take on the role of a scientist or engineer and begin to view themselves as a person who can understand and express science. In understanding what and how the STEM classroom looks, strategies will be discussed on transforming traditional lesson plans into problem-based STEM experiences emphasizing engineering as the center for solving real-world problems. All of the activities presented in this session have been field tested with 8th graders in Mississippi public schools. Examples of innovative projects include: designing a parachute project, snack packaging project, designing an iPod dock (sound) project and how to design an app for a cell phone. Now is the time to integrate and embrace STEM education and innovation in Mississippi classrooms. Through a project-based learning perspective and foundation, students will be prepared to enter the workforce solidly positioned to successfully fill the marketplace positions open for STEM based careers.



OVERVIEW OF DIVISIONAL PROGRAMS

AGRICULTURE AND PLANT SCIENCE

Thursday, February 26

MORNING

Room TC 231

- 9:00 COMPARATIVE ANALYSIS OF YIELD AND FRUIT QUALITY ATTRIBUTES OF ORGANICALLY GROWN MELONS (*CUCUMIS MELO L.*) FROM AROUND THE GLOBE
- 9:15 PLANT DENSITY EFFECTS ON BIOMASS DEVELOPMENT AND RATE OF RESIDUE DECOMPOSITION OF FOUR VARIETIES OF SWITCHGRASS (*PANICUM VIRGATUM L.*) ON MEMPHIS SILT LOAM FOR EROSION PREDICTION, NUTRIENT MANAGEMENT, AND CONSERVATION PLANNING
- 9:30 SACCHARIFICATION AND FERMENTATION OPTIMIZATION IN *MISCANTHUS GIGANTEUS* BASED BIOETHANOL PRODUCTION
- 9:45 BEST SEASON TO PRODUCE CABBAGE IN SOUTHWEST AND CENTRAL MISSISSIPPI: EMPIRICAL EVIDENCE
- 10:00 WHOLE GENOME SEQUENCING AND THE GENETIC DIVERSITY OF AN ALCORN STATE SWEET POTATO LEAF CURL VIRUS (SPLCV) ISOLATE
- 10:15 BREAK
- 10:30 A COMPARATIVE STUDY TO THE 2011/2013 WATER QUALITY ASSESSMENTS IN THE PASQUOTANK WATERSHED IN NORTHEASTERN NORTH CAROLINA WITH A SEA LEVEL RISE COMPONENT
- 10:45 *PSEUDOGNAPHALIMUM OBTUSIFOLIUM*: REVEALING THE MYSTERIOUS SECRETS OF A COMMONPLACE NATIVE WEED
- 11:00 TRANSMISSION ELECTRON MICROSCOPY STUDY OF *LISTERIA MONOCYTOGENES*
- 11:15 EFFECT OF AGRONOMIC PRACTICES ON PEANUT GROWTH AND YIELD POTENTIAL
- 11:30 MORTALITY OF CONTAINER-GROWN BLUEBERRY PLANTS INOCULATED WITH
- 11:45 BUSINESS MEETING

Thursday, February 26

AFTERNOON

POSTER SESSION (1:15-2:45)

1. NANOTECHNOLOGY-BASED APPROACH TO IMPROVE FERTILITY OUTCOMES IN SWINE
2. A COMPARATIVE STUDY TO THE 2011/2013 WATER QUALITY ASSESSMENTS IN THE PASQUOTANK WATERSHED IN NORTHEASTERN NORTH CAROLINA WITH A SEA LEVEL RISE COMPONENT.
3. HONEY PLANT DIVERSITY IN THE STATE OF MISSISSIPPI
4. INTEGRATED PEST MANAGEMENT EDUCATION FOR SMALL FARM FAMILIES IN RURAL MISSISSIPPI
5. SUSTAINABLE VEGETABLE PRODUCTION, MARKETING AND MANAGEMENT FOR LIMITED-RESOURCE FARMERS
6. GERMINATION AND EARLY SEEDLING GROWTH OF *FESTUCA ARUNDINACEA*, *TRITICUM AESTIVUM*, AND *BRASSICA JUNCEA* UNDER VARYING LEVELS OF LEAD AND CADMIUM
7. GROWTH AND LEAD ACCUMULATION OF *FESTUCA ARUNDINACEA* GROWN IN LEAD-CONTAMINATED SOIL: EFFECTS OF BACTERIAL INOCULATION
8. EFFECT OF ENVIRONMENTAL VARIATION AND SPATIAL DISTANCE ON SOIL MICROBIAL
9. DIFFERENCES IN SURVIVAL OF HEAT STRESS ADAPTED CELLS OF *LISTERIA MONOCYTOGENES* SEROTYPE 1/2A IN DIFFERENT SANITIZERS/DISINFECTANTS AND ESSENTIAL OILS
10. GENETIC DIVERSITY IN CYTOPLASMIC AND NUCLEAR GENOME OF UPLAND COTTON
11. PHYTOTOXIC EVALUATION OF WHOLE PINE TREE SUBSTRATES

Room

Ballroom II/III

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION



CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Thursday, February 26

MORNING

Room TC 210

- 7:55 WELCOME
- 8:00 A ROLE FOR TOLL-LIKE RECEPTOR 8 IN WEST NILE VIRUS INFECTION
- 8:15 ROLE OF MSAABCR OPERON IN THE REGULATION OF PROTEASES AND BIOFILM DEVELOPMENT IN STAPHYLOCOCCUS AUREUS
- 8:30 *msaB* REGULATES BIOFILM DEVELOPMENT AND VIRULENCE IN STAPHYLOCOCCUS AUREUS
- 8:45 THE IN VITRO EVALUATION OF PEDIATRIC BRAIN CANCER CELL LINE
- 9:00 THE ROLE OF THE PCD PROTEIN IN CARBOXYSOME BIOLOGY
- 9:15 MOLECULAR AND PHENOTYPIC CHARACTERIZATION OF CLINICAL METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS ISOLATES CAUSING BACTEREMIA AT A MAJOR HOSPITAL IN SOUTHERN MISSISSIPPI
- 9:30 ANDROGEN DEPRIVATION PROMOTES ALTERNATIVE SPLICING OF ANDROGEN RECEPTOR THROUGH REGULATION OF PCGEM1
- 9:45 GRANULIN E AS AN INFLAMMATORY MEDIATOR IN ALZHEIMER'S DISEASE
- 10:00 BREAK
- 10:15 AUTOPHAGY FROM ENDOPLASMIC RETICULUM STRESS IS CONTROLLED BY PRO-APOPTOTIC GENES IN RAT HEPATOCYTES
- 10:30 A NOVEL ROLE FOR OSTEOPONTIN IN FACILITATING WEST NILE VIRUS NEUROINVASION
- 10:45 MODULATING CCM1P EXPRESSION TO ELUCIDATE THE ASSEMBLY PROCESS OF THE MITORIBOSOME MINOR SUBUNIT
- 11:00 THE MSAABCR OPERON REGULATES CAPSULE POLYSACCHARIDE PRODUCTION IN STAPHYLOCOCCUS AUREUS
- 11:15 THE EFFECTS OF ENVIRONMENTAL CONDITIONS ON THE BIOACTIVITY OF OCCIDIOFUNGIN, A NOVEL ANTIFUNGAL
- 11:30 EFFECTS OF PSEUDOGNAPHALIIUM OBTUSIFOLIUM EXTRACTS ON PROLIFERATION OF SACCHAROMYCES
- 11:45 INVESTIGATING THE PROMOTER OF THE MOLD SPECIFIC GENE M46, IN THE PATHOGENIC DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM
- 12:00 LUNCH BREAK

Thursday, February 26

AFTERNOON

Room TC 210

- 1:00 MPACT PCP1 MUTATIONS HAVE ON ATP SYNTHASE SUPER-COMPLEX ASSEMBLY AND MITOCHONDRIAL MORPHOLOGY
- 1:15 INVESTIGATING M46, A PHASE SPECIFIC GENE, IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

- 1:30 BIOCHEMICAL AND MOLECULAR METHODS FOR THE DETECTION OF ENDOGENOUS CFTR EXPRESSION
- 1:45 RESCUE OF PLASMA MEMBRANE CFTR BY INHIBITORS OF PROTEASOMES AND LYSOSOMAL ENZYMES
- 2:00 COMPETITION EXPERIMENTS SHOW THAT THE [URE3] PRION OF SACCHAROMYCES CEREVISIAE PUTS PRION-CONTAINING CELLS AT A GROWTH DISADVANTAGE IN A NUTRIENT-RICH ENVIRONMENT.
- 2:15 ENHANCEMENT OF TOTAL RADICAL TRAPPING POTENTIAL OF CHEDDAR WHEY CONTAINING EMULSIONS BY ULTRA-HIGH-PRESSURE HOMOGENIZATION
- 2:30 BUSINESS MEETING

Room

Ballroom II/III

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. PNA-DNA FOUR-WAY JUNCTIONS AS A POSSIBLE THERAPEUTIC FOR PROINFLAMMATORY CYTOKINE HIGH MOBILITY GROUP B1
2. THE IN VITRO EVALUATION OF PEDIATRIC BRAIN CANCER CELL LINES
3. THE EFFECTS OF LPS AND MWCNT ON ALVEOLAR EPITHELIAL LUNG CELLS
4. MESENCHYMAL STEM CELLS SUPPORT OSTEOSARCOMA GROWTH BY ENTERING AN AUTOPHAGIC STATE
5. IDENTIFICATION OF FUNGI CAUSING WILT DISEASES ON MISSISSIPPI COTTON PLANTS
6. TESTOSTERONE SUPPLEMENTATION CHANGES ADIPOSE COMPOSITION IN OBESE ZUCKER RATS
7. AGES AND AGING: ELIMINATING RAGE EXTENDS LIFESPAN
8. HYPERINSULINEMIA DOES NOT AFFECT MELANOMA PROLIFERATION
9. CHARACTERIZING THE PROMOTER OF M46, A MOLD SPECIFIC GENE, IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM
10. GENE EXPRESSION IN OXIDATIVE STRESS PATHWAY IS ALTERED IN SPACE-FLOWN TK6 CELLS
11. RAT MODEL OF ISCHEMIA REPERFUSION INJURY (IRI)
12. THE INVESTIGATION OF THE SPECIFIC FUNCTIONS OF TWO SUPEROXIDE DISMUTASE SPECIES IN OXIDATIVE STRESS DAMAGE AND MICROBIAL COMMUNITY HOMEOSTASIS IN AMBLYOMMA MACULATUM
13. INVESTIGATION OF ANGIOTENSIN-CONVERTING METALLOENZYME (ACE) IN AMBLYOMMA MACULATUM
14. THE ADDITION OF RAPAMYCIN CAUSES DE-REPRESSION OF THE NITROGEN REGULATORY PROTEIN AreA IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM
15. BONE MARROW MESENCHYMAL STEM/STROMAL CELLS DERIVED EXOSOMES IN BREAST CANCER PROGRESSION AND METASTASIS
16. RAP1A GTPASE: A NOVEL LINK BETWEEN PKA AND AGE/RAGE SIGNALING CASCADES
17. RAP1A IN AGE/RAGE-PKC-Z SIGNALING IN TYPE 2 DIABETES MELLITUS
18. RAP1A INTERCONNECTS AT1R AND RAGE SIGNALING IN DIABETES
19. A NOVEL MICRORNA TARGETS SUZ12 AFFECTING CELL PROLIFERATION.
20. NON-EMBRYONIC STEM CELL CORE (NESCC) AT UNIVERSITY OF MISSISSIPPI MEDICAL CENTER
21. IDENTIFICATION OF IL-6 AND IL-10 IN CHANNEL CATFISH, ICTALURUS PUNCTATUS
22. INVESTIGATING THE ROLE OF M46 IN DRUG RESISTANCE IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM
23. THE IMPACT PCP1P MUTATIONS HAVE ON MITOCHONDRIAL GENOME STABILITY AND MORPHOLOGY
24. AN EXAMINATION OF OBESITY-INDUCED EPITHELIAL TO MESENCHYMAL TRANSITION IN MELANOMA CELLS
25. EXPRESSION AND PURIFICATION OF CCM1P IN ESCHERICHIA COLI
26. CCM1P IS REQUIRED TO STABILIZE 15S RRNA BY PROTEIN-RNA INTERACTION DURING



- MITORIBOSOME BIOGENESIS
27. IDENTIFICATION OF EFFECTOR PROTEINS OF HISTONE LYSINE METHYLATION IN RICE
 28. *VERNONIA AMYGDALINA* (V. *AMYGDALINA*): THERAPEUTIC FOOD FOR CANCER
 29. THERAPY REDUCTION OF LYSOSOMAL ACID SPHINGOMYELINASE ACTIVITY BY 2-HYDROXY-PROPYL-B-CYCLODEXTRIN
 30. DECIPHERING THE FUNCTIONAL COLLABORATION OF MID AND BRIC-A-BRAC 2 AS POTENTIAL REGULATORS OF CELLULAR PROLIFERATION WITHIN ADULT *DROSOPHILA* OVARIES
 31. REGULATION OF MICRORNA-1 AND ITS TARGET IN A549 CELLS
 32. REDUCED OXIDATIVE DEGRADATION OF COATED RETAIL-CUT MISSISSIPPI FARM-RAISED CATFISH FILLET USING ULTRA-HIGH PRESSURE HOMOGENIZED CHEDDAR WHEY AND
 33. GENETIC MANIPULATION IN THE TWO-SPOT SPIDER MITE
 34. USING A POLYANILINE BASED SENSOR FOR DETECTION OF miRNA EXPRESSION
 35. SCREENING FOR FACTORS INVOLVED IN MICRORNA PROCESSING
 36. CHARACTERIZING A MOLD SPECIFIC GENE IN THE PATHOGENIC DIMORPHIC FUNGI *HISTOPLASMA CAPSULATUM*
 37. FRACTIONATION OF CRUDE CHYMOTRYPTIC HYDROLYZATE OF SODIUM CASEINATE BASED ON HYDROPHOBICITY
 38. USE OF MIXED STABILIZATION SYSTEMS TO OBTAIN STABLE NANO-GLOBULAR DISPERSIONS

Friday, February 27

MORNING

Room TC 210

- 8:00 COMPARATIVE ANALYSIS OF QPCR AND DDPCR METHODS FOR QUANTIFICATION OF BACTERIAL LOAD IN TICK TISSUES
- 8:15 ELUCIDATING THE ROLE OF REPROLYSIN METALLOPROTEASES IN *AMBLYOMMA AMERICANUM*
- 8:30 CAFFEINE ADMINISTRATION IN A 3-DIMENSIONAL CO-CULTURE SYSTEM MEANT TO RECAPITULATE IN VIVO SIGNALING FROM LUMEN-TO-ENTERIC NERVOUS SYSTEM
- 8:45 MAKING SENSE OF THE *AMBLYOMMA MACULATUM* SALIVARY GLAND SIALOPROTEOME
- 9:00 PARACRINE SIGNALING IS KEY FOR MELANOMA CELL MIGRATION
- 9:15 EFFECTS OF SURFACTANTS ON PARTICLE SIZE DISTRIBUTION AND ANTIOXIDATIVE POTENTIAL OF PEANUT OIL-IN-WATER NANOEMULSIONS STABILIZED BY WHEY PROTEIN CONCENTRATE
- 9:30 ISOLATION OF BOVINE α S2-CASEIN AND FRACTIONATION OF ITS TRYPTIC HYDROLYZATES BY SIZE-EXCLUSION HIGH PERFORMANCE CHROMATOGRAPHY
- 9:45 ELUCIDATING THE ROLE OF PHOSPHATIDYLCHOLINE TRANSFER PROTEIN (PCTP) IN *TETRAHYMENA THERMOPHILA* CONJUGATION.
- 10:00 PHENOTYPIC VARIATION OF VIRULENCE IN THE ENTOMOPATHOGENIC BACTERIUM *XENORHABDUS NEMATOPHILA*



CHEMISTRY AND CHEMICAL ENGINEERING

Thursday, February 26

MORNING

Room TC 218A

- 7:50 WELCOME
- 8:00 DEVELOPMENT OF IN-VIVO TRACEABLE CARRIER FOR GUIDED DELIVERY OF ANTICANCER DRUGS
- 8:15 DOPING-INDUCED MOLECULAR PACKING OF CONJUGATED POLYMERS
- 8:30 USING NMR SPECTROSCOPY TO STUDY PROTEIN STRUCTURE ON NANOPARTICLE SURFACES
- 8:45 MCF-7 CELL VIABILITY STUDY ON VERNONIA AMYGDALINA ETHANOL AQUEOUS EXTRACT AND ITS ENZYMATIC HYDROLYSATES WITH α -AND- β -AMYLASES
- 9:00 BIOGEOCHEMISTRY OF TRACE ELEMENTS AND HEAVY METALS IN THE GRAND BAY NATIONAL ESTUARINE RESERVE IN THE NORTHERN GULF OF MEXICO
- 9:15 ATOMIC FORCE MICROSCOPY AND KELVIN PROBE FORCE MICROSCOPY STUDY OF POLY(3-HEXYLTHIOPHENE) NANOWHISKERS
- 9:30 CHARGE DENSITY VARIATION OF HYDROPHILIC-BLOCK-CATIONIC COPOLYMERS FOR TUNING COMPLEXATION WITH SIRNA AND THE EFFECTS ON GENE SUPPRESSION
- 9:45 ANALYSIS OF NMR DATA TO INVESTIGATE PROTEIN DYNAMICS
- 10:00 MORNING BREAK
- 10:15 SYNTHESIS AND CHARACTERIZATION OF A NOVEL ANTI-FOULING COATING FOR MARINE VESSELS
- 10:30 PROGRESS TOWARD THE TOTAL SYNTHESIS OF THE LYCOPODIUM ALKALOID PALHININE A
- 10:45 WINSTEIN-MASAMUNE DEAROMATIZATION APPROACH TO THE SPICROCICLYC CORE OF THE LYCOPODIUM ALKALOID MAGELLANINE
- 11:00 INVESTIGATION OF A VINYL SULFOXIDE-CARBODIIMIDE ANNULATION VIA [3,3]-SIGMATROPIC REARRANGEMENT AND RING CLOSURE
- 11:15 FINDING A GENERAL AND TUNABLE METHOD FOR ESTER TO ETHER REDUCTION
- 11:30 PHOTOCATALYTIC DEGRADATION OF CRYSTAL VIOLET DYE ON POSS CONTAINING TITANIA-THIOL-ENE SUBSTRATES
- 11:45 UTILIZING DIRECT AND INDIRECT SOLUTION-BASED ASSAYS TO CHARACTERIZE SINGLET OXYGEN GENERATION FROM FULLERENE THIOL DERIVATIVES
- 12:00 – 1:30 LUNCH

Thursday, February 26

AFTERNOON

ROOM TC 218A

- 1:30 DETERMINING FUDAMENTAL STRUCTURE-REACTIVITY RELATIONSHIPS IN THE PREPARATION OF NOVEL THIOLATED C60 DERIVATIVES
- 1:45 COMPLETE SYNTHESIS OF ANALOGUES OF TUBERCULOSIS MEDICATION, ETHAMBUTOL, WITH KNOWN INTERMEDIATES, DIETHYL ETHYLMALONATE AND DIETHYL PHENYLMALONATE
- 2:00 STEREOSELECTIVE PREPARATION OF 3, 5-DISUBSTITUTED PYRROLIDINE-3-CARBOXYLIC ACIDS AS CATALYSTS IN THE ASYMMETRIC ALDOL AND MANNICH REACTIONS



- 2:15 SYNTHESIS AND APPLICATION OF (R)-3-METHYLPYRROLIDINE-3-CARBOXYLIC ACID
 2:30 Ti(III) and Ti(IV) AS NOVEL CATALYST FOR GENERATING CADMIUM VAPOR: IS THIS A
 REVOLUTION IN CADMIUM COLD VAPOR GENERATION?
 2:45 CLEANING THE SURFACE OF GRAPHENE OXIDE BY ELECTROCHEMICAL REDUCTION:
 AN IN SITU RAMAN SPECTROELECTROCHEMICAL STUDY

3:00 BUSINESS MEETING

Room

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. SCREENING OF FULLERENE NANOPARTICLES FOR BIOLOGICAL TARGETS: INVERSE DOCKING STUDY
2. INVESTIGATION ON AMINE CURED EPOXY POLYMERS AND WATER INTERFACE: A MOLECULAR DYNAMICS APPROACH
3. COMPUTING ACIDITIES OF BARBITURIC AND THIOBARBITURIC ACID
4. RELATIVE STABILITIES OF DERIVATIVES OF 9-METHYLANTHRACENE AND 9-METHYLENE-9,10-DIHYDROANTHRACENE
5. CHEMOENZYMATIC SYNTHESIS OF ETHAMBUTOL ANALOGUES CONTAINING CHIRAL 4-AMINOALCOHOLS
6. DI-HEME PROTEIN MAUG AS A DUAL MRI CONTRAST AGENT
7. AN EF-HAND MOTIF AS IN-VIVO TRACING TAGINPOLYPEPTIDE-BASED ANTICANCER DRUG CARRIER
8. DEVELOPMENT OF IN-VIVO TRACEABLE CARRIER FOR GUIDED DELIVERY OF ANTICANCER DRUGS
9. CONVENTIONAL STRAIN ENERGIES OF THE OXAPHOSPHETANES AND THE OXADIPHOSPHETANES
10. THE ESCHERICHIA COLI YFDXWUVE OPERON
11. MICROWAVE-ASSISTED ALKYLATION OF ANILINES: ALKYLATION OF 2,4-DIMETHYLANILINE WITH VINYLARENES
12. SYNTHESIS OF CO₂-RESPONSIVE POLYMERIC MICELLES VIA RAFT POLYMERIZATION
13. AMPHIPHILIC COPOLYMERS CAPABLE OF FORMING MICELLES TO SERVE AS UNIMERIC-DISPERSANTS OR GELATORS FOR OIL SPILL REMEDIATION APPLICATIONS
14. PLASMONIC NANOCRYSTALS WITH PRECISE GOLD ATOMS
15. ELECTRO-KINETIC ENHANCED PHYTOREMEDIATION FOR THE RESTORATION OF MULTI-METALS(CD, PB, AS AND CS) CONTAMINATED SEDIMENTS
16. EFFECT OF CHAIN LENGTH, NUMBER OF CHAINS AND CHARGE ON THE IN VITRO CYTOTOXICITY OF SURFACE COATING AGENTS USED ON NANOPARTICLES
17. TOXICITY OF GOLD NANOPARTICLES AND GOLD IONS TO BACTERIA
18. THE ADSORPTION OF CESIUM, STRONTIUM AND COBALT BY MESOPOROUS MATERIALS
19. PREPARATION AND CHARACTERIZATION OF THIOL-ENE POLYMER MICROBEADS USING AN ACOUSTIC EXCITATION MODEL
20. NOVEL NITROGEN-FLUORINE-CODOPED TiO₂ FOR DEGRADATION OF BPA UNDER VISIBLE LIGHT INVESTIGATION ON AMINE CURED EPOXY POLYMERS AND WATER INTERFACE: A MOLECULAR DYNAMICS APPROACH
21. INVESTIGATION ON AMINE CURED EPOXY POLYMERS AND WATER INTERFACE: A MOLECULAR DYNAMICS APPROACH

22. DECARBOXYLATIVE PHOTOCYCLIZATION OF CATIONIC PHTHALIMIDE AND QUINOLINE/ISOQUINOLINE ω -CARBOXYLIC ACIDS
23. ANALYSIS OF THE DNA-CLEAVING EFFICIENCIES OF BIFUNCTIONAL DNA-CLEAVING REAGENTS
24. PHOTOCHEMISTRY OF PYROMELITTIMIDES
25. 1,8-NAPHTHALIMIDE FLUORESCENCE IN REVERSE MICELLES
26. BIOACCUMULATION OF HEAVY METAL AND METALLOID IN *CRASSOSTREA VIRGINICA* IN THE GULF OF MEXICO
27. NOVEL NITROGEN-FLUORINE-CODOPED TiO₂ FOR DEGRADATION OF BPA UNDER VISIBLE LIGHT
28. MORPHOLOGY-PROPERTY RELATIONSHIP FOR BINARY ORGANIC FILMS
29. DISCOVERING CHEMICAL CONSTITUENTS OF THE PASSION FLOWER *P. LUTEA*
30. ICP-MS ANALYSIS OF METAL CONTAMINATION IN SOFT TISSUES AND BONY PARTS OF FISH FROM THE MISSISSIPPI RIVER
31. DETERMINATION OF CADMIUM AND LEAD IN TABLE SALTS AND MULTI-MINERAL SUPPLEMENTS BY ICP-MS AFTER SOLID PHASE EXTRACTION WITH A NEWLY SYNTHESIZED CHELATING RESIN
32. A NOVEL SALICYLALDEHYDE FUNCTIONALIZED CHELATING POLYMER FOR SOLID PHASE EXTRACTION OF URANIUM(VI) AND THORIUM (IV) IN SEAWATER SAMPLES FOR ICP-MS DETECTION
33. GENERATION OF VOLATILE CADMIUM SPECIES IN ACIDIC MEDIA WITH THE AID OF AL(III), SC(III), Y(III) IN THE PRESENCE OF KCN FOR ICP-MS MEASUREMENT
34. IMPACT OF LIGHT EXPOSURE AND CHELATING LIGANDS ON ION RELEASE PROPERTIES OF SILVER NANOPARTICLES
35. THE ADSORPTION OF CS, SR AND CO BY MESOPOROUS SILICA MODIFIED BY THIOGLYCOLIC ACID AND NANOCARBON SYNTHESIZED BY VANILLIC ACID
36. OPTICAL AND MASS SPECTROSCOPIC METHODS FOR HALIDE BINDING WITH TRIPODAL-BASED COPPER(II) COMPLEXES
37. A NEW HEXAFUNCTIONAL UREA-BASED RECEPTOR FOR SULFATE BINDING
38. SYNTHESIS AND BINDING EVALUATION OF BIS-3,5-TRIFLUOROMETHYLPHENYL TRIPODAL UREA ANION RECEPTORS
39. SULFATE BINDING AND EXTRACTION STUDIES BY A TRIPODAL TRIS THIOUREA RECEPTOR
40. OXALATE DETECTION WITH A NEW MACROCYCLE-BASED DINUCLEAR COPPER(II) COMPLEX
41. COLORIMETRIC AND FLUORESCENCE DETECTION CYANIDE BY INDICATOR DISPLACEMENT ASSAY USING A SIMPLE CU(II) COMPLEX OF 2,2'-DIAMINO-N-METHYLDIETHYLAMINE
42. THEORETICAL STUDIES OF UREA AND THIOUREABASED TRIPODAL RECEPTORS FOR ANION BINDING

Friday, February 27

**MORNING Room
TC 218A**

- 8:30 VISUAL SENSING OF ANIONS BY SYNTHETIC RECEPTORS
- 8:45 COLORIMETRIC AND FLUORESCENT SENSING OF CITRATE BY A MACROCYCLE-BASED FOLDED DINUCLEAR COPPER(II) COMPLEX IN WATER
- 9:00 THIOPHENE BASED EXTENDED ACYCLIC AND MACROCYCLIC RECEPTORS FOR ANION BINDING
- 9:15 THE PHOTOCHEMISTRY OF N-SUBSTITUTED HETEROAROMATIC SALTS
- 9:30 STUDENT AWARDS CEREMONY FOR BEST ORAL AND POSTER PRESENTATIONS



ECOLOGY AND EVOLUTIONARY BIOLOGY

Thursday, February 26

MORNING

Room Union C

- 9:00 HABITAT USE AND SEASONAL FOOD HABITS OF COYOTE (CANIS LATRANS) IN DAHOMEY NATIONAL WILDLIFE REFUGE, MISSISSIPPI
- 9:15 ENERGETICS OF DRY FOREST BIRDS ON THE YUCATAN PENINSULA, MEXICO
- 9:30 TESTING THE "CAVES AS MICROREFUGIA" HYPOTHESIS: PHYLOGEOGRAPHY OF THE FUNNEL-WEB SPIDER EUAGRUS CHISOSEUS IN CENTRAL TEXAS
- 9:45 PREVALANCE OF AVIAN MALARIA IN MOSQUITOES AT ROSS BARNETT RESERVOIR
- 10:00 BREAK
- 10:15 AN ASSESSMENT OF MALARIA PARASITEMIA AND PREVALENCE IN A POPULATION OF TUFTED TITMICE (BAELOPHUS BICOLOR)
- 10:30 DISTRIBUTION AND PREVALENCE OF HAEMOSPORIDIAN PARASITES IN THE NORTHERN CARDINAL (CARDINALIS CARDINALIS)
- 10:45 BUSINESS MEETING

Thursday, February 26

Poster Session (11:00 AM)

1. PLETHODON WEBSTERI IN MISSISSIPPI
2. DIVERSITY OF BIRD SPECIES AT BEAR PEN PARK, CLEVELAND, MISSISSIPPI
3. ADAPTIVE MOVEMENTS AND THERMOREGULATION IN RAFINESQUE'S BIG-EARED BATS
4. INVASIVE SPECIES VERSUS NATIVE SPECIES PRESENT ON DELTA STATE UNIVERSITY CAMPUS IN CLEVELAND, MISSISSIPPI
5. AQUATIC INVERTEBRATE STUDY OF CHRISTMAS LAKE BRANCH, DAHOMEY
6. NATIONAL WILDLIFE REFUGE, BOYLE, MISSISSIPPI
7. RESULTING TOXICITY STUDIES OF THE NEW ORLEANS NINTH WARD THAT WAS SUBMERGED IN HURRICANE KATRINA WATERS
8. TOXICITY ANALYSES OF MISSISSIPPI GULF COAST WATER AND SOIL SAMPLES TAKEN FROM HURRICANE KATRINA ACTIVITIES

Room

Ballroom II/III

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

Friday, February 27

AFTERNOON

Room TC 228

PANEL DISCUSSION (Joint Presentation with History and Philosophy of Science)

- 2:30 PRACTICAL AND THEORETICAL CONSIDERATIONS FOR METHODS IN BIOLOGY

GEOLOGY AND GEOGRAPHY

Thursday, February 26

MORNING

Room Union D

- 9:45 EEMIAN/SANGAMONIAN INTERGLACIAL HIGHSTAND AND THE MISSISSIPPI COAST
- 10:00 3D BUILDING EXTRACTION FROM LIDAR DATA FOR ACCURATE DAMAGE ESTIMATION IN CASE OF A NATURAL DISASTER



- 10:15 FIRE AND FUELS IN THE ZUNI MOUNTAINS
- 10:30 BREAK
- 11:00 CHANGES IN WATER QUALITY ACROSS LAND-USE CLASSES ALONG GORDON'S AND GREEN'S CREEKS IN THE HATTIESBURG-PETAL AREA
- 11:15 THE IMPACTS OF SEASONAL FLOODING ON THE MISSISSIPPI DELTA AND FUTURE ADAPTATION MANAGEMENT PLANNING
- 11:30 LUNCH

Thursday, February 26

AFTERNOON
Room Union D

- 1:15 FLOOD ANOMALY PROXYS IN CLARK LAKE, SHARKEY CO., MISSISSIPPI
- 1:30 ALLUVIAL SEDIMENTATION ASSOCIATED WITH HISTORICAL LOGGING IN LOW GRADIENT WATERSHEDS IN DESOTO NATIONAL FOREST, MISSISSIPPI
- 1:45 BUSINESS MEETING

Room

Ballroom II/III

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

HEALTH SCIENCES

Thursday, February 26

MORNING

Room Ballroom II/III

POPULATION HEALTH SYMPOSIUM -- IMPROVING HEALTH OUTCOMES IN MISSISSIPPI
FACILITATOR: Claude Brunson, MD

- 8:45 WELCOME AND OPENING REMARKS
- 9:00 KEYNOTE SPEAKER – MARY CURRIER, MD, MPH, STATE HEALTH OFFICER
- 9:45 BREAK
- 10:00 INVITED SPEAKER KRISTI HENDERSON, DNP, CHIEF TELEHEALTH & INNOVATION OFFICER
- 10:30 INVITED SPEAKER MICHAEL FORSTER, PHD, MSW, DEAN, SCHOOL OF PUBLIC HEALTH, USM
- 11:00 DISTINGUISHED PANEL DISCUSSION
- 11:45 MOVEMENT IS LIFE
- 12:00 LUNCH BREAK

Thursday, February 26

AFTERNOON

PARALLEL SESSIONS

PLENARY SESSION I

Room TC 214

- 1:00 FROM INDIVIDUAL CARE TO POPULATION HEALTH: INTEGRATING COMMUNITY HEALTH CENTERS AND POPULATION RESEARCH TO IMPROVE MATERNAL-CHILD

**HEALTH OUTCOMES**

- 1:15 A STUDY OF THE RELATIONSHIP BETWEEN THE PRIMARY CARE WORKFORCE AND OBESITY PREVALENCE RATES IN MISSISSIPPI
- 1:30 TOBACCO CONTROL AND PREVENTION INITIATIVES AT MISSISSIPPI HOSPITALS
- 1:45 A PROFILE OF COMMUNITY HEALTH WORKERS IN MISSISSIPPI
- 2:00 CLINICAL COMMUNITY HEALTH WORKER INITIATIVE: IMPROVING HEALTH OUTCOMES WITH A TEAM-BASED APPROACH
- 2:15 DEVELOPMENT OF AN INTERACTIVE, SPATIAL, WEB-BASED TOOL FOR PHYSICIAN WORKFORCE PLANNING, RECRUITMENT, AND RESEARCH
- 2:45 BUSINESS MEETING

PARALLEL SESSIONS**PLENARY SESSION II****Room TC 227**

- 1:00 ELUCIDATING THE NATURAL HISTORY OF ATHEROSCLEROSIS: THE ATHEROSCLEROSIS RISK IN COMMUNITIES STUDY
- 1:15 HIGH BLOOD PRESSURE AWARENESS IN THE MISSISSIPPI DELTA REGION AMONG BLACKMEN: (BARBERS REACHING OUT TO EDUCATE ON ROUTINE SCREENING)
- 1:30 IMPACT OF EARLY ELECTIVE DELIVERIES ON BIRTH OUTCOMES IN MISSISSIPPI
- 1:45 SOCIO-DEMOGRAPHIC PREDICTORS OF NUTRITIONAL RISK: CROSS SECTIONAL ANALYSES FROM THE UAB STUDY OF AGING II
- 2:00 PUBLIC HIGH SCHOOL FOOTBALL, NOT SOCCER, PROMOTES LINEMEN OBESE BODY MASS INDEX (BMI) TO THE SAME EXTENT IN MISSISSIPPI AS IN LEAN STATES
- 2:15 IDENTIFYING AND REDUCING RACIAL DISPARITIES IN CARDIOVASCULAR DISEASE: THE JACKSON HEART STUDY
- 2:30 BREAK

Room TC 214

- 2:45 BUSINESS MEETING

Room**Ballroom II/III**

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING**Poster Session**

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. A SYSTEMATIC REVIEW ON THE EFFECTS OF TRANSCRANIAL MAGNETIC STIMULATION IN PATIENTS WITH NEUROPATHIC PAIN
2. VERRUCA LOCALIZATION PREDOMINATELY IN BLACK TATTOO INK
3. SYNTHETIC CANNABINOIDS SAFETY: A DANGEROUS PERCEPTION AMONG ADOLESCENTS
4. ASSESSING A VASCULAR PHYSIOLOGICAL OPERATING RANGE FOR CARDIOVASCULAR HEALTH: A CLINICAL PERSPECTIVE
5. NORMATIVE VALUES FOR NASALANCE AND RATE OF SPEECH IN THE SOUTHERN DIALECT
6. DETECTING MALINGERING WITH THE MILLER FORENSIC ASSESSMENT OF SYMPTOMS TEST
7. SPATIAL-TEMPORAL ANALYSIS OF INFLUENZA VIRUS IN THE STATE OF MISSISSIPPI
8. HOUSING AND PHYSICAL DISABILITY
9. HOW CAN HEALTHCARE DISPARITIES OF WOMEN BE SOLVED AND HOW CAN THE QUALITY OF LIFE BE EQUITABLE ACROSS GENDER LINES IN AMERICA?
10. ASSESSMENT OF PROVIDER COMPLIANCE WITH PROPHYLACTIC AND THERAPEUTIC TREATMENT RECOMMENDATIONS FOR CARE OF ADOLESCENT VICTIMS OF SEXUAL ASSAULT

11. CHARACTERISTICS OF DENTISTS PRACTICING IN URBAN, LARGE RURAL, SMALL RURAL, AND ISOLATED AREAS OF MISSISSIPPI
12. HUMAN SUBJECTS RESEARCH IN A SOUTHERN ACADEMIC MEDICAL CENTER: ETHICAL OBSERVATIONS ON SELECTED DEMOGRAPHIC CHARACTERISTICS
13. ADDRESSING THE BURDEN OF COLORECTAL CANCER IN MISSISSIPPI
14. CROSS SECTIONAL ANALYSIS OF MATERNAL AND CHILD HEALTH OUTCOMES AMONG PARTICIPANTS OF THE TOUGALOO COLLEGE DELTA HEALTH PARTNERS (TC/DHP) HEALTHY START PROJECT
15. PREDICTORS OF DENTAL CARE SERVICE UTILIZATION AMONG LATINOS IN MISSISSIPPI, LOUISIANA AND ALABAMA
16. SMOKE-FREE ORDINANCE REDUCES HEALTH RISKS FOR EMPLOYEES IN HOSPITALITY VENUES
17. WHAT IS THE RELATIONSHIP BETWEEN OBESITY AND THE PROXIMITY OF FAST FOOD RESTAURANTS?
18. NATIONWIDE POLICY SCAN OF FEDERALLY QUALIFIED HEALTH CENTERS (FQHC)
19. THE RELATIONSHIP BETWEEN MEDICAL MISTRUST AND HIV TESTING BEHAVIORS AMONG AFRICAN AMERICAN MSM IN JACKSON, MISSISSIPPI.
20. THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND KNOWLEDGE ABOUT CERVICAL CANCER PREVENTION AMONG AFRICAN AMERICAN WOMEN IN JACKSON, MS
21. HOME AND HEALTH: THE EFFECTS OF NEIGHBORHOOD CHARACTERISTICS ON ACCESS AND UTILIZATION OF HEALTHCARE
22. THE EFFECT OF RELIGIOSITY/SPIRITUALITY ON HIV AND STI INFECTIONS IN AFRICAN AMERICAN MSM
23. OBESITY, BODY IMAGE, AND SELF PERCEPTION: A REVIEW OF SELECT ANTHROPOMETRIC FACTORS & HIV-RISK RELATED BEHAVIORS IN AFRICAN AMERICAN MEN WHO HAVE SEX WITH MEN (AAMSM) IN JACKSON, MS.
24. SEX EDUCATION POLICIES IN PUBLIC SCHOOLS: ABSTINENCE-PLUS VS. ABSTINENCE-ONLY
25. EXAMINING STIGMA AMONG HIV POSITIVE PATIENTS: AN ASSESSMENT OF THE PATIENT-PROVIDER RELATIONSHIP
26. EXAMINING THE RELATIONSHIP BETWEEN BODY IMAGE AND HIV SEXUAL RISK FACTORS AMONG AFRICAN AMERICAN MSM IN THE JACKSON, MS MSA
27. EXAMINING THE RELATIONSHIP BETWEEN ACCESS TO RECREATIONAL FACILITIES AND PHYSICAL ACTIVITY AMONG MISSISSIPPIS
28. PRE-EXPOSURE PROPHYLAXIS FOR HIV PREVENTION PROGRAM AT MISSISSIPPI'S FIRST LBGTI CLINIC
29. EBOLA VIRUS DISEASE: SOME FACTS AND COMMENTS ON THE NIGERIAN SITUATION
30. PREVALENCE OF ZONOTIC DISEASES IN DOGS AND CATS BELONGING TO WOMEN ENTERING A REGIONAL DOMESTIC VIOLENCE SHELTER
31. ENGAGING PEOPLE, PROCESSES AND POLICIES TO COMBAT INEQUITIES IN ACCESS TO DIABETES SELF-MANAGEMENT EDUCATION IN RURAL MISSISSIPPI
32. PUTTING THE PIECES TOGETHER TO IMPROVE HEALTH ACCESS
33. TRANSLATING RESEARCH TO PRACTICE IN MISSISSIPPI'S RURAL COMMUNITIES
34. DELTA ALLIANCE FOR CONGREGATIONAL HEALTH: IDENTIFYING AT-RISK AND UNDIAGNOSED INDIVIDUALS THROUGH CONGREGATIONAL HEALTH SCREENINGS
35. PHYSICOCHEMICAL, MICROBIOLOGICAL, AND SOURCE-TRACKING PARAMETERS OF WATER QUALITY IN THE GRAND BAY NERR IN MISSISSIPPI
36. DYNAMICS OF PROGESTERONE, TNF- α AND A METABOLITE OF PGF_{2 α} IN BLOOD PLASMA OF BEEF COWS FOLLOWING EMBRYO TRANSFER
37. HYPERTENSION AND ENDOTHELIN-1 IN AN ANIMAL MODEL OF HELLP SYNDROME
38. ANTI-MYCOBACTERIAL PROPERTIES OF PSEUDOGNAPHALIMUM OBTUSIFOLIUM PLANT EXTRACTS
39. MANIPULATION OF THE MACROPHAGE RESPONSE USING AMINO ACID COATED UHMW-PE IMPLANTED SUBCUTANEOUSLY
40. MORPHOMETRIC EVALUATION OF THE TISSUE IMPLANT RESPONSE SURROUNDING SUBCUTANEOUS TCP, HA, AND ALCAP BIOCERAMIC IMPLANTS
41. REGULATION OF GONADOTROPINS BY MEANS OF SUSTAINED DELIVERY OF PROGESTINS USING EWES AS A MODEL
42. USING PHOTOTHERMAL THERAPY FOR SELECTIVE DETECTION AND DESTRUCTION OF CANCER CELLS
43. EVALUATION OF ADENOCARCINOMA HUMAN ALVEOLAR BASAL EPITHELIAL CELL



- LINE UPON THE EXPOSURE TO OMEGA FATTY ACIDS IN CULTURE
44. THE EFFECTS OF EXPOSING COMBINATIONS OF DENTAL ADHESIVES, PORPHYROMONAS GINGIVALIS LIPOPOLYSACCHARIDES, AND CORTISOL OR NIFEDIPINE TO HUMAN GINGIVAL FIBROBLASTS
 45. PARACRINE SIGNALING IS KEY FOR MELANOMA CELL MIGRATION
 46. CHRONIC CARBON MONOXIDE TREATMENT ATTENUATES DEVELOPMENT OF OBESITY AND REMODELS ADIPOCYTES IN MICE FED A HIGH-FAT DIET.
 47. AN AQUATIC FULBRIGHT EXPERIENCE IN THAILAND
 48. NUCLEAR RADIATIONS AND HUMAN EXPOSURE
 49. SODIUM INTAKE AND ARTERIAL PRESSURE IN NORMOTENSIVE AND DOCA-SALT HYPERTENSIVE RATS DURING CHRONIC MINOXIDIL TREATMENT
 50. STRUCTURE ELUCIDATION OF G-QUADRUPLEX WITHIN THE MID-REGION OF THE KRAS PROMOTER AND IDENTIFICATION OF STABILIZING SMALL MOLECULES AS PROMISING TRANSCRIPTIONAL SILENCERS
 51. THE EFFECTIVENESS OF ANTI-OXIDANTS AGENTS TO POTENTIATE THE PHYSIOLOGICAL RESPONSE OF INSULIN HORMONE USING PANC-1 PANCREATIC LIKE CELL LINE AS A MODEL
 52. PROLIFERATION OF ENDOGENOUS T-REG CELLS IMPROVES THE PATHO-PHYSIOLOGY ASSOCIATED WITH PLACENTAL ISCHEMIA OF PREGNANCY
 53. SUPRA-ADDITIVE EFFECTS OF BENZODIAZEPINE AND NEUROACTIVE STEROID COMBINATIONS ON SCHEDULE-CONTROLLED BEHAVIOR IN RATS
 54. ANTINOCICEPTIVE EFFICACY OF CHRONIC FLUOXETINE TREATMENT
 55. CHARACTERISTICS OF PHYSICIANS PRACTICING IN URBAN, RURAL, AND ISOLATED AREAS IN MISSISSIPPI

Friday, February 27

MORNING

Room TC 227

PARALLEL SESSIONS

PLENARY SESSIONS III

- | | |
|------|--|
| 8:15 | OPENING REMARK |
| 8:30 | ACUPUNCTURE AND PRURITUS |
| 8:45 | INFLAMMATORY BIOMARKERS AND BLOOD PRESSURE VARIABILITY: THE GENETIC EPIDEMIOLOGY NETWORK OF ARTERIOPATHY |
| 9:00 | HIPPOCAMPAL VOLUME IS ASSOCIATED WITH VERBAL MEMORY PERFORMANCE IN OLDER, BUT NOT YOUNGER ADULTS |
| 9:15 | COMPARISON OF CEA, NSE, AND CYFRA 21-1 FOR THE SERODIAGNOSIS OF LUNG CANCER |
| 9:30 | EFFECTS OF ENDOTHELIN-A RECEPTOR AND ANGIOTENSIN CONVERTING ENZYME INHIBITION ON THE DEVELOPMENT OF PROGRESSIVE PROTEINURIA IN DIABETIC DAHL SS RATS WITH PRE-EXISTING RENAL DISEASE |
| 9:45 | POST RENAL TRANSPLANTATION DIABETES MELLITUS IN RELATION TO CORTICOSTEROID DOSING |

Friday, February 27

MORNING

Room TC 229

PARALLEL SESSIONS

PLENARY SESSIONS IV

- | | |
|------|---|
| 8:15 | OPENING REMARKS |
| 8:30 | DICHLOROMETHANE-DERIVED PSEUDOGNAPHALIMUM OBTUSIFOLIUM EXTRACT DECREASES PROLIFERATION OF BREAST DUCTAL EPITHELIAL ADENOCARCINOMA CELL LINE |

8:45	EFFECTS WHOLE LEAF PSEUDOGNAPHALIIUM OBTUSIFOLIUM CHEMICAL EXTRACTS ON PROLIFERATION OF MCF7 ADENOCARCINOMA CELLS
9:00	TRICHOMONAS VAGINALIS VIRUS IN 8 ATCC CELL LINES
9:15	REGRESSION OF FUNCTIONAL CAPACITY OF SK-OV-3 OVARIAN CANCER LIKE CELL LINE BY SUSTAINED DELIVERY OF TQ AND EGCG
9:30	KILLING CANCER NATURALLY
9:45	BIOLOGICAL EFFECTS OF NUCLEAR RADIATIONS
10:00	BREAK

Poster Session II (Undergraduate and High School (10:00-12:00))

56. RATS WITH HYPERTENSION, HEMOLYSIS ELEVATED LIVER ENZYMES AND LOW PLATELETS (HELLP) HAVE INCREASED PLACENTAL AND FASL
57. EVALUATION OF THE ANTI-MYCOBACTERIAL PROPERTIES OF P. OBTUSIFOLIUM PLANT EXTRACTS
58. ADMINISTRATION OF ANTI-INFLAMMATORY CYTOKINE AMELIORATES BRAIN INFLAMMATION AND IMPROVES NEUROBEHAVIORAL PERFORMANCE IN JUVENILE RATS FOLLOWING NEONATAL EXPOSURE TO LIPOPOLYSACCHARIDE
59. NANOTECHNOLOGY-BASED APPROACH TO IMPROVE FERTILITY OUTCOMES IN SWINE
60. TRICHOMONAS VAGINALIS VIRUS TREATMENT WITH RIBAVIRIN
61. EVALUATION OF ANTI-MYCOBACTERIAL AGENTS USING MYCOBACTERIUM SMEGMATIS
62. THE EFFECT OF SELENOMETHIONE ON COX-2 EXPRESSING CELL LINES
63. THE EFFECT OF SELENOMETHIONE IN COMBINATION WITH DOXORUBICIN ON COX-2 EXPRESSING CANCER CELL LINES
64. FOOTBALL MOUTHPIECE MICROBIOTA
65. THE EFFECTS OF INCREASED EXPOSURE TO UVC LIGHT ON HUMAN SKIN MICROBIOTA
66. OUTBREAK TRACKING: PSEUDOMONAS AERGINOSA IN A NEWBORN INTENSIVE CARE UNIT
67. GROWTH AND CELL VIABILITY OF SKOV-3 CELLS FOLLOWING TREATMENT WITH INOSITOL 6 PHOSPHATE.
68. THE EFFECTS OF OMEGA 3 FATTY ACIDS ON SKOV-3 CELLS
69. CAN NONSTEROIDAL ANTI-INFLAMMATORY DRUGS IN COMBINATION WITH 5-FU ENHANCE APOPTOSIS IN FADU?
70. THE EFFECT OF CAPTOPRIL AND ANGIOTENSIN ON THE HUMAN CARCINOMA A549 CELL LINE IS THE
71. IS THE CUP HALF EMPTY OR HALF FULL: FALSE NEGATIVE IMMUNOASSAY SCREENING FOR METHAMPHETAMINE
72. SPECIFIC ANTIOXIDANT, PTEROSTILBENE, FAILS TO REDUCE BLOOD PRESSURE IN FEMALE SPONTANEOUSLY HYPERTENSIVE RATS.
73. T CELL-DEPENDENT B CELL ACTIVATION PLAYS A ROLE IN MEDIATING HYPERTENSION AND PATHOPHYSIOLOGY IN RESPONSE TO CD4+ T CELLS FROM REDUCED UTERINE PERFUSION PREGNANT RATS
74. NOISE EXPOSURE RESULTS IN VESTIBULAR DEFICITS IN RATS
75. ANTI-INFLAMMATORY CYTOKINE INTERLEUKIN-1 RECEPTOR ANTAGONIST ATTENUATES LIPOPOLYSACCHARIDE-INDUCED NEUROBEHAVIORAL DEFICITS AND BRAIN INFLAMMATION IN NEONATAL RATS
76. INFLAMMATION HYPEROXIA AND WHITE MATTER INJURY
77. EFFECTS OF BENZODIAZEPINE ON SLEEP AND HOMEOSTASIS IN ADULT RATS
78. IN SILICO ANALYSIS OF EBOLAVIRUS EVOLUTION
79. TREATMENT DEPTH EFFECTS OF THE ZAVATION LUMBAR BONE GROWTH STIMULATOR
80. HYPERTENSION DURING PREGNANCY IS ASSOCIATED WITH NEUROINFLAMMATION

10:00-12:00 GRADUATE SYMPOSIUM

1:30-3:00 UNDERGRADUATE SYMPOSIUM



HISTORY AND PHILOSOPHY OF SCIENCE

Thursday, February 26

MORNING

Room TC 228

- 9:30** IS THE SCIENCE OF PSYCHOLOGY REDUCIBLE TO NEUROSCIENCE?
10:00 A NETWORK THEORY OF WILL-POWER

10:30 BREAK

10:45 A CRITIQUE OF DAVID LEWIS' "MAD PAIN AND MARTIAN PAIN"
11:15 DO ENVIRONMENTAL SCIENCE ADVISERS REPRESENT THE THREAT OF A
TECHNOCRACY?

11:45 BREAK

Thursday, February 26

AFTERNOON

Room TC 228

- 1:00** BLOCKING THE PESSIMISTIC META-INDUCTION: A REFUGE FOR REALISM
1:30 DIVISIONAL BUSINESS MEETING
2:00 NO HIDDEN VARIABLES: FROM NEUMANN'S TO KOCHEN AND SPECKER'S THEOREM IN
QUANTUM MECHANICS
2:30 SEEING IS BELIEVING; IT'S INTUITIVELY OBVIOUS!

Room

Ballroom II/III

- 3:15** DODGEN LECTURE AND MEMBERSHIP RECOGNITION

Friday, February 27

MORNING

Room TC 228

- 9:00** BIOLOGICAL ENTITIES AND PERSISTENCE OVER TIME: BIOLOGICAL INDIVIDUALITY
AND THE ORGANISM PROBLEM
9:30 THE AESTHETICS OF SCIENTIFIC REPRESENTATION OF THE HISTORY AND DIVERSITY
OF LIFE ON EARTH
10:00 THE PERSISTENCE OF THE "STORM IN A TEACUP"

10:30 BREAK

AFTERNOON

Room TC 228

- 12:30** JOHN HERSHEL, WILLIAM WHEWELL, AND NINETEENTH CENTURY ROOTS OF
SCIENTIFIC METHOD



1:00 VICTORIAN SCIENCE: THE MILIEU IN WHICH IT WAS BORN, THE MODERNITY INTO WHICH IT EVOLVED

1:30 PHILOSOPHY OF HENNIG'S PHYLOGENETIC SYSTEMATICS

2:00 BREAK

PANEL DISCUSSION (Joint presentation with Ecology and Evolutionary Biology)

2:30 PRACTICAL AND THEORETICAL CONSIDERATIONS FOR METHODS IN BIOLOGY

MARINE AND ATMOSPHERIC SCIENCES

Thursday, February 26

MORNING

Room TC 227

9:00 (Invited Talk) GIS TOOL FOR ASSESSMENT OF QUARTERLY AIR POLLUTION EXPOSURE AND ITS ASSOCIATION WITH ASTHMA IN EASTERN TEXAS STATE

9:30 A SPATIAL ANALYSIS OF TORNADO SIRENS IN MISSISSIPPI

9:45 SURFACE THERMODYNAMIC CONDITIONS OF MISSISSIPPI SEA BREEZE ENVIRONMENTS

10:00 ENVIRONMENTAL WATER QUALITY OF THE PEARL RIVER AND HEALTH EFFECTS

10:15 BREAK

10:30 MODELING OVERFILTRATION OF MARINE PATHOGENS

10:45 GIS ANALYSIS OF TORNADO EVENTS IN MISSISSIPPI

11:00 ENVIRONMENTAL MODELING AND PREDICTION FOR CLIMATE AND SEASONAL FLUCTUATIONS OVER GRANDBAY OF GULF OF MEXICO

11:15 BUSINESS MEETING

AFTERNOON

Room

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

- 1. IMPACTS OF SAHARAN DUST TRANSPORT OVER ATLANTIC ON PARTICULATE MATTER, OZONE AND HEALTH EFFECTS**
- 2. ASSESSMENT AND SPATIAL VARIATION ANALYSIS OF WATER QUALITY IN GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE**
- 3. EPIZOOTIOLOGICAL MODELING OF MARINE INFECTIOUS DISEASE**
- 4. ADVANCE WATER QUALITY MODELING ON OYSTER RESTORATION AT THE NORTHERN GULF OF MEXICO**



MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Thursday, February 26

MORNING Room
TC 229

9:00 SYMPOSIUM

STEM, PROJECT-BASED LEARNING: STRATEGIES AND EXPERIENCES IN THE CLASSROOM

10:00 BREAK

10:30 FLOOD EXTENT SIMULATION: A GEOGRAPHIC INFORMATION SYSTEM (GIS) RIVER FLOODING EXTENT APPROACH

10:50 PROJECT MANAGEMENT FRAMEWORK FOR CLOUD AND HPC RESOURCE PROVIDERS

11:10 DEVELOPING A WEB-BASED INTERFACE TO EVALUATE DOWNSCALED GFS PRODUCTS

11:30 DESIGN OF AN ALGORITHMS FOR BIOINFORMATICS COURSE FOR COMPUTER SCIENCE MAJORS

11:50 BREAK

Thursday, February 26

AFTERNOON

Room TC 229

1:20 OPENING REMARKS

1:30 MONTE CARLO SIMULATION USING DETERMINISTIC BEHAVIOR: AREA PROBLEM

1:50 TRANSFORMING DATA INTO INFORMATION TO SUPPORT EVIDENCE-BASED DECISION MAKING

2:10 D WAVELET FEATURE EXTRACTION AND APPLIED TO FRUIT BRUISE DETECTION

2:30 BUSINESS MEETING

Room

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. **ENHANCING PARENT INVOLVEMENT IN NC-CCSS FOR K-2 MATHEMATICS**
2. **USING A MATLAB/PHOTOSHOP INTERFACE TO ENHANCE IMAGE PROCESSING IN THE INTERPRETATION OF RADAR IMAGERY**
3. **TOWARDS ONLINE TEACHING OF ELECTRICAL AND COMPUTER ENGINEERING LABORATORIES**
4. **IMPLEMENTATION OF AN ARBITRARY PRECISION INTEGER ARITHMETIC PACKAGE**
5. **ADDING FUNCTIONALITY TO FREEMAT: IMPLEMENTING *ode45rev* FUNCTION TO SOLVE SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS**



Friday, February 27

MORNING

Room TC 226

9:00-10:00

WORKSHOP

CHOICE OF STATISTICAL TECHNIQUES:

PARAMETRIC VERSUS NON PARAMETRIC METHODS

PHYSICS AND ENGINEERING

Thursday, February 26

MORNING

Room TC 218 B

8:30 DIRECT VISUALIZATION OF SHEAR WAVE IN MICELLAR FLUID

8:45 EFFECT OF FLUORINATION TREATMENT ON THE HYDROLYTIC DEGRADATION RESISTANCE OF Y-TZP

9:00 AN INVESTIGATION OF WIND-GROUND COUPLING

9:15 COMPUTING OF ULTRASONIC PRESSURE FIELDS IN FELINE BRAIN

9:30 BREAK

9:45 ON THE NATURE OF HIGH FREQUENCY LOCALIZED VIBRATIONS IN HYDROGENATED AMORPHOUS SILICON: A FIRST-PRINCIPLES STUDY

10:00 STRUCTURAL MODELING OF AMORPHOUS GRAPHENE: A FIRST-PRINCIPLES APPROACH

10:15 COMPARATIVE STUDY OF SATURATION EFFECT IN LASER INDUCED BREAKDOWN SPECTROSCOPY (LIBS) AND LASER INDUCED MOLECULAR EMISSION SPECTROSCOPY (LIMES)

10:30 RADIAL OSCILLATIONS OF A GAS BUBBLE VIA CANONICAL PERTURBATION THEORY: FREQUENCY EXPANSION TO FOURTH ORDER

10:45 BREAK

11:00 NEW PHYSICS EFFECTS ON DEEP INELASTIC TAU NEUTRINO SCATTERING THROUGH CHARGED CURRENT

11:15 SEMI-LEPTONIC DECAY RATE OF $\Lambda_b \rightarrow \Lambda_c \tau \bar{\nu}_\tau$

11:30 EXACT DIAGONALIZATION OF FRUSTRATED QUANTUM SPIN CHAINS

11:45 MASS TREND ANALYSIS OF THE AME2003 WHICH ASSUMES CLUSTERING LEADS TO AN EMPIRICAL MASS FORMULA THAT IMPROVES ON THE SEMI-EMPIRICAL MASS FORMULA, PARTICULARLY FOR N = Z NUCLEI

12:00-1:30 BUSINESS MEETING

AFTERNOON

Room TC 218B

1:30 NOVEL TESLA-TYPE HEAT EXCHANGERS FOR MICROFLUIDIC APPLICATIONS

1:45 HORMONE INDEPENDENT PROTEIN TARGETS & DRUG DESIGNING FOR BREAST AND PROSTATE CANCERS

2:00 BREAK

2:15 DEVELOPMENT OF A REMOTE LABORATORY

2:30 POPULATION MONITORING AFTER RADIATION INCIDENT

2:45 STUDY OF (NORM) RADIONUCLIDES IN FARM RAISED CATFISH IN STATE MISSISSIPPI (MS)

Room

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

Poster Session Immediately Following Dodgen Lecture

**EVENING****Poster Session**

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. FETUIN-A THERAPY: A NEW APPROACH FOR THE TREATMENT OF VASCULAR CALCIFICATION
2. MONTE CARLO SIMULATION OF THE MISSISSIPPI STATE AXION SEARCH
3. CHARACTERIZING AND ANALYZING HAMMAMATSU MULTIANODE PHOTO MULTIPLIER TUBES FOR USE IN THE RICH DETECTOR IN THE JEFFERSON LAB HALL B CLAS 12 SPECTROMETER.
4. NOVEL TREATMENT OF OSTEOSARCOMA VIA MAGNETIC NANOPARTICLES
5. MICROSTRUCTURAL CHANGES OF PORCINE LUNG PARENCHYMA UNDER COMPRESSIVE LOADING
6. REPORTING ON THE A=74 CHAIN IN THE BETA DECAY OF Z=29-31

Friday, February 27

MORNING**Room TC 218 B**

- 9:00 HIGH TEMPERATURE RESONANT ULTRASOUND SPECTROSCOPY STUDY ON LEAD MAGNESIUM NIOBATE - LEAD TITANATE (PMN-PT) RELAXOR FERROELECTRIC MATERIAL
- 9:15 ULTRASONIC BAND GAPS IN TWO-DIMENSIONAL PHONONIC METAMATERIALS WITH PERIODIC ARRAYS OF COPPER RODS
- 9:30 AN ASSESSMENT OF THE ANGULAR SPECTRUM METHOD FOR THE PROPAGATION OF
- 9:45 ULTRASONIC FIELDS COMPUTING OF ULTRASONIC PRESSURE FIELDS IN FELINE BRAIN SHEAR WAVES IN VISCOELASTIC WORMLIKE MICELLAR FLUIDS
- 10:00 ACOUSTICAL MEMORY IN A YZ-CUT LITHIUM NIOBATE PLATE
- 10:15 STUDY OF SrCl SPECTRA BY LASER INDUCED BREAKDOWN SPECTROSCOPY (LIBS)

PSYCHOLOGY AND SOCIAL SCIENCES

Thursday, February 26

MORNING**Room Ballroom II/III**

- 9:00-11:00 POPULATION HEALTH SYMPOSIUM -- IMPROVING HEALTH OUTCOMES IN MISSISSIPPI

MORNING**Room TC 226**

- 11:00 CULTURAL CONSIDERATIONS TO SUICIDE ATTEMPTS OF AFRICAN AMERICANS: THE POSTULATION OF CREATING A CULTURE SPECIFIC RISK ASSESSMENT
- 11:15 EFFECT OF PERCEIVED GRANDPARENTAL ACCEPTANCE ON AFRICAN AMERICAN STUDENTS
- 11:30 ASSESSMENT OF PSYCHOLOGICAL RESILIENCE TO COASTAL DISASTERS
- 11:45 RACIAL IDENTITY, RACIAL DISCRIMINATION AND PERCEIVED STRESS AMONG AFRICAN AMERICAN COLLEGE STUDENT
- 12:00 BREAK
- 1:00 THE ATTITUDES TOWARD PLEDGING AMONG AFRICAN AMERICAN GREEK AND NON-GREEK AFFILIATES
- 1:15 BIRTH ORDER EFFECTS ON PERSONALITY AMONG AFRICAN AMERICAN COLLEGE STUDENTS
- 1:30 RACE AND PERCEPTION OF POLICE MISCONDUCT AND CONFIDENCE IN THE POLICE
- 1:45 LOCUS OF CONTROL AND GENDER AMONG AFRICAN AMERICAN COLLEGE STUDENTS
- 2:00 SOCIAL ANXIETY AND CONFLICT IN ROMANTIC RELATIONSHIPS



2:15 SOCIAL ANXIETY PSYCHOLOGICAL EFFECTS OF RELOCATED DARFUR GENOCIDE SURVIVAL

2:30 DIVISION BUSINESS MEETING

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. THE RELATIONSHIP BETWEEN PERSONALITY AND METACOMPREHENSION ACCURACY
2. DETECTING MALINGERING BY THE MILLER FORENSIC ASSESSMENT OF SYMPTOMS TEST
3. PERSISTENT NEGATIVE EFFECTS OF ALCOHOL DRINKING ON NOVEL OBJECT RECOGNITION IN RHESUS MACAQUES
4. USING GIS TO STUDY THE IMPACT OF NATURAL DISASTERS IN MISSISSIPPI AND HOW IT DISPROPORTIONATELY AFFECTS DIFFERENT DEMOGRAPHIC GROUPS
5. WEIGHT STIGMA AND REGIONAL LOCATION: SURPRISING CORRELATIONS

SCIENCE EDUCATION

Thursday, February 26

EVENING

Room

Ballroom II/III

3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION

EVENING

Poster Session

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

1. BE SMART, BE ACTIVE, BE A LEADER: A HEALTH SCIENCE EDUCATION CURRICULUM AND INSTRUCTIONAL MATERIALS FOR EARLY CHILDHOOD CLASSROOMS IN MISSISSIPPI

Friday, February 27

FRIDAY AFTERNOON

Room TC 210

- 1:00 STUDENT PERCEPTIONS OF THE RECEIVED CURRICULUM: THE RELEVANCE AND USEFULNESS OF HIGH SCHOOL BIOLOGY
- 1:15 OPTIMIZATION OF ONLINE DISCUSSION FORUMS FOR STUDENTS' CLIMATE LITERACY
- 1:30 SENSE OF PLACE WRITING TEMPLATES: INTEGRATION OF FORMATIVE SCIENCE ASSESSMENTS, STUDENT EXPERIENCES, AND COMMON CORE ENGLISH LANGUAGE ARTS STANDARDS
- 1:45 IMPLICATIONS OF DEGREE MODIFICATION AND AN INNOVATIVE SCIENCE ARTIFACTS PORTFOLIO IN SECONDARY SCIENCE EDUCATION PROGRAM
- 2:00 USING ARGUMENTATION AND DISCREPANT EVENTS TO INCREASE STUDENT INTEREST IN THE BIOLOGICAL SCIENCES
- 2:15 COMMUNITY SERVICE SHADOW-EDUCATION PROJECTS AND ACTIVITIES TO REINFORCE BASIC SCIENCE PRINCIPLES
- 2:30 BREAK
- 2:45 TEACHER'S PERCEIVED BENEFITS AND BARRIERS TO HANDS-ON PERFORMANCE TASKS

**IN THE SCIENCE CLASSROOM**

- 3:00 WORKSHOP FOR PRE-SERVICE TEACHERS TO DEVELOP UNDERSTANDING OF THE ROLE OF INQUIRY AND PLACE-BASED INSTRUCTION IN ENVIRONMENTAL EDUCATION**
- 3:15 UTILIZING MULTIMEDIA PRE-TRAINING AND AN INTERACTIVE ENZYME MODEL TO FOSTER UNDERSTANDING OF SUBSTRATE SPECIFICITY OF ENZYMES**
- 3:30 MISSISSIPPI SCIENCE TEACHERS UTILIZING THE COOPERATIVE TEACHING MODEL TO INCREASE PERCEPTIONS OF EFFECTIVE COMMUNICATION METHODS AMONG STEM GRADUATE STUDENTS**
- 3:45 A CALL FOR DIFFERENTIATED INSTRUCTION TO BE A NORMAL COMPONENT OF PROFESSIONAL DEVELOPMENT**

ZOOLOGY AND ENTOMOLOGY

Thursday, February 26

MORNING**Room Union H**

- 9:00 COMPARATIVE ANALYSIS OF QPCR AND DDPCR METHODS FOR QUANTIFICATION OF BACTERIAL LOAD IN TICK TISSUES**
- 9:15 PENTATRICOPEPTIDE REPEAT PROTEINS AND MITOCHONDRIAL RIBOSOMES**
- 9:30 STUDIES ON THE DISTRIBUTION OF POLLUTANTS IN THE LOWER MISSISSIPPI RIVER IN PORT GIBSON AREA AND ALCORN STATE UNIVERSITY (ASU) POND NEAR MEDGAR EVERS WILEY VILLAGE DORMITORY DURING THE SPRING AND SUMMER OF 2014**
- 9:45 A COMPARATIVE STUDY ON THE SEASONAL DISTRIBUTION OF POLLUTANTS IN TWO BODIES OF LOTIC WATER, MUD ISLAND CREEK AND COLES CREEK**
- 10:00 ECOLOGICAL SERVICE OF CAVITY DWELLING BIRDS**
- 10:15 NATAL ENVIRONMENT EFFECTS ON FEMALE SIZE, EGG SIZE AND EGG NUMBER IN CONTAINER-INHABITING MOSQUITOES**
- 10:30 NATAL ENVIRONMENT EFFECTS ON FEMALE SIZE, EGG NUMBER AND EGG VOLUME IN CONTAINER-INHABITING MOSQUITOES**
- 11:00 BUSINESS MEETING**

Thursday, February 26

Room**Ballroom II/III**

- 3:15 DODGEN LECTURE AND MEMBERSHIP RECOGNITION**

EVENING**Poster Session**

Immediately Following Dodgen Lecture (location and set-up time will be posted on-line at www.msacad.org)

- 1. COMPARATIVE TOXICITY OF PYRETHROID INSECTICIDES TO SQUASH BUG**
- 2. EFFECTS OF HUMAN INTERACTION OF SQUIRRELS IN MISSISSIPPI RIVER DELTA**
- 3. SOCIAL ASPECTS OF BASKING BEHAVIOR IN FRESHWATER TURTLES**
- 4. ALTERNATIVE MATERIAL NEST BOXES AND IMPACTS ON NESTING PHYSIOLOGY AND ADULT BEHAVIOR IN THE EASTERN BLUEBIRD**
- 5. ROLE OF PENTATRICOPEPTIDE REPEAT MOTIFS ON PROTEIN-RNA INTERACTIONS**
- 6. ASSEMBLY OF MITOCHONDRIAL RIBOSOMES**
- 7. INVESTIGATION OF WATER QUALITY OF ROSS BARNETT RESERVOIR, MISSISSIPPI, USA**
- 8. ECOLOGICAL SIGNIFICANCES OF CLIMATE CHANGE**

Key to Abbreviations

O = Oral Presentation

P = Poster Presentation

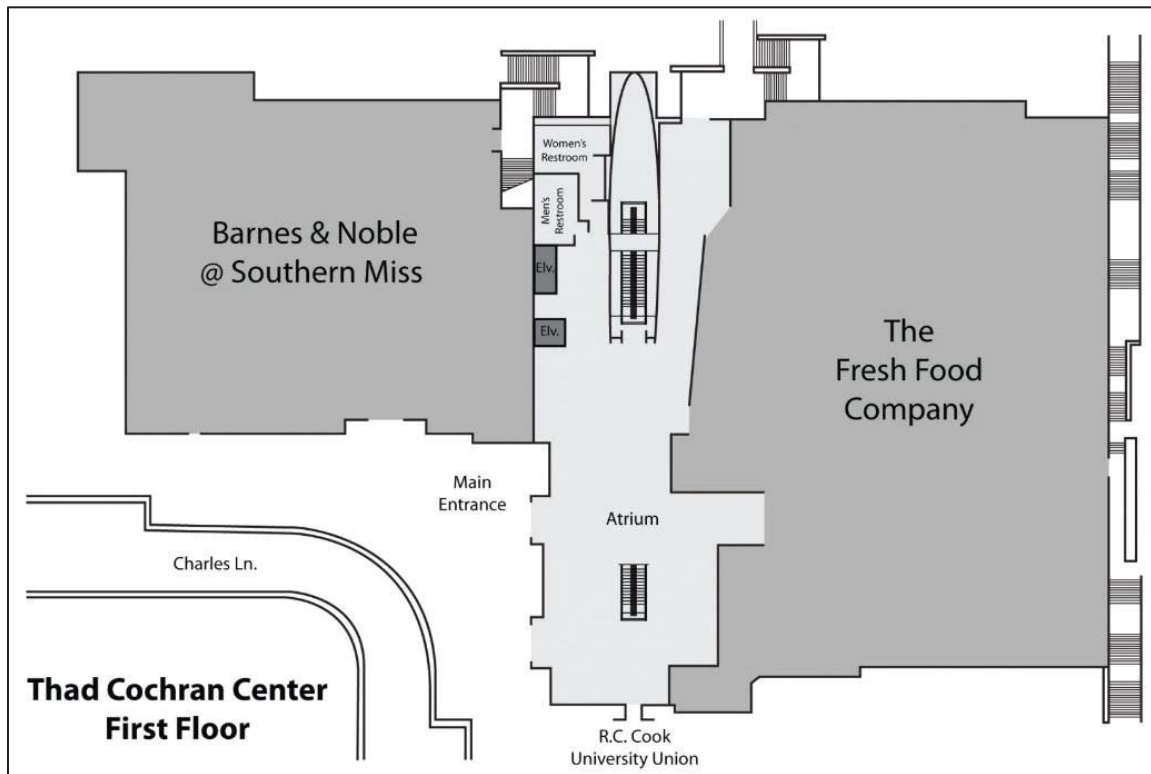
1st number is Division

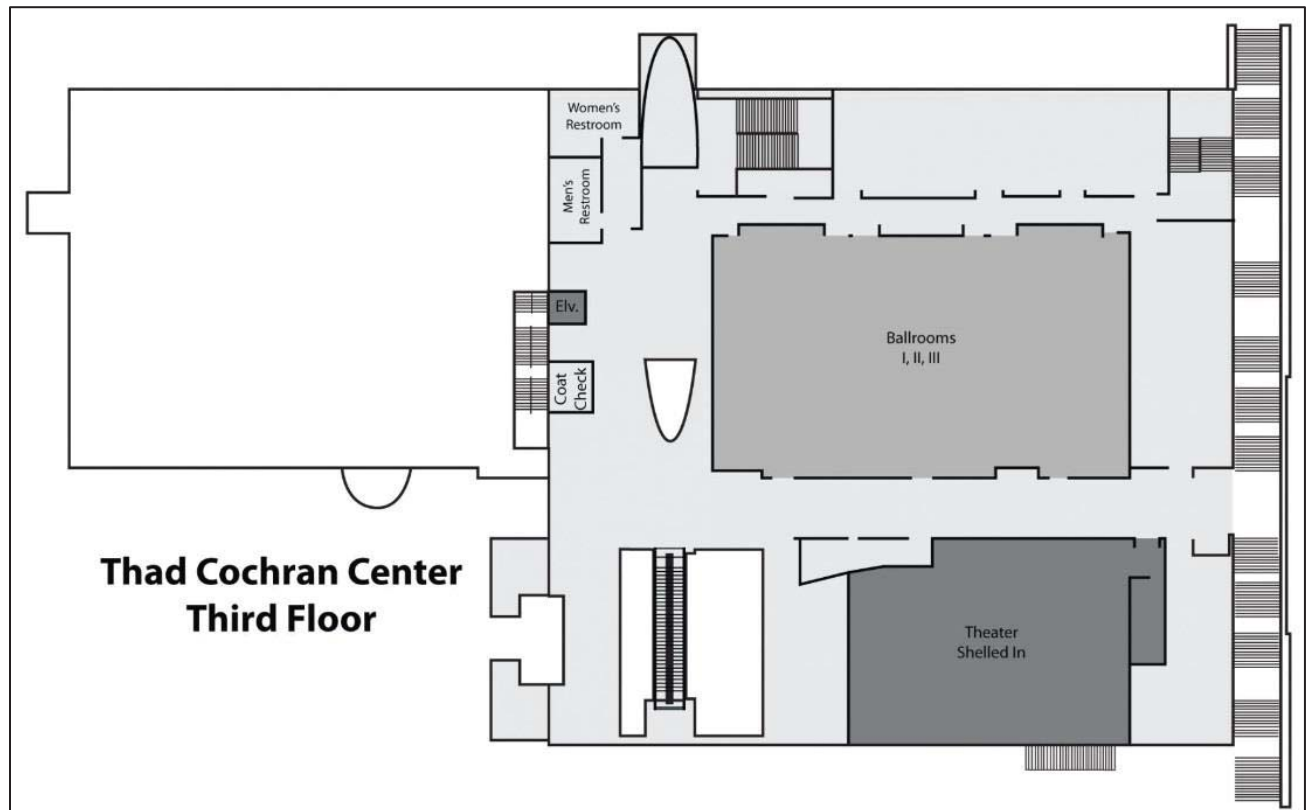
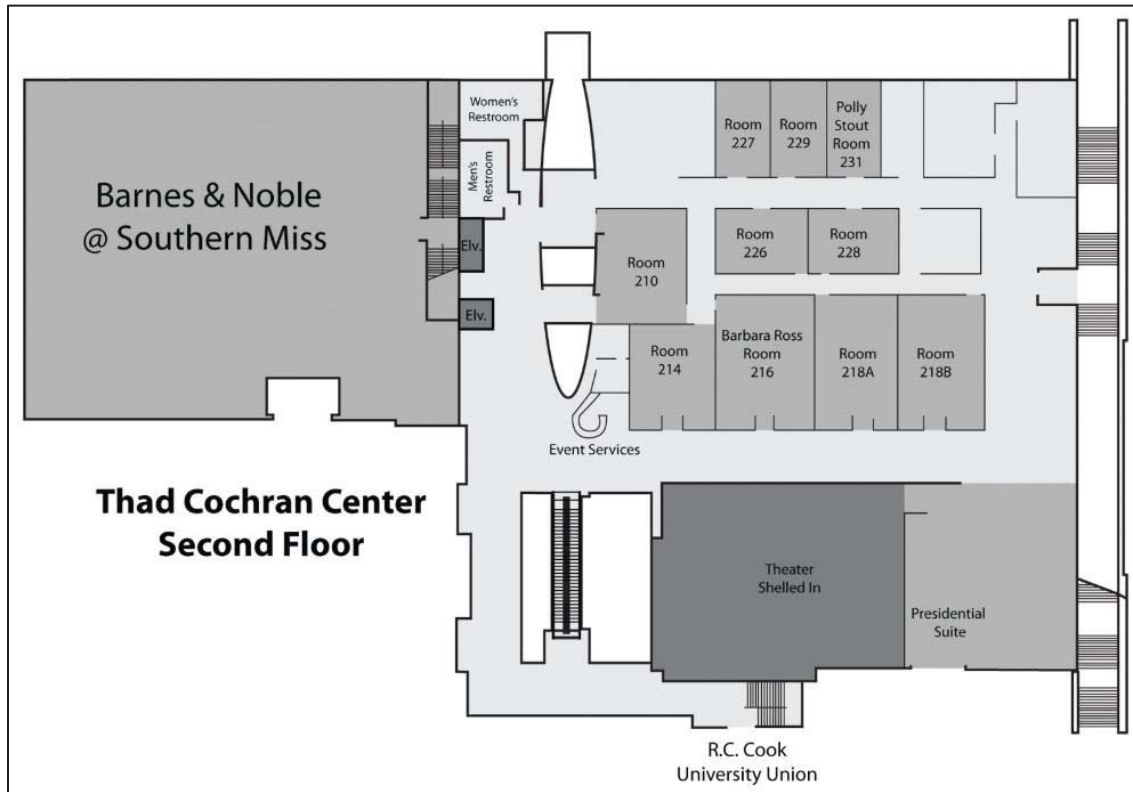
- 1 Agriculture and Plant Science (pages,
- 2 Cellular, Molecular, and Developmental Biology
- 3 Chemistry and Chemical Engineering
- 4 Ecology and Evolutionary Biology
- 5 Geology and Geography
- 6 Health Sciences
- 7 History and Philosophy of Science
- 8 Marine and Atmospheric Sciences
- 9 Mathematics, 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

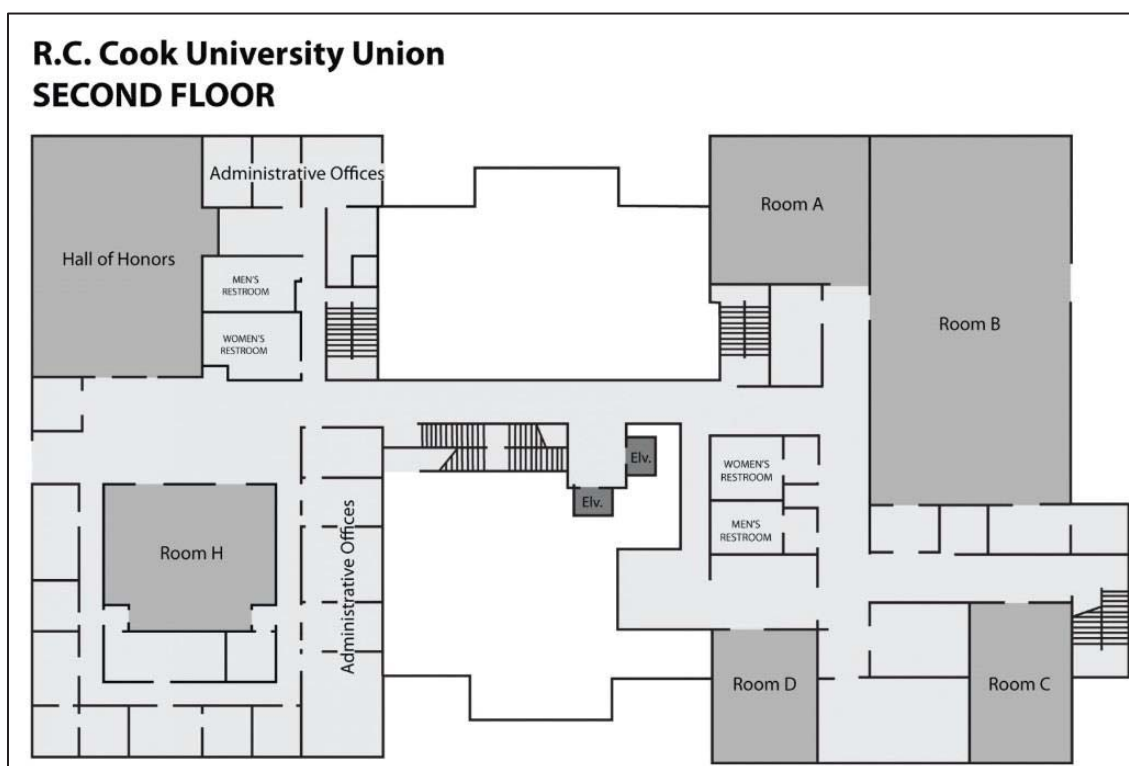
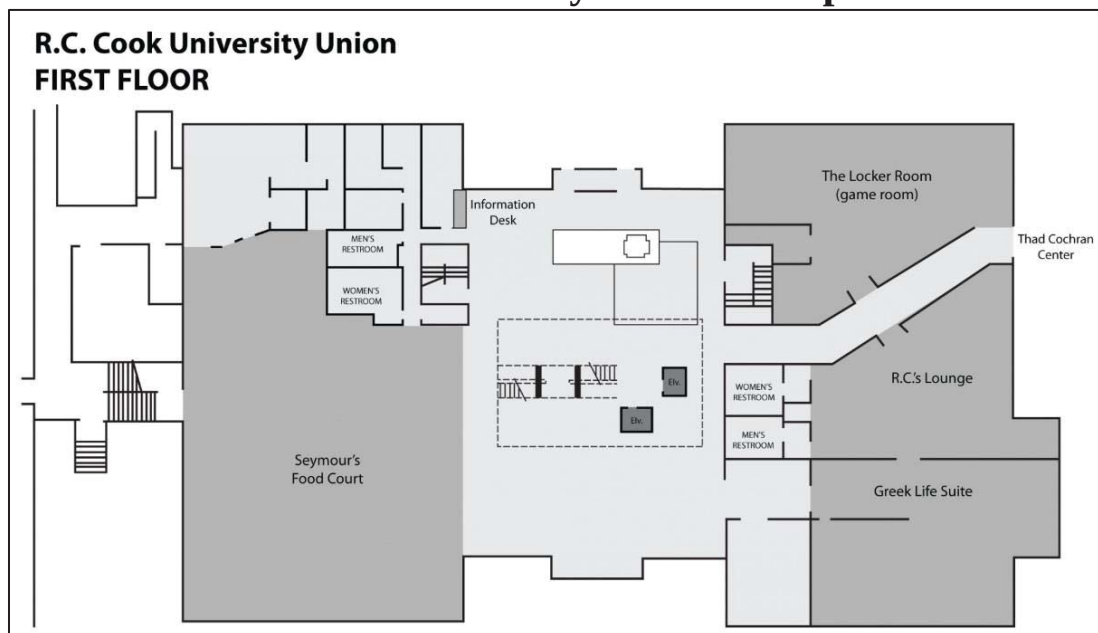
Eg., O3.04 = oral presentation (O) number 4 in the division of Chemistry and Chemical Engineering (3)

Thad Cochran Center Floorplans





R.C. Cook University Union Floorplans



Mississippi INBRE Bioinformatics Symposium

Big Data (BD2K) to Knowledge – Pitfall, Progress, and Future

Thursday, February 26, 2015, Time 9:30 AM to 12:00 PM, Location TC 214

Organizer: Dr. Shahid Karim

Department of Biological Sciences, University of Southern Mississippi

9:30-9:35: Welcoming remarks



9:35-10:00

Dr. Bindu Nanduri

College of Veterinary Medicine,
Mississippi State University

“Big Data, Bioinformatics and No-Boundary Thinking”



10:00-10:25

Dr. Joe Zhang

School of Computing, University of
Southern Mississippi

“Data Mining and Biological Network Analysis”



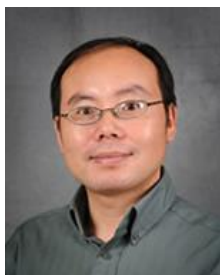
10:25-10:50

Dr. Deepak Kaushal

Tulane National Primate Center

“Intrgranulomatous transcriptomics of *Mycobacterium tuberculosis* infection in a human-like model”

10:50-11:00: BREAK



11:00-11:25

Dr. Henry X-F. Wan

Department of Basic Sciences, College of
Veterinary Sciences, College of Medicine,
Mississippi State University

“Emerging opportunities and challenges of Big Data to Knowledge in influenza vaccine strain selection”



11:25-11:50

Dr. Alex Flynt

Department of Biological Sciences,
University of Southern Mississippi

“Small RNAome of mites”

11:50-12:00: Concluding remarks

Agriculture and Plant Science

Chair: Melinda Butler

USDA-ARS

Vice-Chair: Girish Panicker

Alcorn State University

Thursday, February 26, 2015

MORNING

Room TC 231

O1.01

9:00 COMPARATIVE ANALYSIS OF YIELD AND FRUIT QUALITY ATTRIBUTES OF ORGANICALLY GROWN MELONS (*CUCUMIS MELO L.*) FROM AROUND THE GLOBE

Girish Kumar Panicker, Germania Salazar-Mejia, Padma Nimmakalaya, Yan Thomason, and Umesh Reddy

Alcorn State University, Lorman, MS, USA

Consumer demand for fruit and vegetables has increased over the past few decades due to the growing awareness of their contributions in nutrition and human health. US melon growers are seeking to diversify the varieties and rotate them every season to sustain melon production and protect them from the devastating diseases. Development of resistant and high quality melon varieties is critical to the economic prosperity of US melon growers. The main objective of our melon research program is to implement whole genome level characterization of diverse melon groups and breed superior melon types by pyramiding favorable allele combinations into the US melons for their fruit quality, disease resistance, adaptability, and yield. Fruit quality attributes were evaluated for 103 melon cultivars grown under organic conditions in a two year field study on Memphis silt loam in southwest Mississippi. These melon types have unique textures and flavors and vary in their sweetness and shelf life. Fruit quality attributes including total soluble solids, rind pressure, thickness of flesh, fruit weight, flesh pressure, cavity length and width, and yield were evaluated for these Melons. On the basis of the quality analysis, 25 varieties have been selected for distribution in all land grant universities in the nation.

O1.02

9:15 PLANT DENSITY EFFECTS ON BIOMASS DEVELOPMENT AND RATE OF RESIDUE DECOMPOSITION OF FOUR VARIETIES OF SWITCHGRASS (*PANICUM VIRGATUM L.*) ON MEMPHIS SILT LOAM FOR EROSION PREDICTION, NUTRIENT MANAGEMENT, AND CONSERVATION PLANNING

Crystal Lenora Vance¹, Girish Panicker¹, Patrick Igbokwe¹, LaShunda Anderson¹, Germania Salazar-Mejia¹, and Timothy Carry²

*Alcorn State University, Lorman, MS, USA*¹, *Army Cold Regions Research and Engineering Laboratory, Hanover, NH USA*

Soil erosion is a major conservation issue on farmlands around the globe. Switchgrass is a warm-season perennial grass

of the Poaceae family that displays agronomically attractive traits of extremely high biomass yield, rapid growth, and extensive climatic tolerance. The main objective of this research is to study the plant density effects of four varieties of Switchgrass, including Kanlow, Colony, Alamo, and BoMaster, on biomass development, leaf area index (LAI), percent canopy cover, dry biomass, carbon buildup, rate of residue decomposition, C:N ratio of dry biomass and decomposing residues for erosion prediction, nutrient management, and conservation planning. Plants were raised on Memphis silt loam soil at two plant densities without any fertilizer application; high density planting (HDP) and low density planting (LDP) of 10.16cm and 12.7cm between plants, respectively. Percent canopy cover, leaf area index, number of tillers, and dry biomass of all varieties were higher for HDP than LDP. While Alamo and BoMaster were higher in plant height for HDP than LDP, Colony and Kanlow were higher for LDP. Our data indicated that HDP is better than LDP for Switchgrass biomass production on heavy soils.

O1.03

9:30 SACCHARIFICATION AND FERMENTATION OPTIMIZATION IN *MISCANTHUS GIGANTEUS* BASED BIOETHANOL PRODUCTION

Amber Jones, Ananda K Nanjundaswamy, Victor Njiti, and Franklin Chukwuma

Alcorn State University, Lorman, MS USA

Cost of enzyme and substrate loading are the two important factors that determine the process efficiency of cellulosic ethanol production. While increased enzyme results in enhanced sugar release, cost of the enzyme makes the process expensive. While increased substrate results in enhanced sugar, it will reduce the fermentation process by interfering in mass transfer rates. Developing an optimal concentration of enzyme and substrate loading will assist in developing a feasible method that can enhance the process efficiency. *Miscanthus giganteus* is emerging as a potential feedstock for production of drop-in fuels as well as bioethanol. The objective of the study is to develop an ideal enzyme and biomass loading concentration for saccharification and fermentation using acid pretreated *Miscanthus*. The pretreatment method, effect of enzyme and substrate loading and process optimization using RSM design will be discussed.

O1.04

9:45 BEST SEASON TO PRODUCE CABBAGE IN SOUTHWEST AND CENTRAL MISSISSIPPI: EMPIRICAL EVIDENCE

Cori Pittman, Torri Hampton, Jarvis Sims, and A. Funtikova-White

Alcorn State University, Lorman, MS USA

Cabbage production data used in our research was collected during a study performed by Panicker, School of Agriculture, Research, Extension, and Applied Sciences (AREAS) at Alcorn State University, and sponsored by USDA/NRCS Conservation Research Project. The main objective of our research project was to determine which season, spring or fall, was the most profitable for growing cabbage in Southwest and Central Mississippi. Weather conditions are more favorable for cabbage production in the spring season than in the fall, fall season; production costs are higher by \$87.30 due to

need for irrigation, higher dosages of fungicides, and insecticides. While in the spring season, no irrigation or fungicides were used, and about 1.5 lbs. less of insecticide per acre was required due to the favorable weather conditions. These factors make spring season cabbage production less costly and more efficient. The profit in the spring season was \$1,163.72 higher than the fall season due to the price being higher by \$0.03 per pound along with lower production costs mentioned above. In conclusion, farmers in Southwestern or Central Mississippi should produce cabbage in the spring season due to higher market price and lower cost of production.

O1.05

10:00 WHOLE GENOME SEQUENCING AND THE GENETIC DIVERSITY OF AN ALCORN STATE SWEET POTATO LEAF CURL VIRUS (SPLCV) ISOLATE

Chunquan Zhang, Leonna Tyler, Qun Xia, Ming Gao, and Victor Njiti

Alcorn State University, Lorman, MS USA

Sweet potato (*Ipomoea batatas*) is an important food crop worldwide and it is a major agricultural business in the southern U.S., valued at \$283 million which represents 75% of the U.S. grown sweet potatoes. However, viral infection is one of the main factors limiting the full potential of sweet potato production. Among many sweet potato viruses in the U.S., Sweet potato leaf curl begomovirus (SPLCV), a member of Geminiviridae, is the most widespread and detrimental virus in U.S. The incidence of SPLCV in the U.S. has dramatically expanded in recent years including major production states such as Louisiana and Mississippi. SPLCV infection reportedly resulted in 25-30% yield losses to the cultivar 'Beauregard' which accounts for about 80% of the U.S. production. To date, there is no resistance sweet potato line reported. Genomic characterization and genetic diversity knowledge is important for disease epidemics and management. As a typical monopartite begomovirus in the family of Geminiviridae, SPLCV has a small, circular, single-stranded DNA (ssDNA) genome that is encapsulated in twinned quasi-icosahedral particles. SPLCV is transmitted exclusively by the whitefly (*Bemisia tabaci*) and infects only dicotyledonous plants. Here we report the isolation of a SPLCV from sweet potato grown in Southern Mississippi and subsequent full genomic DNA cloning and sequencing. Results showed that there is significant genetic diversity with the same SPLCV Alcorn State isolate that is important for virus disease epidemic.

10:15-10:30 BREAK

O1.06

10:30 A COMPARATIVE STUDY TO THE 2011/2013 WATER QUALITY ASSESSMENTS IN THE PASQUOTANK WATERSHED IN NORTHEASTERN NORTH CAROLINA WITH A SEA LEVEL RISE COMPONENT

Raveen McKenzie and Jamal Stevenson

Mississippi Valley State University, Itta Bena, MS USA

The Pasquotank River Watershed is found in Northeast North Carolina beginning in the Great Dismal Swamp at the Virginia/North Carolina border and flows into the Albemarle

Sound. The watershed provides a transition between spawning grounds and the waters of the Albemarle Sound. The sound serves as a nursery area for many fish species and is home to numerous sport and commercial species. Due to indications of rising global temperature and the monitoring of melting ice sheets, these coastal watersheds could be a leading indicator of rising sea levels as their chemical compositions changes. The effects of sea-level rise were also taken into consideration for future monitoring. The 2014 Research Experience for Undergraduates Pasquotank River Watershed Team completed two sets of tests of five tributaries and the river itself. These test points were derived from the 2011 and 2013 Watershed Team research projects with the addition of four points created to sample further downstream in the Pasquotank River itself. Results were compared with previous readings utilizing a Water Quality Index (WQI). The streams tested were the Pasquotank River, Newbegun Creek, Knobbs Creek, Areneuse Creek, Mill Dam Creek, and Sawyers Creek. These streams, along with the river, cover a large portion of the watershed and provide a wide area of study for the watershed. Tests performed in the laboratory on this year's samples included pH, salinity, total dissolved solids, and conductivity. Air/water temperature, dissolved oxygen, wind speed/direction, and turbidity/clarity measurements were taken in the field. The results collected were placed online and displayed in correlation to their position utilizing Google Maps. The data were then compared to the 2011 and 2013 project results and examined for any variations or similarities. It was found that the water quality for some water sources remained in their respective ranges from the past years. The others, such as Knobbs Creek, varied from the previous years. Newbegun Creek, with a water quality index of 59, stayed within the two previous team's WQI of 50 (2011) and 66 (2013). Mill Dam Creek had a very slight increase in water quality from the previous team's readings 47 (2013) and 48 (2011) but still managed to acquire a bad reading of 49. Areneuse Creek increased from 49 (2011) and 47 (2013) to reach a medium water quality of 57. The Pasquotank River, ranking as the lowest, has dropped significantly from 64 (2011) to 44 (2013) and continued to be lower in 2014 standing at 41 for its WQI. Sawyers Creek remained consistent between 54 (2011) and 50 (2013) at a low medium range with this year's water quality being 51. Knobbs Creek WQI, having the highest water quality reading, increased from the two past readings of 52 (2011) and 50 (2013) with a WQI of 63.

O1.07

10:45 PSEUDOGNAPHALIMUM OBTUSIFOLIUM: REVEALING THE MYSTERIOUS SECRETS OF A COMMONPLACE NATIVE WEED

Leanna Long, Latoya Bridges, Aaron Zenon, Shivalika Rana, Dale Rosado, and Angela Whitton

Mississippi College, Clinton, MS USA

This native North American flowering plant has been used throughout American history as a remedy for human ailments, first with the Native Americans, then later by the English settlers. It has been noted to have been used for treating minor ailments, but larger ambitions for the plant were never sought after. Our understanding of *Pseudognaphalium obtusifolium* in terms of botany is quite explicit, although little research has been done to expand on the early notion of the plant as a medical aid. Limited previous work has shown that the plant

does possess at least one known flavonoid, which has various health benefits. Also, the extracts from the seed coat and plant have been shown to express high levels of antioxidants. Since it is possible that different extracts from the plant exhibit and offer various unique benefits to our process in fighting disease, even aiding to inhibit cancer, we are examining how extracts from the plant *P. obtusifolium* and their properties effect proliferation in cells. We have taken advantage of the yeast *Saccharomyces cerevisiae* as a model organism to examine the effects the plant extracts derived from ethanol, dichloromethane, and hexane solvents on proliferation of eukaryotic cells. Additional studies will be expanded to examine effects of a specific extract on the proliferation of a breast carcinoma cell line.

O1.08

11:00 TRANSMISSION ELECTRON MICROSCOPY STUDY OF *LISTERIA MONOCYTOGENES* SEROTYPE 1/2A CELLS EXPOSED TO SUBLETHAL HEAT STRESS AND CARVACROL

Sulagna Saha, Nitin Dhowlaghar, and Ramakrishna Nannapaneni
Mississippi State University, Mississippi State, MS USA

Previous findings showed that *Listeria monocytogenes* exhibits higher heat tolerance to thermal exposure at 60°C when pre-exposed to sublethal heat stress at 48°C for 30/60 min. The objective of this study was to investigate the morphological changes that occur occurred in *L. monocytogenes* serotype 1/2a cells as visualized by transmission electron microscopy (TEM) after exposure to sublethal heat stress at 48°C for 60 min and in combination with a lethal concentration of carvacrol for 30 min. The TEM micrographs revealed thickening of cell wall and cell membrane, and clumping of cytoplasm when subjected to sublethal heat stress followed by carvacrol treatment. These studies indicate that *L. monocytogenes* cells when adapted to heat stress may alter its morphology to protect themselves against carvacrol. Further studies will be conducted to investigate the effect of increased contact time with carvacrol and with other essential oils on the ultrastructural changes in *L. monocytogenes* cells adapted to heat stress.

O1.09

11:15 EFFECT OF AGRONOMIC PRACTICES ON PEANUT GROWTH AND YIELD POTENTIAL

Marcus Shorter and Patrick Igbokwe

Alcorn State University, Lorman, MS USA

The peanut, (*Arachis hypogaea*), is a species in the legume family of Fabaceae or Leguminosae which are large and economically important family of flowering plants. A field experiment was conducted to evaluate the effects of spacing on the yield of direct seeded and transplanted peanuts. The study was conducted in 2007 and 2008, on a Memphis Silt Loam soil at the Alcorn State University Experiment Station, Alcorn State, Mississippi. A split plot arrangement in a Completely Randomized Design (CRD) was used for this study. Seeds were spaced 7.6 cm, 15.2 cm, 22.8 cm, and 30.5 cm apart. The seeding method made up the main plot, and within-row spacing made up the subplot. Data collected were on seed weight, vine weight, pod number, segmentation per pod, pod seed number, and seed quality. The finding suggest that the “Alcorn Pat” peanut cultivar can be grown successfully when either direct seeded or transplanted in a Memphis Silt Loam in Southwest

Mississippi. Direct seeding method favored peanut growth and within-row spacing favored peanut growth and development, and yield potential more than 7.6 cm, 22.8 cm, and 30.5 cm spacing. “Alcorn Pat” peanut cultivar is being recommended for production in Southwest Mississippi because of its comparable yield potential with outstanding cultivars such as Florigiant, NC-7, and GK3 now grown by farmers.

O1.10

11:30 MORTALITY OF CONTAINER-GROWN BLUEBERRY PLANTS INOCULATED WITH *PHYTOPHTHORA CINNAMOMI*

Melinda Miller-Butler, Barbara J. Smith, and Kenneth J. Curry
University of Southern Mississippi, Hattiesburg, MS USA

We conducted four studies to evaluate the effect of *Phytophthora cinnamomi* isolates and inoculum delivery methods on root rot development and mortality of container-grown blueberry plants. *Phytophthora cinnamomi* isolates were obtained from the root zone of symptomatic blueberry plants and identified using morphological and molecular techniques. Plants were inoculated using one to four delivery methods (mycelial slurry, zoospore suspension, isolates grown on rice or vermiculite). Some studies incorporated a drought/flood treatment. In all studies inoculated plants had higher disease scores than “not inoculated” plants. Study 1: More ‘Biloxi’ plants died (91%) compared to ‘Tifblue’ (12%), suggesting that rabbiteye cultivars are more tolerant of this disease than southern highbush cultivars. Study 2: Significant differences were found in delivery method. Plants inoculated with rice grown inoculum had a mortality rate of 31% compared to 12% for those inoculated with mycelium or zoospores. Study 3: Comparison of virulence of five recently recovered isolates showed no significant differences between disease score and plant vigor due to isolate or delivery method. Study 4: Plants were subjected to three drought/flood treatments and those subjected to a 48-hour flood every three weeks were least vigorous and had the highest mortality rate. There were no differences in plant vigor or disease scores due to drought treatments. In Studies 3 and 4 ‘Biloxi’ received higher vigor ratings, but succumbed to the disease more readily than ‘Star’. Results of these trials will be used to develop procedures for evaluating chemical and biological controls for *Phytophthora* root rot on blueberries.

11:45 BUSINESS MEETING

AFTERNOON

Poster Session 1:15-2:45

P1.01

NANOTECHNOLOGY-BASED APPROACH TO IMPROVE FERTILITY OUTCOMES IN SWINE

Hannah R. Nelson¹, Isabella C. Morales¹, Darby S. Dillard¹, Christy S. Steadman¹, Henry Clemente², Mark A. Crenshaw¹, Shengfa F. Liao¹, Scott T. Willard¹, Peter L. Ryan¹, and Jean M. Feuang¹

Department of Animal and Dairy Sciences, Mississippi State University Mississippi, MS USA¹ and Clemente Associates, Inc. Madison, CT USA²

Pork is the most widely consumed meat in the world. The sustainable supply of these markets relies on the maintenance of highly fertile pigs on farms. Currently, numerous factors are known to influence swine fertility, and the use of selected breeds and improved-farming systems contributes to minimizing production losses. Still, many other factors that impact boar fertility remain uncharacterized. Here, we took advantage of the recent advances in nanotechnology to test a novel approach to selecting high quality spermatozoa for breeding programs. In this preliminary study, magnetic nano-devices designed to specifically interact with defective or poor performing spermatozoa were mixed with freshly collected boar semen and incubated in appropriate conditions. Mixtures were submitted to a magnetic field for a serial elimination of free and sperm-bound nano-devices. A total of seven sister gilts were inseminated with normal (n=3 gilts) and nanopurified (nano-device free; n=4 gilts) semen. Thirty days following inseminations, two gilts in the control group were diagnosed non-pregnant and remaining gilts maintained pregnancies until farrowing. Totals of 17 piglets were born alive in the control group, versus 55 in the nanopurified (14±1/gilt). Equal percentages of piglets were weaned alive (77%) and comparable growth performance, in terms of weekly weight gain, crown-rump length, and heart girth was observed between groups. Interestingly, nanopurified semen generated a higher proportion of males that averaged 55%, versus 38% in the control. Findings indicate that male fertility may benefit from nanopurification technology that improves semen quality. Further studies are needed with larger groups of gilts. USDA-ARS#58-6402-3-0120.

P1.02

A COMPARATIVE STUDY TO THE 2011/2013 WATER QUALITY ASSESSMENTS IN THE PASQUOTANK WATERSHED IN NORTHEASTERN NORTH CAROLINA WITH A SEA LEVEL RISE COMPONENT

Jamal Stevenson and Raveen McKenzie

Mississippi Valley State University, Itta Bena, MS USA

The Pasquotank River Watershed is found in Northeast North Carolina beginning in the Great Dismal Swamp at the Virginia/North Carolina border and flows into the Albemarle Sound. The watershed provides a transition between spawning grounds and the waters of the Albemarle Sound. The sound serves as a nursery area for many fish species and is home to numerous sport and commercial species. Due to indications of rising global temperature and the monitoring of melting ice sheets, these coastal watersheds could be a leading indicator of rising sea levels as their chemical compositions changes. The effects of sea-level rise were also taken into consideration for future monitoring. The 2014 Research Experience for Undergraduates Pasquotank River Watershed Team completed two sets of tests of five tributaries and the river itself. These test points were derived from the 2011 and 2013 Watershed Team research projects with the addition of four points created to sample further downstream in the Pasquotank River itself. Results were compared with previous readings utilizing a Water Quality Index (WQI). The streams tested were the Pasquotank River, Newbegun Creek, Knobbs Creek, Areneuse Creek, Mill Dam Creek, and Sawyers Creek. These streams, along with the river, cover a large portion of the watershed and provide a wide area of study for the watershed. Tests performed in the laboratory on this year's samples included pH, salinity, total dissolved

solids, and conductivity. Air/water temperature, dissolved oxygen, wind speed/direction, and turbidity/clarity measurements were taken in the field. The results collected were placed online and displayed in correlation to their position utilizing Google Maps. The data were then compared to the 2011 and 2013 project results and examined for any variations or similarities. It was found that the water quality for some water sources remained in their respective ranges from the past years. The others, such as Knobbs Creek, varied from the previous years. Newbegun Creek, with a water quality index of 59, stayed within the two previous teams' WQI of 50 (2011) and 66 (2013). Mill Dam Creek had a very slight increase in water quality from the previous teams' readings 47 (2013) and 48 (2011) but still managed to acquire a bad reading of 49. Areneuse Creek increased from 49 (2011) and 47 (2013) to reach a medium water quality of 57. The Pasquotank River, ranking as the lowest, has dropped significantly from 64 (2011) to 44 (2013) and continued to be lower in 2014 standing at 41 for its WQI. Sawyers Creek remained consistent between 54 (2011) and 50 (2013) at a low medium range with this year's water quality being 51. Knobbs Creek WQI, having the highest water quality reading, increased from the two past readings of 52 (2011) and 50 (2013) with a WQI of 63.

P1.03

HONEY PLANT DIVERSITY IN THE STATE OF MISSISSIPPI

Elena Kostyleva

Alcorn State University, Lorman, MS USA

Honey plants are the only food source for honey bees and a food source for humans. However, anthropogenic activity leads to a decrease in honey plant diversity. Hence, the aim of this work was identifying the honey plant species inhabiting the state of Mississippi. The counts showed that more than 180 species of honey and pollen plants of 99 genera belonging to 41 families inhabit the territory of study. The most numerous are representatives of the families: *Asteraceae* (21% of the total number of species); *Fabaceae* (11%), *Rosaceae* (10%), *Lamiaceae* (5%). The distribution of honey plants is as follows: 55% of species are distributed throughout the territory of the region, 14% - in the northern, 20% - southern, 4% - central, 5% - eastern and 2% - in the western part. The largest number of honey plant species inhabits forest lands - 37%, plants of woodland belts, ornamental and plants of meadows and pastures are represented by 24% each, field and forage plants - by 9%, fruit and berry plants - by 4%, and vegetable garden plants - by 2% of species. Cultivated honey plants account for more than 87 species. Most of them (60%) are only available in the wild state, mainly in the forests. The basis of the regional bee forage is comprised of more than 25 species of honey plants characterized by greatest distribution, availability and abundance of nectar, are well visited by bees and provide the commercial honey.

P1.04

INTEGRATED PEST MANAGEMENT EDUCATION FOR SMALL FARM FAMILIES IN RURAL MISSISSIPPI

Victor Njiti, Patrick E. Igboke, and Franklin O. Chukwuma

Alcorn State University, Lorman, MS USA

The major need for an Integrated Pest Management (IPM) development and adoption is the creation of public

awareness and understanding of the problems associated with pest infestations of crop lands. The negative impact on human health, the environment, and the economy due to the lack of adequate pest control cannot be overemphasized. Alcorn State University IPM Education project provided a series of workshops on sustainable management practices to reduce pest problems in field crops. Nine training sessions were conducted in 2012 and 2013. Approximately 580 farmers, extension agents, and other agriculture professionals received hands-on training for enhancing crop production and profitability while reducing pesticide usage. A pre-training survey indicated that only 15% of the participants are engaged in some form of IPM activities. However, a post-training questionnaire survey revealed that 80% of the participants intended to reduce high-risk pesticide usage based on information received; 75% indicated knowledge gain on sustainable crop management practices; and 60% anticipated benefiting economically as a result of the training programs.

P1.05

SUSTAINABLE VEGETABLE PRODUCTION, MARKETING AND MANAGEMENT FOR LIMITED-RESOURCE FARMERS

Franklin O. Chukwuma, Patrick E. Igbokwe, and Victor Njiti

Alcorn State University, Lorman, MS USA

The success of a farm rests on the farmer being skilled in a wide number of areas which include but are not limited to sustainable crop production, good farm financial management, and effective marketing strategy. Therefore, ten training sessions were conducted in 2013 and 2014 on sustainable vegetable crop production practices, alternative marketing strategies, and effective management of their farm plan at Alcorn State University demonstration centers located in Mound Bayou, Preston, Marks, and Lorman Mississippi. A total of six hundred and fifty-three (653) farmers and agriculture professionals received hands-on training exercises. The pre-training survey indicated that 70% of the farmers do not keep records of their farming operations, 80% produce and sell locally, and 15% are engaged in some form of sustainable agricultural practices. The survey also revealed that the average age of the participating farmer is 45. The farm size ranged from less than 3 acres (5%), up to 10 acres (40%), 11-25 acres (35%), and more than 25 acres (20%). The majority of the participants (84%) reported that they receive a fraction of their annual income from their farming operation. Retrospective post surveys were utilized to determine the effectiveness of the training and all areas of instruction showed the overall participant knowledge was increased.

P1.06

GERMINATION AND EARLY SEEDLING GROWTH OF *FESTUCA ARUNDINACEA*, *TRITICUM AESTIVUM*, AND *BRASSICA JUNCEA* UNDER VARYING LEVELS OF LEAD AND CADMIUM

Michael Collins, Brianna Burton, Gloria Miller, Maria Begonia, and Gregorio Begonia

Department of Biology, Jackson State University, Jackson, MS USA

A study was conducted to determine the effects of different concentrations of lead (Pb) and cadmium (Cd) on germination, seedling growth, and dry biomass of three plant species: tall fescue (*Festuca arundinacea* cv. Titan), tall fescue

(*Festuca arundinacea* Schreb. cv. Spirit), hard red wheat (*Triticum aestivum*), and broadleaf Florida mustard (*Brassica juncea*). Seeds were grown under laboratory conditions at concentrations of 0, 250, 500, and 1000 ppm of metal ions of lead (lead nitrate) and cadmium (cadmium nitrate). The results revealed that germination was significantly higher in red wheat and mustard grown in Pb as compared to the two cultivars of tall fescue (Titan and Spirit). Cadmium nitrate inhibited germination and shoot growth more severely than did Pb nitrate. Mustard, overall, was less affected in terms of germination and shoot growth for both Pb and Cd. Although red wheat and mustard exhibited some degree of tolerance to Pb and Cd, further investigation is warranted. The results of the study suggest that due to better metal tolerance indices, there is a possibility of growing red wheat and mustard in areas contaminated with lead and cadmium. [Support provided by the National Aeronautics and Space Administration (NASA) through the University of Mississippi to Jackson State University under the terms of Agreement/Grant No. NNX10AJ79H.]

P1.07

GROWTH AND LEAD ACCUMULATION OF *FESTUCA ARUNDINACEA* GROWN IN LEAD-CONTAMINATED SOIL: EFFECTS OF BACTERIAL INOCULATION

Tasha Norwood, Krystin Cook, Miriam Igboavodha, Gloria Miller, Maria Begonia, and Gregorio Begonia

Department of Biology, Jackson State University, Jackson, MS USA

Some microorganisms are known to mobilize metals in soils and can enhance the accumulation of heavy metal in roots of non-accumulator plants. The objective of this study was to evaluate the effects of bacterial inoculation on the growth and lead (Pb) accumulation of tall fescue (*Festuca arundinacea*) grown in sterile soils. Tall fescue seeds were planted in plastic tubes containing topsoil and peat (2:1 v:v) that had been amended and incubated with various concentrations of lead nitrate. The plants were maintained in the greenhouse for 8 weeks. One week before harvest, ethylenediaminetetraacetic acid (EDTA) solutions were applied to the root zone as an aqueous solution in a 1:1 ratio with the metal. The dry weights of plant tissues were obtained after oven-drying clean roots and shoots at 75°C for 48 hours. The dried tissues were acid-digested and their metal concentrations were quantified using inductively coupled plasma-mass spectrometry (ICP-MS). Our results revealed that generally, EDTA, bacteria, and a combination of EDTA plus bacteria increased the shoot and root dry weights of tall fescue with increasing Pb concentrations up to 1,000 mg Pb/kg dry soil. However at 2,000 mg Pb/kg, shoot and root dry weights were significantly reduced. Lead concentrations in roots and shoots increased with increasing soil Pb treatments. Root Pb concentrations were higher than those found in the shoots in the presence of EDTA and bacteria. These results suggest that the presence of bacteria and EDTA synergistically enhanced the bioaccumulation of Pb in tall fescue grown under sterile soil conditions.

P1.08

EFFECT OF ENVIRONMENTAL VARIATION AND SPATIAL DISTANCE ON SOIL MICROBIAL COMMUNITIES ACROSS SAND DUNE CHRONOSEQUENCES

Anna Claire Rogers, William Kingery, and Shankar Shanmugam
Mississippi State University, Mississippi State, MS USA

Microbial diversity patterns have been extensively surveyed in different ecosystems, but few such studies attempted to address them with respect to spatial and temporal scales and their correlations to environmental factors. Developmental chronosequences with ages ranging from 105 to 500,000 years across Georgia and Michigan were studied to investigate the effects of environmental parameters and geographic distance on bacterial community composition. The study sites included 14 soils which were 1- 1700 km apart. We surveyed the diversity using barcode pyrosequencing to quantify the effects of local geochemical properties and geographic distance for bacterial community structure and membership. Variation partitioning was used to differentiate the effects of spatial, environmental and spatio-environmental factors on bacterial community composition. Bacterial community similarities were not positively correlated with geographic distance ($r_M = 0.13$, $p = 0.35$) when the distance matrix included all the distances. However, when the distance variance was partitioned into classes, there was a marginal correlation at a spatial scale of 50- 1700 km. A subset of environmental parameters (Ca, Mg, pH, Total Carbon (%) and Total Nitrogen (%)) that had the highest correlation with the bacterial communities. Variable partitioning analysis showed that soil factors contributed more to bacterial community variation (38.2%) than geographic distance (11.9 %). We conclude that on the whole, microbial biogeography in eolian sediments is determined more by specific environmental factors than geographic distances and future research should focus on both soil microbial function, and more explicit biome based assessments of the local ecological drivers of bacterial biodiversity.

P1.09

DIFFERENCES IN SURVIVAL OF HEAT STRESS ADAPTED CELLS OF *LISTERIA MONOCYTOGENES* SEROTYPE 1/2A IN DIFFERENT SANITIZERS/DISINFECTANTS AND ESSENTIAL OILS

Nitin Dhowlaghar and Ramakrishna Nannapaneni

Mississippi State University, Mississippi State, MS USA

There is a high diversity of heat tolerance within strains of *Listeria monocytogenes* serotypes. This pathogen also exhibits higher heat tolerance to thermal exposure at 60°C when pre-exposed to sublethal heat stress at 48°C for 30/60 min. The objective of this study is to investigate the differences in survival of heat stress adapted cells of *L. monocytogenes* serotype 1/2a in various disinfectants/sanitizers and essential oils. Heat-stress adapted cells of *L. monocytogenes* BUG600 were prepared in TSB-YE by exposing cells to sublethal heat stress at 48°C for 60 min and then subjected to various lethal concentrations of disinfectants and essential oils prior to plating on TSA plates containing esculin and ferric ammonium citrate. The survival of heat stress adapted cells of *L. monocytogenes* BUG 600 was decreased by 2.2 - 2.7 log CFU/ml in HCl (pH 3.5) and H3PO4 (pH 3.5), H2O2 (1000 ppm) and by 2.7 to 3. 9 log CFU/ml in

NaOH (pH 12.4) and chlorine (800 ppm) as compared to non-adapted control cells. No difference in survival of *L. monocytogenes* 1/2a cells was observed in peracetic acid (PAA 70 ppm) compared to non-adapted control cells. However, the survival of heat stress adapted cells of *L. monocytogenes* BUG600 cells was increased by 3.5 - 4.0 log CFU/ml in two essential oils, carvacrol (428 ppm) and bay oil (1100 ppm) but not in two other essential oils, red thyme (300 pm) or cinnamon (1050 ppm) when compared to non-adapted control cells.

P1.10

GENETIC DIVERSITY IN CYTOPLASMIC AND NUCLEAR GENOME OF UPLAND COTTON

Sharof S. Egamberdiev^{1#}, Sukumar Saha^{2#}, Ilkhom Salakhutdinolo¹, Johnie N. Jenkins², Dewayne Deng², Ernest Khurshut, and Ibrokhim Abdurakhmonov^{1#}

Center of Genomics and Bioinformatics, Academy of Sciences of Uzbekistan, Ministry of Agriculture & Water Resources of Uzbekistan, and 'Uzpakhtasanoat' Association, University street-2, Kibray region, Tashkent 111215, Uzbekistan¹ and USDA-ARS, Crop Science Research Laboratory, Genetics and Precision Agriculture, 810 Highway 12 East, Starkville, MS 39762, USA²

[#] Equally credited as the first author for their contribution in this research.

Breeders normally select genotypes based on morphological characters, primarily regulated by nuclear genome because gene flow took place predominantly through nuclear genome via pollination and subsequently via fertilization of male and female gametes. However, cytoplasmic genome play a critical role to perform many important biological functions, so it is important to know the genetic diversity associated with cytoplasmic genome in a plant species. The economic importance of cytoplasmic genome is well documented by the severity and wide range of southern corn leaf blight epidemic in USA in 1970. Normally, the variation in cytoplasmic genome is very difficult to identify in Upland cotton because no DNA marker tool is currently available specific to the cytoplasm. In many crops including the nuclear genome of cotton, simple sequence repeats (SSRs) or microsatellites are considered to be one of the markers of choice. Recently, the advanced sequencing technologies provided a scope to sequence chloroplast genome from several tetraploid and diploid *Gossypium* species. Here we report on the development of cytoplasmic SSR markers and comparative SSR-marker analysis of cytoplasmic genome with the nuclear genome in a set of improved Upland cotton lines. Results revealed that the genetic diversity in cytoplasmic genome is narrow compared to the nuclear genome. The genetic relationship among the lines showed a different pattern of variation in cytoplasmic compared to the nuclear genome. The comparative results on the variation of cytoplasmic and nuclear genome will complement to understand the genetic diversity and gene flow within this set of Upland cotton accessions.

P1.11

PHYTOTOXIC EVALUATION OF WHOLE PINE TREE SUBSTRATES

Anthony L. Witcher¹, Kenneth J. Curry², Eugene K. Blythe³, Glenn B. Fain⁴, and James M. Spiers¹

¹USDA-ARS Southern Horticultural Lab, Poplarville, MS, USA,

²University of Southern Mississippi, Hattiesburg, MS, USA,

³Coastal Research and Extension Center, Mississippi State University, Poplarville, MS, USA, ⁴Auburn University, Auburn, AL, USA

Decreased availability and increased cost of quality substrates are issues facing many horticulture crop producers. Peat moss and pine bark are the most widely used substrate components, yet producers have become more aware of acceptable alternative components. Processed whole pine trees have been identified as an effective substrate component for horticulture crop production, while plant propagation evaluations in such substrates have yielded less desirable results. A simple, direct method for evaluating potential phytotoxicity would be a useful tool for developing alternative substrates, including whole pine tree (WPT) substrates. A PhytotoxKit was used to evaluate root length and calculate percent inhibition of seed germination and root growth for three plant species exposed to a reference soil compared with those in saline pine bark, aged WPT, fresh WPT, aged pine needles, and fresh pine needles. The PhytotoxKit allowed for direct contact of seed and substrate, along with subsequent observation and root measurement of germinated seeds. Saline pine bark produced the greatest inhibition of seed germination and root growth in *Sinapis alba*, while fresh pine needles resulted in the greatest inhibition of *Lepidium sativum* and *Sorghum saccharatum*. *Lepidium sativum* and *Sorghum saccharatum* mean root length was greatest in aged WPT, while *S. alba* mean root length was greatest in the fresh WPT. We discovered fresh pine needles can be phytotoxic to some plant species, yet further research is required to determine whether the presence of pine needles has led to reduced plant growth in WPT substrates.

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Chair: Melissa Adams

Copiah Lincoln Community College

Vice-Chair: Mary Bonds

Northwest Mississippi Community College

Thursday, February 26, 2015

MORNING

Room TC 210

7:55 WELCOME

O2.01

8:00 A ROLE FOR TOLL-LIKE RECEPTOR 8 IN WEST NILE VIRUS INFECTION

Amber Paul, Dhiraj Acharya, Linda Gates, and Fengwei Bai

University of Southern Mississippi Hattiesburg, MS USA

West Nile virus (WNV) is a neurotropic virus that can cause encephalitis, meningitis or possible death. Recently, WNV was under national surveillance due to the epidemic in the USA in 2012, whereby 51% of reported WNV infected cases were neuroinvasive. Human and mouse Toll-like receptor 7 (h/mTLR7) and human Toll-like receptor 8 (hTLR8) detect ssRNA motifs. Importantly, mTLR7 recognizes WNV, as TLR7-

TLR8-/- mice are susceptible to lethal WNV infection. Recently, TLR8-/- mice have been characterized as having increased expression of TLR7, compared to wild-type (WT) mice, which resulted in systemic autoimmunity following TLR7 ligand stimulation. Since TLR8-/- mice have increased TLR7 expression, we hypothesized TLR8-/- mice are protected against lethal WNV infection. In this study, increased TLR7 expression was observed at both the gene and protein levels, in TLR8-/- whole brains following WNV infection. In addition, the interferon-induced, anti-viral gene ISG56 (IFIT-1) was significantly induced in TLR8-/- mice whole-brain isolates and mixed neuronal cultures following infection. Importantly, WNV infection (2,000 plaque forming units) in TLR8-/- mice displayed an increased percent survival (65%) compared to WT controls (25%) that was coupled to reduced viral burden in the brains of TLR8-/- mice. Since TLR7 and its associated signaling pathways are increased in TLR8-/- mice, determining the mechanisms involved in TLR8 signaling are necessary to understand how WNV is recognized and controlled within the central nervous system.

O2.02

8:15 ROLE OF MSAABCR OPERON IN THE REGULATION OF PROTEASES AND BIOFILM DEVELOPMENT IN STAPHYLOCOCCUS AUREUS

Gyan Sundar Sahukhal and Mohamed O. Elasri

The University of Southern Mississippi, Hattiesburg, MS USA

Staphylococcus aureus is an important human pathogen that causes nosocomial and community-acquired infections. One of the most important aspects of staphylococcal infections is biofilm development within the host, which renders the bacterium resistant to the host's immune response and antimicrobial agents. Biofilm development is very complex and involves several regulators that ensure cell survival on surfaces within the extrapolymeric matrix. Previously, we identified the msaABCR operon as an additional positive regulator of biofilm formation. In this study, we define the regulatory pathway by which msaABCR controls biofilm formation. We demonstrate that the msaABCR operon is a negative regulator of four major proteases ((aureolysin [aur], staphopain [scp], cysteine [ssp], and serine [spl]) in both planktonic and biofilm conditions. The control of protease production mediates the processing of the major autolysin, Atl, and thus regulates the rate of autolysis. In the absence of the msaABCR operon, Atl is processed by proteases at a high rate, leading to increased cell death and a defect in biofilm maturation. We conclude that the msaABCR operon plays a key role in maintaining the balance between autolysis and growth within the staphylococcal biofilm via regulation of proteases.

O2.03

8:30 msaB REGULATES BIOFILM DEVELOPMENT AND VIRULENCE IN STAPHYLOCOCCUS AUREUS

Mounir R. Saleh, Bina Jayana, Gyan Sahukhal, and

Mohamed Elasri

The University of Southern Mississippi, Hattiesburg, MS USA

CA-MRSA strains are important human pathogens that cause severe infections among healthy individuals. We have previously identified msaABCR operon as a regulator of virulence and biofilm development. In this study, we test the hypothesis that msaB is the main effector gene produced by

msaABCR operon. We deleted msaB gene from CA-MRSA strain LAC and studied different phenotypes (Biofilm formation, pigmentation, protease production and expression of global regulators (sarA, agr) and compared with msaABCR deletion mutants. msaB mutant showed decreased pigmentation, increased extracellular protease activity, increased autolysis and reduced biofilm formation relative to wild type. Complementation by msaB alone was not sufficient to restore wild type phenotypes which supports our previous finding that msaB is part of a four-gene operon. This study supports the hypothesis that msaB is a structural gene in msaABCR operon and is essential for the regulation of biofilm development and virulence in *Staphylococcus aureus*.

O2.04

8:45 THE IN VITRO EVALUATION OF PEDIATRIC BRAIN CANCER CELL LINES

Scharri Ezell Walker and Charles Phillips
Tougaloo College, Tougaloo, Mississippi USA

Treatment for pediatric brain malignancies typically requires a combination of surgery, radiation therapy, and chemotherapy. Chemotherapy specifically can have undesired toxic effects. Cabazitaxel was recently approved for the second line treatment of hormone refractory prostate cancer. This compound also possesses the ability to pass through the blood brain barrier making it a promising chemotherapy agent for brain malignancies. However, no studies have been conducted investigating the efficacy of this compound in pediatric brain tumors. To address this problem, we designed a series of studies to determine the anticancer efficacy of cabazitaxel in medulloblastoma (D341Med), fibroblast (IMR-90), and neuroblastoma (N2A) cell lines. The aim of future in vitro mechanistic studies will be to determine the anticancer potency of cabazitaxel and to establish the underlying mechanisms of action for any observed anticancer activity. The effects of this compound are to be tested cytotoxicity, proliferation, and cell cycle assays. These findings will further establish the rationale of cabazitaxel as a chemotherapeutic agent in the pediatric population. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

O2.05

9:00 THE ROLE OF THE PCD PROTEIN IN CARBOXYSUME BIOLOGY

Meredith Barefield, Evan Roberts, Cassandra Bates, Gordon C. Cannon, and Sabine Heinhorst

The University of Southern Mississippi, Department of Chemistry and Biochemistry, Hattiesburg, MS USA

Carboxysomes are microcompartments found in all cyanobacteria and in many chemoautotrophic bacteria. These microcompartments house the primary carbon-fixing enzyme in the cell, ribulose-1,5- biphosphate carboxylase/oxygenase (RuBisCO). Carboxysomes are also crucial elements of the bacterial carbon concentrating mechanism. The structural protein components of the *Halothiobacillus neapolitanus* carboxysome were previously thought to be encoded solely by the *cso* operon; however, recently the gene for a novel carboxysome shell protein was found to be part of the gene cluster that is located immediately downstream from the *cso* operon, suggesting that

additional proteins may play a role in carboxysome function and/or assembly. The downstream genes of interest include the *pcd* gene, which is predicted to encode a pterin-4a-carbinolamine dehydratase. This gene is particularly intriguing due to its presence in most genomes of carboxysome-containing chemoautotrophic bacteria. An expression construct of the *H. neapolitanus* *pcd* gene was generated and recombinant Pcd protein expressed in *E. coli*. Following optimization of expression and protein purification conditions, anti-Pcd antibodies were raised and used to assess whether the Pcd protein is a carboxysome component. To test the contribution of Pcd to carboxysomes, a *pcd* mutant of *H. neapolitanus* is being created in which the *pcd* gene is deleted. This mutant will be tested for efficient growth in air, a characteristic of organisms with functional carboxysomes. Should a complete understanding of carboxysome structure/function relationships be gained, there is potential for manipulation of the microcompartment for synthetic biological applications or environmental research.

O2.06

9:15 MOLECULAR AND PHENOTYPIC CHARACTERIZATION OF CLINICAL METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS ISOLATES CAUSING BACTEREMIA AT A MAJOR HOSPITAL IN SOUTHERN MISSISSIPPI

Dhritiman Samanta, Justin Batte¹, Luis Marcos², and Mohamed Elasri¹

The University of Southern Mississippi, Hattiesburg, MS USA
¹ and Forrest General Hospital, Hattiesburg, MS USA²

Background: *Staphylococcus aureus* is the predominant cause of bacteremia worldwide. Distribution of methicillin-resistant *Staphylococcus aureus* (MRSA) tends to be geographically unique. We assessed molecular epidemiology and antibiotic resistance of MRSA isolates causing bacteremia in Southern Mississippi. Methods: We collected 30 MRSA blood isolates over one year period, which were subjected to staphylococcal chromosomal cassette *mec* (SCCmec) typing, pulsed field gel electrophoresis (PFGE), multi-locus sequence typing (MLST), and antibiotic resistance profiling. Risk factors underlying bacteremia were analyzed by Fisher's exact test and regression analysis. Results: All MRSA isolates were *mecA* positive and 70% were SCCmec type IV, indicating community-acquired infections, and 30% were SCCmec type II, of which 50% were Pantone-Valentine leukocidin (PVL) negative, indicating hospital-acquired infections. Most isolates (97%) were resistant to oxacillin and erythromycin and 30% to clindamycin. Risk factor analysis revealed a strong association of prior hospitalization, prior antibiotic usage, nursing home origin, and presence of PVL with MRSA isolates with minimum inhibitory concentration (MIC) >1 µg/ml for vancomycin. Conclusion: This is the first study to assess systematically the clinical and molecular epidemiology of bacteremia by MRSA isolates in Mississippi. Diverse genetic backgrounds in terms of SCCmec, PFGE, and MLST types of MRSA were identified as causing bacteremia in Mississippi. A strong association of PVL with high vancomycin MIC is one of the important findings of our study.

O2.07

9:30 ANDROGEN DEPRIVATION PROMOTES ALTERNATIVE SPLICING OF ANDROGEN RECEPTOR THROUGH REGULATION OF PCGEM1

Ziqiang Zhang, Tsui-Ho, Nanjiang Zhou, Jianguo Huang, and Yin-Yuan Mo

University of Mississippi Medical Center, Jackson, MS USA

The androgen receptor (AR), a member of the nuclear receptor superfamily, is required for prostate development and is also a major driver of prostate cancer pathogenesis. Thus androgen deprivation therapy (ADT) is the mainstay of treatment for advanced prostate cancer. However, castration resistance due to expression of constitutively active AR splice variants is a significant challenge to prostate cancer therapy; little is known why effectiveness of ADT can only last for a relatively short time. In the present study, we show that long non-coding RNA (lncRNA) PCGEM1 is highly expressed in prostate cancer and it is correlated with AR3, a predominant and clinically important form of AR splice variants. Moreover, androgen deprivation (AD) induces PCGEM1 and causes its accumulation in nuclear speckles where active RNA splicing takes place. Importantly, the AD-induced PCGEM1 regulates the competition between heterogeneous nuclear ribonucleoprotein (hnRNP) A1 and U2AF65 for AR pre-mRNA. Although AD promotes PCGEM1 to interact with both hnRNP A1 and U2AF65, the interaction of PCGEM1 with hnRNP A1 suppresses AR3 by exon skipping, whereas its interaction with U2AF65 promotes AR3 by exonization. Together, we demonstrate an AD-mediated castration resistance regulatory network involving PCGEM1 and splicing factors, and thus, this AD-PCGEM1-AR3 axis may provide an opportunity for intervention to prevent or overcome castration resistance.

02.08

9:45 GRANULIN E AS AN INFLAMMATORY MEDIATOR IN ALZHEIMER'S DISEASE

Randi Gail Reed, Gaurav Ghag, and Vijay Rangachari

University of Southern Mississippi, Hattiesburg, MS USA

Alzheimer disease (AD) is a neurodegenerative disorder characterized by mild to severe dementia and is caused by the aggregation and deposition of amyloid- β (A β) in the brain. This deposition causes neuroinflammation; however, whether inflammation from an external source like traumatic brain injury could trigger A β aggregation is unclear. A suspect for a potential inflammatory mediator that can interact with A β and induce its aggregation are granulins (Grns). Grns are small cysteine rich proteins proteolytically cleaved from a precursor protein called progranulin (PGrn) during inflammation. Grns have been implicated in another form of dementia called frontotemporal dementia. Several circumstantial evidences suggest that Grns play a role in AD. I hypothesize that GrnE interacts with A β and forms neurotoxic aggregates. To test this hypothesis, I will recombinantly express GrnE in *E. coli* and purify it using affinity chromatography. The structural characteristics will be studied using different biochemical and biophysical techniques like SDS and native gel electrophoresis, circular dichroism (CD), MALDI-ToF, and fluorescence spectroscopy. Further, the interactions will be characterized using fluorescence spectroscopic assays. I have optimized the purification protocol to obtain GrnE in a pure form. The CD data shows that the protein is random coiled. In summary, I have expressed and purified GrnE successfully for its structural characterization and interaction studies. This work was supported by the USM Center for Undergraduate Research and Mississippi INBRE, funded by an Institutional Development

Award (IDEA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

10:00 Break

02.09

10:15 AUTOPHAGY FROM ENDOPLASMIC RETICULUM STRESS IS CONTROLLED BY PRO-APOPTOTIC GENES IN RAT HEPATOCYTES

Junlin Zhang, Nitesh Singh, Kendra S. Robinson-Taylor, Wanda A. Dorsett-Martin Michael W. Morris, Truman M. Earl, and Christopher D. Anderson

University of Mississippi Medical Center, Jackson, MS USA

Endoplasmic reticulum (ER) stress and autophagy are significant in hepatocyte cell injury. We hypothesized that CHOP (C/EBP homologous protein), BIM (Bcl2 interacting mediator of cell death), and BID (BH3 interacting domain death agonist) interact with each other to regulate ER stress induced autophagy and cell death. Hepatocytes from lean Zucker rats were incubated with single or combined siRNA targeting CHOP, BIM, and/or BID for 24 hours. ER stress was stimulated via incubation with tunicamycin (TM) for 24 hours. Gene expression was measured via real time PCR. Autophagy was measured via immunostaining with LC3 (microtubule-associated protein 1 light chain 3). Cell viability was measured via trypan blue exclusion. TM treatment increased expression of CHOP and BIM but decreased expression of BID. TM increased autophagy and decreased cell viability. Individual gene inhibition of CHOP, BIM, or BID protected against autophagy and cell death. Inhibition of individual genes had an obvious effect on the expression of the other two genes. However, simultaneous inhibition of any combination of CHOP, BIM, or BID reduced autophagy but increased cell death. This occurred independent of ER stress induction. Conclusion: Autophagy in hepatocytes results from acute ER stress and involves interplay, at the gene expression level, of CHOP, BIM, and BID. This study suggests that gene expression of CHOP, BIM and BID together play an important role in ER stress related cell death. It also suggests that a homeostasis of these genes is required to promote cell survival.

02.10

10:30 A NOVEL ROLE FOR OSTEOPONTIN IN FACILITATING WEST NILE VIRUS NEUROINVASION

Linda Gates, Amber Paul, Dhiraj Acharya, and Fengwei Bai

University of Southern Mississippi, Hattiesburg, MS USA

WNV is an arthropod-transmitted virus, mainly by the mosquito *Aedes aegypti*. It has a positive sense, single-stranded RNA genome and is also classified as a *flavivirus*. Although 80% of individuals infected with the WNV are asymptomatic, approximately 20% will show clinical symptoms. In 2012, there was a massive outbreak of neuroinvasive WNV that posed a great threat to the US, as 51% of individuals that were diagnosed with neuroinvasive WNV, including symptoms that associated with encephalitis and meningitis (1). Osteopontin (OPN), a proinflammatory chemokine, has been implicated as a biomarker of neuroinflammatory diseases, such as Multiple Sclerosis, Alzheimer's, and HIV-encephalitis (2). In this study,

we found that OPN expression was dramatically up-regulated in both human peripheral blood mononuclear cells (PBMC) and murine bone marrow derived dendritic cells (BMDC) following WNV infection, indicating a role for OPN in WNV pathogenesis. After WNV challenge, wild-type (WT) C57BL/6 and OPN^{-/-} mice demonstrated comparable levels of viral clearance from blood and peripheral organs. In contrast, the viral burden in the brain of OPN^{-/-} mice was significantly lower than that in WT mice. In addition, quantitative real-time polymerase chain reaction (q-PCR) of various blood brain barrier (BBB) tight junction genes were up-regulated in OPN^{-/-} mice, indicating decreased permeability of the BBB. Consistent with this, 80% of OPN^{-/-} mice exhibited a higher survival rate than WT mice (20%) after a lethal dose (2000 Plaque Forming Units) of WNV. Together, these data suggest that the OPN signaling mediates WNV neuroinvasion.

O2.11

10:45 MODULATING CCM1P EXPRESSION TO ELUCIDATE THE ASSEMBLY PROCESS OF THE MITORIBOSOME MINOR SUBUNIT

Jon Ignacio Moreno and Marta Piva

Alcorn State University, Lorman, MS USA

Expression of mitoribosomal proteins is increased in cancer epithelial cells whose elevated aerobic energy requirements are met by lactate produced in associated fibroblasts. This metabolic partnership allows the epithelial cells to over-proliferate creating the invasive malignant tissue. To elucidate the many unknown aspects of mitoribosome biogenesis, we developed a regulable expression system for Ccm1p, a dual-functional PPR protein involved in the accumulation of 15S rRNA, which is a mitoribosomal component of *Saccharomyces cerevisiae*. The effects of down-and up-regulating Ccm1p expression on yeast were evaluated by growth assays, assessment of mitochondrial DNA by Southern blot analysis and quantitation of 15S rRNA by RT-qPCR. Down-regulation of Ccm1p expression decreased 15S rRNA steady-state levels by 95 % without loss of mitochondrial DNA and completely abolished aerobic growth. Up-regulation of Ccm1p expression restored 15S rRNA levels and ability to grow on non-fermentable substrates. This system is an excellent tool to elucidate the still unknown early molecular events of the mitoribosome synthesis pathway and might contribute to design new drugs that specifically target cells with enhanced mitochondrial biogenesis. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174

O2.12

11:00 THE MSAABCR OPERON REGULATES CAPSULE POLYSACCHARIDE PRODUCTION IN STAPHYLOCOCCUS AUREUS

Justin Batte and Mohamed O. Elasar

The University of Southern Mississippi, Hattiesburg, MS USA

Staphylococcus aureus has many different virulent factors that allow it to infect the host. One of these major factors includes the production of capsular polysaccharide or (CP). The production of capsule has been shown to play a major role in the virulence response during infection by aiding in the pathogens

survival, particularly in chronic infections such as bacteremia. Capsule has been shown to act as an antiphagocytic factor that allows the pathogen to persist and escape phagocytosis during epistasis or movement from one localized site of infection to another. *S. aureus* has developed a complex regulatory network that is responsible for regulating many virulent processes including CP production. In this study we show that the msaABCR operon plays a role in the regulation of cap genes and CP production within *S. aureus*. We show that deletion of the operon significantly reduces transcription of the cap genes and reduces CP production to undetectable levels. Using in vitro methods to measure phagocytosis by specialized human immune components or polymorphonuclear neutrophils (PMNs), we observed that the msaABCR mutant strains are significantly more susceptible to phagocytic uptake compared to their respective wild type strains. Upon further examination of this regulation, we have found that a member of the msaABCR operon, msaB, binds directly to the promoter region encoding the cap genes. Currently, we are examining this direct binding to further explore the potential of msaB acting as an activator of capsule production as well as when this binding occurs during the course of growth. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

O2.13

11:15 THE EFFECTS OF ENVIRONMENTAL CONDITIONS ON THE BIOACTIVITY OF OCCIDIOFUNGIN, A NOVEL ANTIFUNGAL

Chase Robinson and Donna M. Gordon

Mississippi State University, Starkville, MS USA

The pathogenic yeast, *Candida*, is the 4th leading cause for bloodstream infections in the USA with an estimated mortality rate of 19-24% and excess healthcare costs of \$44-\$320 million. Further, recent studies have brought attention to the increasing occurrence of candidemia isolates that are resistant to classical antifungal treatments. This trend, paralleled with overall increases in the frequency of invasive fungal infections (IFI), justifies the development of novel antifungal therapies [3]. Occidiofungin is a novel fungicidal cyclic peptide secreted by the soil bacterium, *Burkholderia contaminans* MS14. Analyses of occidiofungin demonstrated its broad-spectrum activity against fungi via a mechanism unique from currently available antifungals. Studies on the chemical stability and in vitro activity revealed that occidiofungin retains the full potency of its activity after exposure to extreme pH ranges (2-9), high temperatures (100°C), and incubation with gastric proteases [1]. These characteristics make it a potential candidate for clinical therapeutic use. It is known that occidiofungin activates the Cell Wall Integrity pathway and induces apoptosis through undetermined mechanisms [2]. In our attempts to discover its cellular target, we used *Saccharomyces cerevisiae* to identify environmental factors that have a significant impact on cell viability after occidiofungin exposure. Among these are the deprivation of glucose and phosphate (leading to increased susceptibility and resistance, respectively), and the inhibition of new protein synthesis by cycloheximide (increased sensitivity). By determining the mechanisms behind these alterations in susceptibility, we hope to identify signaling cascades involved in

mediating occidiofungin's bioactivity. 1. Ellis, Dayna, et al. *Antimicrobial Agents and Chemotherapy* 56.2 (2012): 765-769. 2. Emrick, Dayna, et al. *Journal of Natural Products* 76.5 (2013): 829-838. 3. Pfaller, Michael A. *The American Journal of Medicine* 125.1 (2012): S3-S13.

O2.14

11:30 EFFECTS OF PSEUDOGNAPHALIMUM OBTUSIFOLIUM EXTRACTS ON PROLIFERATION OF SACCHAROMYCES CEREVISIA

Samantha Hirt, Ronald Young, Joscelyn Johnson, Emily Fu, Kaneshia Tolbert, Darrow Thomas, Anjaneyulu Girimaji, Sriram Takkallapelly, Jonathon townes, Jeneau Wright, Mary McDonnell, Dale Rosado, and Angela Whittom Reiken

Mississippi College, Clinton, MS, USA

Pseudognaphalium obtusifolium, a member of the Asteraceae family, is an eastern North American annual herb having historical uses in traditional medicine among many Native American groups and early settlers of the region. Since scientific research delving into its actual medicinal value is scarce, we are investigating the effects of *P. obtusifolium* extracts on eukaryotic cells. Ethanol-, hexane-, and dichloromethane-derived extracts, in addition to whole leaf extracts, were obtained from collected plants and suspended in DMSO. The different extracts in serial dilutions of liquid media were used to culture the budding yeast, *Saccharomyces cerevisiae*. In quantitative and/or qualitative assessments, proliferation was evaluated over time. Particular serial dilutions of each extract are tested for effects on toxicity, cell viability, changes in mitochondrial morphology and distribution, and production of reactive oxygen species for cultures exhibiting a significant increase or decrease in proliferation. The data gained through these experiments will hopefully further our knowledge of the reported therapeutic values of *P. obtusifolium*.

O2.15

11:45 INVESTIGATING THE PROMOTER OF THE MOLD SPECIFIC GENE M46, IN THE PATHOGENIC DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Angela R. Jackson and Davida Crossley

Alcorn State University, Alcorn, MS USA

Histoplasma capsulatum (Hc) is a dimorphic fungus, it can exist as mold or yeast. The yeast is the causative agent for the respiratory infection histoplasmosis. M46 is a mold specific gene. The gene is expressed in the mold, but not in the yeast. Northern blot analysis has shown that M46 is expressed in the mold form of Hc G186AS and Downs strains. The gene is not expressed in the mold form of strains G184AS and G217B. Sequence analysis of the M46 promoter from all four Hc strains has shown that the open reading frame is conserved, and therefore the open reading frame is not a reason for lack of expression. Sequence analysis of the promoter has identified a deletion site and an insertion site in the promoter of strain G217B. The 12 bp deletion is approximately 500 bp upstream of the TATA rich sequence, and the 10 bp insertion site is approximately 40 bp upstream of the TATA rich sequence. The promoter region of strain G184AS was found to be identical to G186AS M46 expressing strain. To determine if the promoter of M46 is functional in all four Hc strains, the promoter will be fused in frame to the reporter GFP (Green Fluorescent Protein).

The fragment will be ligated to the telomeric vector pRPU1. The construct will be electroporated into the M46 expressing strain G186AS and the M46 non-expressing strain G184AS. GFP fluorescence will indicate if the M46 promoter is functional in the various strains. The results from this experiment will help with understanding how M46 is regulated in *Histoplasma capsulatum*. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

12:00

LUNCH BREAK

Thursday, February 26, 2015

AFTERNOON

Room 210

O2.16

1:00 IMPACT PCP1 MUTATIONS HAVE ON ATP SYNTHASE SUPER-COMPLEX ASSEMBLY AND MITOCHONDRIAL MORPHOLOGY

Mary Elizabeth Huddleston and Donna M. Gordon

Mississippi State University, Mississippi State, MS USA

In eukaryotes, mitochondria are key for the production of energy in the form of ATP. Central to ATP generation is the maintenance of mitochondrial morphology, which involves a balance between fusion and fission based events, and the formation of inner membrane folds called cristae. In the budding yeast, *Saccharomyces cerevisiae*, several genes have been identified for their role in cristae formation, including PCP1, MGM1, and TIM11. Pcp1p is a mitochondrial serine protease that processes Mgm1p, a GTPase involved in mitochondrial fusion (2). Tim11p, or subunit e of the mitochondrial ATP synthase complex, is required for the assembly of ATP synthase dimers and super-complex formation (3). Haploid cells deleted for PCP1 or MGM1 have reduced Tim11p protein levels in addition to defects in ATP synthase super-complex assembly (1). Here, select Pcp1p mutants displaying defects in Mgm1p processing were further analyzed by BN-PAGE and in-gel ATP synthase activity assays. Like haploid yeast deleted for PCP1, nonfunctional pcp1 alleles were found to contain unassembled ATP synthase units while pcp1 alleles with only minor substrate processing defects were capable of ATP synthase super-complex assembly. To detail ultrastructural changes in mitochondrial morphology, Pcp1p mutants will be processed for transmission electron microscopy. Together, these results offer insight into the function of Pcp1p in ATP super-complex assembly and its role in influencing mitochondrial morphology. 1. McQuibban GA, et al. *Nature* 2003 423(6939): 537-41. 2. Paumard P, et al. *EMBO J* 2002 21(3): 221-30. 3. Amutha B, et al. *Biochem J* 2004 381(Pt 1): 19-23.

O2.17

1:15 INVESTIGATING M46, A PHASE SPECIFIC GENE, IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Davida Crossley

Alcorn State University, Alcorn MS USA¹

Histoplasma capsulatum (Hc) is a dimorphic fungus, that causes histoplasmosis. The fungus exists in the environment as a mold and converts to a yeast in the mammalian host. It is the yeast which is pathogenic, and is the morphotype that is highly studied. Studies on Hc mold is highly overlooked. This research focuses on characterizing the mold specific M46 gene. M46 is a single copy gene. Northern blot analysis with four commonly used Hc strains has shown that M46 is upregulated in strains G186AS and Downs but is down regulated in strains G184AS and G217B. The reason for the lack of expression in the latter strains is unknown. Currently we are investigating via promoter analysis and electrophobility assays to determine if the reason for lack of expression is due to a cis or trans-acting element(s). Promoter deletion studies are also ongoing to determine the essential regions of the M46 promoter that is required for expression. According to NCBI Genbank, M46 does not have a homolog, and therefore the function is unknown. An M46 knockout revealed that M46 may not be involved in dimorphism, maintaining normal hyphal formation, and cell growth rate. RNA sequencing suggests that M46 may be involved in drug resistance. Currently we are conducting drug susceptibility assays to test this hypothesis. Other current M46 characterization studies include; confirming the predicted protein 8.5kDa protein size of M46 via western blot analysis, and determine the location of M46 in the cell via immunofluorescence. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

O2.18

1:30 BIOCHEMICAL AND MOLECULAR METHODS FOR THE DETECTION OF ENDOGENOUS CFTR EXPRESSION

Ghanshyam D. Heda and Oluwabukola Omotola
Mississippi University for Women, Columbus, MS USA

Background: CFTR is a membrane protein that function as a chloride channel on surface of many epithelial cells. Defective CFTR is the cause of genetic disease cystic fibrosis. CFTR is expressed endogenously at a level that is normally difficult to detect by traditional biochemical methods such as western blotting and immunohistochemistry. In order to detect endogenous CFTR levels we first aimed to increase the sensitivity of CFTR immunoblots by altering the concentrations of SDS and methanol in transfer buffer. SDS facilitates the removal of proteins from polyacrylamide gels (PAGE) and methanol allow there binding to nitrocellulose (NC) membrane. Methods: Endogenous (Capan-1, CFPAC) and exogenous (LLC-PK1, CFBE) CFTR expressing epithelial cell lines were treated with 5 mM sodium butyrate for 60 h to up-regulate the CFTR expression. CFTR protein levels were determined either by western blotting or immunoprecipitation. Real-time PCR was used to determine the CFTR mRNA expression. Results: The addition of 0.015% SDS in transfer buffer enhanced the detection of exogenous but not endogenous CFTR expression levels. Concentrations of methanol (5 to 20%) didn't influence the sensitivity of CFTR immunoblots. Endogenous CFTR expression levels, however, could be detected by immunoprecipitation with anti-CFTR antibody. At molecular level, the endogenous CFTR mRNA expression can also be detected and quantified by real-time PCR. Conclusions: SDS increased the sensitivity of CFTR-

immunoblotting, however, not sensitive enough to detect endogenous CFTR expression levels. Endogenous CFTR protein levels, however, can be determined by immunoprecipitation, whereas CFTR mRNA expression levels can be determined by real-time PCR.

O2.19

1:45 RESCUE OF PLASMA MEMBRANE CFTR BY INHIBITORS OF PROTEASOMES AND LYSOSOMAL ENZYMES

Ghanshyam D. Heda, Nadeema Appukutti, and Oluwabukola Omotola¹

Mississippi University for Women, Columbus, MS USA

Background: Cystic fibrosis (CF) is a lethal genetic disease caused by mutations that affect the folding and trafficking of CFTR protein to the plasma membrane in many epithelial cells. Over 70% of CF patients are affected by F508 mutation. Our laboratory has shown that the biochemical half-life of DF508 CFTR at the plasma membrane is much shorter (~4 h) than that of wild type CFTR (>48 h) (Heda et al, Am J Physiol Cell Physiol 280:166-174, 2001). We hypothesize that the reduced half-life of DF508 CFTR at the cell surface is caused by a variety of factors including degradation following endocytosis by proteasomes, lysosomal enzymes and protein-protein interactions. Aim: In this study we aimed to determine the role of various inhibitors of proteasomes and lysosomes on plasma membrane CFTR degradation. Methods: Human bronchial epithelial cells (CFBE) transfected with DF508 or wild-type CFTR were pre-treated with 5 mM sodium butyrate to up-regulate plasma membrane CFTR expression. Cells were then incubated at 37°C in the presence of protein synthesis inhibitor (cycloheximide, 20 µg/ml) and/or inhibitors of proteasomes (10µM MG132, 50µM ALLN, 10µM lactacystin), or lysosomes (100µM E64, 100µM EST, 20µM leupeptin, 10mM NH4Cl). All of the proteasomal inhibitors (see above) rescued both DF508 and wild-type CFTR degradation in a time-dependent manner. On the other hand only fewer lysosomal inhibitors (E64, EST) could rescue CFTR degradation. Conclusions: Proteasomes and lysosomal enzymes are in part responsible for CFTR degradation. Role of proteasomes, specifically in CFTR degradation warrants further investigation in determining the level of CFTR ubiquitination.

O2.20

2:00 COMPETITION EXPERIMENTS SHOW THAT THE [URE3] PRION OF SACCHAROMYCES CEREVISIAE PUTS PRION-CONTAINING CELLS AT A GROWTH DISADVANTAGE IN A NUTRIENT-RICH ENVIRONMENT.

James Osborne, and Ross Whitwam

Mississippi University for Women, Columbus, MS USA

Prions are infectious proteins which, in mammals are associated with neurodegenerative diseases and have many features in common with non-infectious diseases such as Alzheimer's disease. Yeast prions such as [URE3] serve as model systems for mammalian prions because they share many molecule features in common with them. However, unlike mammalian prions, the yeast prions are not associated with any disease states and while the [URE3] prion has been reported to slow yeast growth, the evidence is not strong. We show that, contrary to published reports, pure cultures of [URE3] yeast

grow at the same rates as prion-free yeast. However, when prion-containing [URE3] yeast are grown in direct competition with prion-free yeast in the same nutrient-rich culture, the prion-free yeast out-grow the prion-containing [URE3] yeast and eventually come to dominate the culture. This effect, on the other hand, is not seen in nutrient-poor medium, when the prion-containing yeast grew at essentially the same rate as the prion-free yeast.

02.21

2:15 **ENHANCEMENT OF TOTAL RADICAL TRAPPING POTENTIAL OF CHEDDAR WHEY CONTAINING EMULSIONS BY ULTRA-HIGH-PRESSURE HOMOGENIZATION**

Dipaloke Mukherjee, and Zahur Haque

Mississippi State University, Starkville, MS USA

Antioxidants alleviate deleterious effects of air and foodborne oxidative radicals (ROS) on human health and shelf-life and quality of foods by quenching the hunger of these molecules for electrons. Many small chemical antioxidants exhibit excellent antioxidative activity (AA) but are woefully deficient in terms of antioxidative persistence (AP). This study investigates enhancement of ROS quenching ability over time of an oil-in-water emulsion, where McIlvaine's iso-ionic buffer (pH 7) containing Cheddar whey (CW) (2% w/v) was the continuous phase, and dispersed phase was fresh peanut oil at a phase fraction (ϕ) of 0.1. Samples were prepared by applying various levels of Ultra-High Pressures (UHP); nil (control), 70, 140 and 210 megapascals (MPa). The blank was the buffer by itself. Total radical trapping potential (TRAP) was determined following generation of hydroxyl-radicals on challenging, i.e., introducing 2,2'-Azobis(2-methylpropionamidine) dihydrochloride (ABAP) to the reaction mix (termed "first challenge"). Luminol, which chemiluminesces (CL) stoichiometrically in the presence of unquenched radicals, was used to measure residual ROS over time, with and without test samples. Reduction in the maxima of CL/time plots gave the real-time AA and AP. Results show significant enhancement of antioxidative efficacy (AE) of the samples following UHP. Furthermore, a dose-dependent increase in AE was observed when samples were exposed to the highest pressure of 210 MPa; both AA and AP exhibited >0.5-fold improvement (59 and 66 AE units, respectively) compared to control. The study can potentially result in development of novel food preservatives, as well as nano-vesicular systems for effective drug/nutrient delivery.

2:30 **BUSINESS MEETING**

Thursday, February 26, 2015

EVENING

Poster Session

Immediately following Dodgen Lecture

P2.01

PNA-DNA FOUR-WAY JUNCTIONS AS A POSSIBLE THERAPEUTIC FOR PROINFLAMMATORY CYTOKINE HIGH MOBILITY GROUP B1

Sana Solangi, John Adams, and Anthony Bell

The University of Southern Mississippi, Hattiesburg, MS USA¹

High Mobility Group B1, or HMGB1, is a multifunctional or "moonlighting" protein that has two prominent cellular functions. HMGB1 was originally classified as an architectural nuclear protein that binds bent and distorted DNA with high affinity to mediate chromatin remodeling as well as DNA recombination and repair. It is now clear that HMGB1 also functions as a proinflammatory cytokine. Unintended HMGB1 cytokine signaling is associated with a variety of diseases and conditions such as: lupus, cancer, rheumatoid arthritis and sepsis. To date, there is dearth of HMGB1 targeted therapeutics. Our long-term goal is to develop hybrid four-way junctions (4WJs) composed of DNA and PNA (peptide nucleic acids) as high affinity ligands against HMGB1. PNA were used to enhance the biophysical and in vivo stability of the hybrid 4WJs. Our initial investigations have focused on monitoring the nuclease and thermostability of hybrid vs. DNA 4WJs. Preliminary data shows that hybrid 4WJs are more resistant to DNase I and Exo III than DNA 4WJs. Deoxyribonuclease I (DNase I) is an endonuclease that cleaves DNA as the phosphodiester links adjacent to a pyrimidine nucleotide, yielding 5'-phosphate-terminated polynucleotides with a free hydroxyl group on position 3'. Exonuclease III (Exo III) is an enzyme that catalyzes the stepwise removal of mononucleotides from 3'-hydroxyl termini of duplex DNA. Future studies will focus on measuring the serum stability of hybrid 4WJs.

P2.02

THE IN VITRO EVALUATION OF PEDIATRIC BRAIN CANCER CELL LINES

Charles Phillips and Scharri Walker

Tougaloo College, Tougaloo, MS USA

Treatment for pediatric brain malignancies typically requires a combination of surgery, radiation therapy, and chemotherapy. Chemotherapy specifically can have undesired toxic effects. Cabazitaxel was recently approved for the second line treatment of hormone refractory prostate cancer. This compound also possesses the ability to pass through the blood brain barrier making it a promising chemotherapy agent for brain malignancies. However, no studies have been conducted investigating the efficacy of this compound in pediatric brain tumors. To address this problem, we designed a series of studies to determine the anticancer efficacy of cabazitaxel in medulloblastoma (D341Med), fibroblast (IMR-90), and neuroblastoma (N2A) cell lines. The aim of future in vitro mechanistic studies will be to determine the anticancer potency of cabazitaxel and to establish the underlying mechanisms of action for any observed anticancer activity. The effects of this compound are to be tested cytotoxicity, proliferation, and cell cycle assays. These findings will further establish the rationale of cabazitaxel as a chemotherapeutic agent in the pediatric population. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.03

THE EFFECTS OF LPS AND MWCNT ON ALVEOLAR EPITHELIAL LUNG CELLS

Ianna Danielle May, Christian Rodgers², Erica Brown², Jelicia Crawford¹, and Maricica Pacurari^{1,2}

¹ *Biology Department, College of Science, Engineering, and Technology, Jackson State University, Jackson, MS, USA*, ² *NIH RCMI-Center for Environmental Health, College of Engineering, Science, and Technology, Jackson State University, Jackson, MS, USA*

PURPOSE: Matrix degrading metalloproteinase, MMP-9 and MMP-12, are implicated in lung disease including fibrosis and cancer. Multi-walled carbon nanotubes (MWCNT) are widely used in favor of their small size, mechanical strength, and electrical conductivity. Due to the increased use of MWCNT in the pharmaceutical and commercial industries, the susceptibility to potential medical side effects in particularly through inhalation into the lung is further analyzed. MWCNT cause inflammation, fibrosis, and structural changes in the lung. In the present study, we tested whether bacterial lipopolysaccharide (LPS), a ubiquitous agent in the environment, potentiates MWCNT-induced lung remodeling. **MATERIALS AND METHODS:** Alveolar epithelial type II cells (A549) were treated with LPS (1ng/ml), MWCNT (20 µg/ml), or combination of both for 24 h. Total RNA was isolated, reverse transcribed, and the expression levels of MMP-9 and MMP-12 genes were analyzed using real-time quantitative PCR (qPCR) in comparison with the endogenous control gene 18S. **RESULTS:** Treatment with MWCNT and LPS resulted in a change in the MMP-9 and MMP-12 expression levels in the A549 cells. MWCNT (20 µg/ml) alone increased the expression levels of MMP-9 or MMP12 (1.96-, and 1.5- fold change versus control, (p<0.05), respectively). The combination of LPS (1 ng/ml) and MWCNT (20 µg/ml) resulted in a tremendous increase in the expression of MMP-9 with a 7.97-fold increase, and MMP-12 with 3.85-fold increase versus control. An enhanced migration of alveolar epithelial cells was found in all treatment groups. **CONCLUSION:** These results suggest that LPS potentiates MWNCT-induced lung remodeling by increasing the expression of matrix metalloproteinases MMP-9 and MMP-12. These findings also indicate that individuals easily prone to pulmonary inflammation are at greater risk for potential adverse effects of MWCNT and hinder the normal biological functioning of the lung. **Acknowledgements:** This research is supported by a grant from the Research Initiative for Scientific Enhancement Program at Jackson State University (JSU).

P2.04

MESENCHYMAL STEM CELLS SUPPORT OSTEOSARCOMA GROWTH BY ENTERING AN AUTOPHAGIC STATE

Jason Whitt, Patrice Penformis¹, Shelby Padway², Jennifer Barr¹, and Radhika Pochampally¹

UMMC Jackson, MS USA¹ | Tulane New Orleans, LA USA²

Osteosarcoma (OS) is the eighth most common type of cancer found in children and adolescents, accounting for approximately 20% of all primary bone cancers. Unfortunately, the survival of patients with osteosarcoma has not improved significantly in recent years and the prognosis of patients with metastatic osteosarcoma is especially poor. Located within the tumor microenvironment are mesenchymal stem cells (hMSCs) which have been implicated in tumor growth, invasion, metastasis and drug resistance. Recent results from our lab have

shown serum deprived OS cells maintained viability when cultured in the presence of serum-deprived hMSCs, conditions which replicate the nutrient poor environment found in the tumor. Furthermore, OS cells grown in the presence of hMSC conditioned media are resistant to apoptosis. These results correlate with previous studies which have shown tumor associated MSCs enter an autophagic state wherein they release growth factors and tumor supportive microRNAs. These microRNAs regulate gene expression by initiating the degradation of mRNA, thus preventing the translation of genes into proteins. Preliminary microarray assays had already shown a specific pattern of epigenetic regulators in donor matched hMSCs and OS cells. This study revealed 10 apoptosis-associated genes that are downregulated in OS cells compared to donor-matched hMSCs and 4 associated microRNAs were upregulated in hMSCs, providing possible diagnostic markers for early osteosarcoma detection.

P2.05

IDENTIFICATION OF FUNGI CAUSING WILT DISEASES ON MISSISSIPPI COTTON PLANTS

Din-Pow Ma and Fahad Albukhari

Mississippi State University, Mississippi State USA

The emergence and spread of Verticillium wilt was recently observed in cotton plants at the R.R. Foil Plant Science Research Center at Mississippi State during the summer of 2013 and 2014. This disease could pose a considerable threat to cotton growers because some breeding lines appeared to be extremely susceptible to the disease. Two soilborne fungi with different morphology and growth characteristics were isolated from diseased cotton plants by culturing infected stem tissues on potato dextrose agar (PDA) plates. Genomic DNA was isolated from the two fungi and used in genomic typing via PCR amplification and DNA sequencing. The two fungi species were identified as Verticillium sp. and Diaporthe phaseolorum via ribosomal ITS (Internal Transcribed Spacer) DNA sequencing. Two ITS regions, ITS1 (between the 18S rRNA and 5.8S rRNA) and ITS2 (between 5.8S rRNA and 28S rRNA), are present in the fungal rRNA operon. The two ITS regions are removed during pre-rRNA cleavage. Due to their nonfunctional role, the ITS regions have higher rates of mutations and genetic variations and are often used for molecular systematics and species identification. The isolated Verticillium sp. could be Verticillium dahliae, Verticillium longisporum or Verticillium albo-atrum and will be further identified using the PCR-based genotyping method with species-specific primers.

P2.06

TESTOSTERONE SUPPLEMENTATION CHANGES ADIPOSE COMPOSITION IN OBESE ZUCKER RATS

Jasmine Irene Jennings¹, Rodrigo Maranon², and Jane Reckelhoff²

Tougaloo College Tougaloo, Mississippi USA¹ and University of Mississippi Medical Center Jackson, Mississippi USA²

Obesity in men is characterized by a reduction in serum testosterone levels and an increase in visceral adiposity. Obese rats also have a reduction in serum testosterone and an increase in adiposity. Whether testosterone supplements in obese males have a beneficial effect on adiposity is not clear. The following questions were addressed in this study: Do

obese male rats have an increase in visceral adiposity and do testosterone supplements change the distribution of adipose tissue? We hypothesized that obese males have an increase in adipose tissue and that testosterone supplements will reduce adiposity. Male obese (OZR) Zucker rats were implanted at 10 weeks of age with testosterone pellets (T; 10 mm silastic tubing with 10 mg testosterone propionate) or empty pellets that were changed every 3 weeks. At 20 weeks of age, rats were subjected to echo magnetic resonance imaging (MRI) for determination of fat mass. Body weights were similar in OZR and OZR + T rats (OZR: 657.2 ± 20.2 vs OZR+T: 632.4 ± 10.7 g; $p=NS$). Echo MRI showed that fat mass was significantly lower in OZR+T than OZR (OZR+T: 279.3 ± 6.8 vs OZR: 387.1 ± 8.3 g, $p<0.05$). Lean mass was also lower in OZR +T (OZR+T: 342.8 ± 9.4 vs OZR: 379.0 ± 6.3 g, $p<0.05$). These data show that testosterone treatment reduced both fat and lean mass in OZR. These data suggest that testosterone supplements may be beneficial for obese men. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P2.07

AGES AND AGING: ELIMINATING RAGE EXTENDS LIFESPAN

Carter G. Holland, Jack Sudduth, Paul Hogue, Donna Gordon, and James Stewart

Mississippi State University, Starkville, MS USA

Stable advanced glycation endproducts (AGEs) accumulate within the body over time. This phenomenon, commonly known as the Maillard theory of aging, has been demonstrated to be a determinant for the rate of aging. RAGE (Receptor for AGE), is normally expressed at low levels; however, its expression is increased during aging. The purpose of this study was to establish a mechanistic link whereby increased AGE/RAGE signaling contributes to the aging process by decreasing longevity. Casual observations of RAGE knockout (R-/-) mice noted these animals had significantly increased lifespans (6-7 years of age) compared to their wildtype (Wt) controls (2-3 years of age). RAGE activation has been demonstrated to trigger intracellular pro-inflammatory pathways culminating in the activation of the transcription factor, NF-KB, to increase pro-inflammatory gene expression. In this study R-/- and Wt mice were sacrificed at 15-18 months. Protein and RNA were isolated from cardiac tissue for biochemical analysis. There was a significant 18% decrease (0.72 ± 0.02 ; p 2-fold increase or decrease in gene expression). We are currently validating these results using RT-PCR and 2D electrophoresis to be followed by proteomic analysis with the goal of understanding the role accumulated AGEs and RAGE activation play in longevity.

P2.08

HYPERINSULINEMIA DOES NOT AFFECT MELANOMA PROLIFERATION

Shuh-Marraka Chandler and Elizabeth Brandon

Mississippi College, Clinton, MS USA

The relationship between obesity and insulin resistance has been studied for decades. Insulin resistance is a major

challenge faced by many obese patients. It delays glucose uptake after a meal, which increases plasma glucose concentration. Insulin is also an important regulator of fat metabolism and resistance leads to higher levels of plasma lipids. Studies show that high glucose and lipid levels are directly decrease insulin sensitivity. The body compensates by stimulating pancreatic beta cells to secrete more insulin, generating a positive feedback loop that leads to hyperinsulinemia and eventually type II diabetes. The changes that occur in obesity are associated with certain cancers and hyperinsulinemia has been shown to promote the growth of some tumors. Tumor growth may result from the anabolic and antiapoptotic actions of insulin, which are mediated by the insulin receptor and the IGF-1-receptor or a hybrid receptor. The activation of both receptors is seen in many tumor cells, especially in obesity-associated cancers. Melanoma is one such cancer and these tumors express both receptors. To test the hypothesis that insulin increases the growth of melanoma cells, we treated melanoma cells with insulin (1 and 10 ng/mL) and monitored their growth for 48 hours. We counted cells at 24 and 48 hours to observe any changes in growth. Insulin did not significantly affect melanoma cell growth. Support from Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.09

CHARACTERIZING THE PROMOTER OF M46, A MOLD SPECIFIC GENE, IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Zacharia Harris and Davida Crossley

Alcorn State University, Lorman, MS USA

Histoplasma capsulatum (Hc) is a dimorphic fungus that can exist as a mold or a yeast. The fungus causes the respiratory infection histoplasmosis. M46 is a mold specific gene that it is expressed in the mold form, but not in the yeast. Northern blot analysis, revealed that the gene is expressed in mold, for strains G186AS and Downs, but not in strains G184AS and G217B. A promoter analysis investigation is underway to determine the reasons for these findings. The objective of the project is to see which part of the M46 promoter is required for expression. In order to do so, a promoter fragment of M46 from Hc strain G186AS will be amplified via PCR with various sizes and placed in frame with GFP (Green Fluorescent Protein) in the vector pRPU1. The construct will be electroporated into strain Wu27 (186ura-) and then later viewed with a fluorescent microscope to detect GFP fluorescence. The importance of this experiment is to help understand how a mold specific gene is regulated in a dimorphic fungus. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.10

GENE EXPRESSION IN OXIDATIVE STRESS PATHWAY IS ALTERED IN SPACE-FLOWN TK6 CELLS

Alexandria Nicole Thompson, Ming Shenwu, Joshua Age, and Alamelu Sundaresan

Tougaloo College, Tougaloo, MS USA

Microgravity is the weightlessness or 0g compared to normal 1g on earth. Astronauts can be experienced multiple risk factors which compromise their immune system and increase cancer risk. Factors in the space environment that contribute to immune dysregulation include: microgravity, stress, deconditioning, and radiation, etc. Our previous studies indicated that combination of microgravity and radiation can decrease immune function through oxidative stress and benzofuran-2- carboxylic acid derivatives (KMEG or KM12) can be used as countermeasures against it. We hypothesize that space environment will cause an increase in oxidizing species and a decrease in antioxidant defenses in TK6 cells, and KM12 will increase cell sensitivity to oxidative stress. Gene expression in oxidative stress pathway in space- flown TK6 cells was compared to that of ground controls using cells fixed 7 days after launch. The results of the RT2 ProfilerTM PCR Array analysis prove our hypothesis to be true due to the down regulation of antioxidant genes such as GSTZ1 and TXNRD1 and an up regulation of oxidative stress response genes such as GPX1 in space-flown cells. KM12 does increase cell apoptosis. In conclusion, the expression of many genes in oxidative stress pathway is altered after exposure to space environment. Our data suggest that synergistic effect of space microgravity and radiation on tumor cell damages probably caused by an imbalance between reactive oxygen species and antioxidant defense, and KM 12 does increases cell sensitivity to oxidative stress and may be used for anti tumor reagent.

P2.11

RAT MODEL OF ISCHEMIA REPERFUSION INJURY (IRI)

Danielle Amaris Redd^{1,2} and Olga McDaniel¹

University of Mississippi Medical Center Jackson, MS USA¹ and Tougaloo College, Tougaloo, MS USA²

Ischemia reperfusion injury is the process in which there is a lack of oxygen to certain tissues for a period of time, followed by the return of blood supply to those tissues. The tissue used to perform this IRI research was the rat's left anterior descending coronary artery (LAD). The purpose of this study is to determine if the initial ischemia/reperfusion during organ procurement may cause capillary pressure and physiologic injury which may have a significant impact on organ dysfunction and rejection. In order to acquire data, The LAD of the rat was ligated at different time intervals while ischemic conditions were present. After the different time intervals, reperfusion followed and the LAD was tested for cytokine production and inflammation. Data shows that there is a significant amount of cytokine production following IRI. With this research, we expect the percentage of organ dysfunction and rejection to significantly decrease. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.12

THE INVESTIGATION OF THE SPECIFIC FUNCTIONS OF TWO SUPEROXIDE DISMUTASE SPECIES IN

OXIDATIVE STRESS DAMAGE AND MICROBIAL COMMUNITY HOMEOSTASIS IN AMBLYOMMA MACULATUM

Gary P Crispell, Khem BC, and Shahid Karim

University of Southern Mississippi, Hattiesburg, MS USA

Background: The Gulf Coast tick (*Amblyomma maculatum*) is an obligate blood-feeding ectoparasite of animals and humans. The unique ability of ticks to ingest huge blood meals requires robust antihemostatic strategies; one of which is an important anti-oxidative mechanism against blood meal derived oxidative stress. We hypothesized that tick superoxide dismutase (mitochondrial and cytoplasmic) enzymes are critical in combating stress during the blood-meal cycle on and off the host. Methods/Findings: RNAi-mediated gene silencing approach was used to assess the functional role of target genes in tick blood-feeding and associated microbial communities. Using qRT-PCR, the transcriptional expressions of tick MnSOD and Cu/ZnSOD were elevated upon blood feeding in salivary glands in relation to midgut tissues. Ticks injected with individual dsRNA and dual-SOD cocktail dsRNA showed a significant depletion in transcript level. The findings also showed that the silencing of MnSOD and Cu/ZnSOD altered the native microbial load associated with ticks. A malondialdehyde (MDA) assay was performed to quantify lipid peroxidation from superoxide radicals, and the results showed increased lipid peroxidation in knockdown samples over the control samples. Conclusions/Significance: The results support the potential role of tick SOD in maintaining bacterial communities in tick tissues by alleviating the deleterious effect of reactive oxygen species. This work opens up a new avenue of research in oxidative stress and provides a logical connection between oxidative stress and the microbiome within the tick host. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.13

INVESTIGATION OF ANGIOTENSIN-CONVERTING METALLOENZYME (ACE) IN AMBLYOMMA MACULATUM

Joseph Jelinski, Jaclyn Williams and Shahid Karim

University of Southern Mississippi, Hattiesburg MS USA

Ticks attach and feed on their host for numerous days. To cope with host reactions such as inflammation and immune response; ticks saliva, with a variety of compounds has evolved methods to disarm the host defense. In the host there is a variety of agonist that plays a role in inflammation, including bradykinin, known as a mediator of pain. ACE has been associated with the degradation of multiple pro-inflammatory peptides, including bradykinin. Methods/Findings: Two Angiotensin Converting enzymes were identified in an *A. maculatum* proteome. Total RNA was isolated from female *A. maculatum* and subjected to Temporal Gene Expression during tick feeding points including early and late hours. The data acquired from qRT-PCR showed differential expression of both genes of interest, with highest expression correlating with fast feeding. Utilizing ACE inhibitors and bradykinin degradation assays, the role of ACE will be further revealed in tick saliva. Conclusion/Significance: Degradation of bradykinin, a mediator

of pain, is likely significant to the ticks ability to stay on its host for extended amounts of time unknown to the host. Further developments could make aware the host of the infestation and reduce tick infestations.

P2.14

THE ADDITION OF RAPAMYCIN CAUSES DE-REPRESSION OF THE NITROGEN REGULATORY PROTEIN AreA IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Terra Parker, Glen Shearer, Thomas Buford, and Logan Blancett
University of Southern Mississippi Hattiesburg, MS USA¹

Histoplasma capsulatum (Hc) is a dimorphic fungus most commonly found in the USA in the Mississippi-Ohio River Valley flyways where high levels of bird and bat excrement can be found. Hc is the etiological agent of the disease Histoplasmosis, the most common respiratory mycosis of humans. Hc is a dimorphic organism existing as a mold (M) at 25°C and once inhaled by a mammalian host (37°C) undergoes a dimorphic shift to the yeast (Y) phase. This dimorphic shift is required for the disease progression of Hc. Nitrogen Catabolite Repression (NCR) is the process by which fungi selectively utilize the most energetically favorable nitrogen source available. AreA has been identified as a key transcriptional activator of NCR-sensitive genes. Quantitative real-time PCR has revealed that AreA is up-regulated when subjected to growth conditions with no nitrogen source present. TOR (target of rapamycin) is a protein kinase that has been shown to repress AreA in the presence of favorable nutrients. Rapamycin is an immunosuppressant drug that inhibits TOR. We hypothesize that the addition of rapamycin to a favorable growth media will inhibit TOR, thus de-repression of AreA should be observed. Our experiments have shown that inhibition of TOR via rapamycin leads to de-repression of AreA even under nitrogen sufficient growth conditions. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P2.15

BONE MARROW MESENCHYMAL STEM/STROMAL CELLS DERIVED EXOSOMES IN BREAST CANCER PROGRESSION AND METASTASIS

Krishna C Vallabhaneni, Fei Xing, Kounsuke Watabe, and Radhika Pochamapilly

Cancer Institute, University of Mississippi Medical Center, Jackson, MS USA

Human mesenchymal stem/stromal cells (hMSCs) are shown to provide support for breast cancer progression, partly through their secretome. The secretome of the stressed cells is tumor supportive, demonstrating that this model mimics solid tumor core. It has been shown that exosomes secreted by cells affect a recipient cell by modifying its protein translation, thus, inducing a cascade of signaling events. Exosomes (30-120nm) are made up of a double membrane of phospholipids that contain miRNA, mRNA, proteins and lipids. Previous studies in our lab characterized the exosomes cargo from serum deprived hMSCs (SD-MSCs) and their roles in tumor supportive properties. In this study we developed an *in vivo* model to understand the role of exosomes in breast cancer metastasis.

Next-Gen sequencing assays for non-coding RNAs in exosomes from SD-MSCs indicated the presence of tumor supportive miRNAs. AntagomiR studies were performed as a proof of concept which confirmed the role of miRNA-21 and -34a as tumor supportive miRNAs. The orthotopic xenograft mouse model using MCF-7 cells demonstrated the tumor supportive function of these exosomes. On the contrary, *in vivo* metastatic mouse model demonstrated that exosomes from SD-MSCs suppresses MDA-MB-231 cells metastasis. Together, these findings suggests that exosomes transfer miRNAs from hMSCs may promote breast cancer progression but inhibit metastatic niche. Further studies to identify specific factors responsible are yet to be studied.

P2.16

RAP1A GTPASE: A NOVEL LINK BETWEEN PKA AND AGE/RAGE SIGNALING CASCADES

Rebecca A. Worsham, Rosalynn Gunn, Emily Lightsey, and James Stewart

Mississippi State University, Starkville, MS USA

Rap1a is a small monomeric G-protein that acts as a molecular switch coupling extracellular events to intracellular signaling. This cycling process can be triggered by three known second messenger molecules, cyclic AMP (cAMP), calcium, and diacylglycerol. These molecules are components of the protein kinase A (PKA) signaling cascade. In a diabetic, hyperglycemic environment, advanced glycation endproducts (AGEs) will accumulate and bind to their receptor (RAGE) to elicit multiple downstream signaling events. The purpose of this study was to identify a novel role for PKA-dependent Rap1a GTPase signaling in the AGE/RAGE cascade. We hypothesize that the downstream effects of AGE/RAGE signaling in diabetes mellitus will be increased by a Rap1a-PKA-dependent pathway resulting in elevated extracellular matrix (ECM) accumulation to alter heart function. Cardiac fibroblasts were isolated from diabetic mice (C57BL/KsJ-db/- or db/-) and lean (db/+) littermates. Acute forskolin treatments (2μM; 48 hours) to increase intracellular cAMP concentrations and activate PKA increased phospho-ERK1/2 in db/- cells as compared to db +/- cells. In addition, protein expression α-smooth muscle actin (α-SMA), a marker for fibroblast differentiation, was increased. Combination therapy of glycated albumin (AGE; 5mg/mL) to activate RAGE and forskolin increased both phospho-ERK1/2 and α-SMA suggesting a synergistic effect. Defining a role for Rap1a and PKA in the AGE/RAGE signaling cascade will provide a more comprehensive understanding of the intercommunication and regulation of ECM production and accumulation in type 2 diabetic patients.

P2.17

Rap1a IN AGE/RAGE-PKC-ζ SIGNALING IN TYPE 2 DIABETES MELLITUS

Jia Zhao and James A. Stewart, Jr.

Mississippi State University, Starkville, MS USA

Hyperglycemia is a commonality shared by patients with type 1 and 2 diabetes mellitus. It is considered to be an underlying cause of myocardial dysfunction. Hyperglycemia has been demonstrated to differentiate cardiac fibroblasts to a myofibroblast phenotype. Fibroblasts are responsible for normal myocardial extracellular matrix (ECM) regulation; however,

during pathological ECM remodeling, myofibroblasts display a heightened state of activity that has been correlated with pathological fibrotic conditions. Advanced glycation endproducts (AGEs) accumulate in the body and bind to their receptor (RAGE) to elicit downstream PKC- ζ activation and subsequent fibrosis, RA and increased fibroblast differentiation. The purpose of this study was to determine if AGE/RAGE/PKC- ζ signaling is facilitated by Rap1a GTPase activity to increase fibroblast differentiation and ECM accumulation in the heart. Rap1a is a member of the Ras GTPase superfamily that acts as a molecular switch coupling extracellular events to intracellular signaling. Cardiac fibroblasts were isolated from diabetic mice (C57BL/KsJ-db $^{-/-}$ or db $^{-/-}$) and lean (db $^{+/+}$) littermates. Silencing Rap1a mRNA in diabetic fibroblasts returned RAGE, collagen I, phospho-PKC- ζ , and α -smooth muscle expression (α -SMA, fibroblast differentiation marker) to non-diabetic levels. We propose that Rap1a and AGE/RAGE signaling cascades converge at PKC- ζ to stimulate the downstream mediators. Deactivation of this mechanism by utilizing a loss-of-function approach led to reduced fibroblast phenotype changes, decreased collagen accumulation, and RAGE down-regulation.

P2.18

RAP1A INTERCONNECTS AT1R AND RAGE SIGNALING IN DIABETES

Neeta Kumari, Eleanor L. Bailey, and James A. Stewart, Jr.

Dept of Biological Sciences, Mississippi State University, Starkville, MS 39762

Chronic hyperglycemia increases renin-angiotensin system activation. Angiotensin II (ANGII) binds to angiotensin type 1 receptor (AT $_1$ R) to enhance fibroblast activation and increased ECM protein levels. Crosstalk between renin-angiotensin system and the AGE-RAGE signaling cascade has been demonstrated to exacerbate diabetic cardiac remodeling; however, the linking signaling molecules are unknown. ANGI stimulation of AT $_1$ R has been shown to upregulate the AGE-RAGE signaling pathway by increasing AGE accumulation and RAGE expression. Administering inhibitors of ANGI conversion or AT $_1$ R antagonists delayed diabetes onset. Our laboratory has identified a molecular switch, Rap1a, linking the AGE-RAGE signaling cascade and the renin-angiotensin system. We propose that interrupting Rap1a signaling downregulates type 2 diabetes-mediated AGE/RAGE cascade will reduce fibrotic ECM synthesis and accumulation and prevent maladaptive fibroblast to myofibroblast phenotype differentiation to restore LV structural remodeling and stiffness. Cardiac fibroblasts were isolated from age-matched 16 week-old non-diabetic (db/wt), db/wt^{RAGE $^{-/-}$} , and db/wt^{Rap1a $^{-/-}$} mice. Cells were treated with agonists for AT $_1$ R (ANGII, 100nM), Rap1a (Epac, 100 μ M), and RAGE (AGE-BSA, 0.5mg/mL) for 24 hours. After 24 hours, proteins were isolated and western blot analysis was performed. Both db/wt^{Rap1a $^{-/-}$} and db/wt^{RAGE $^{-/-}$} phospho-PKC- ζ expression was similarly decreased despite agonist stimulation. RAGE expression was greatly reduced in db/wt^{Rap1a $^{-/-}$} cells. These results indicate there is a role for Rap1a in RAGE expression and perpetuation of AGE/RAGE signaling cascade. By decreasing Rap1a expression, AGE/RAGE downstream signaling through PKC- ζ is altered to decrease collagen accumulation and myofibroblast differentiation.

P2.19

A NOVEL MICRORNA TARGETS SUZ12 AFFECTING CELL PROLIFERATION.

Patrice Penfornis, Joseph D. Fernandes¹ Chindo Hicks¹ and Radhika Pochampally¹

University of Mississippi Medical Center, Jackson MS USA

Current knowledge in cancer biology shows that human mesenchymal stem/stromal cells (hMSCs) provide support for cancer progression through their secretome. Our lab has shown that MSCs are resilient to serum deprivation using autophagy. The secretome of these stressed cells is tumor supportive, demonstrating that this model mimics solid tumor core. It has been shown that extracellular vesicles (EVs) secreted by cells contains microRNAs which in turn affect a recipient cell by modifying its protein translation, thus, inducing a cascade of signaling events. Using deep-sequencing method, we report characterization of a novel miRNA provisionally named miR-G665A from hMSCs EVs that has not previously been described. This miR-G665A is highly conserved among mammals and further assays confirm its expression in primary normal cells and most cancer cell lines. Next, knockdown studies using anti-gomirs and shRNA strategies demonstrate that miR-G665A plays a role in cell proliferation. Gene expression studies from miR-G665A knockdown cells revealed potential targets of miR-G665A. Two such targets with a role in proliferation were further analyzed using 3'UTR luciferase assays, which showed SUZ12 as one of the targets. SUZ12 is a component of the polycomb group complexes, which play a role in conferring the neoplastic phenotype of adult cells. Furthermore, chromatin immunoprecipitation assays demonstrate that SUZ12 binds to miR-G665A suggesting a feedback loop mechanism of co-regulation. The role of this novel miRNA on the regulation of an essential transcription factor could lead to a better understanding of cancer mechanisms.

P2.20

NON-EMBRYONIC STEM CELL CORE (NESCC) AT UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

Joseph D Fernandes, Radhika Pochampally, and Patrice Penfornis

University of Mississippi Medical Center Jackson, MS USA

Mission: The overall mission of the UMMC Non-embryonic Stem Cell Core (NESCC) is to support investigators interested in stem cell research in the fields of cancer and regenerative medicine. NESCC is a part of the infrastructure to support and conduct basic and clinical research related to non-embryonic stem cells for members of the academic research community in Mississippi. Services: NESCC provide the expansion of mesenchymal stem cells (MSCs) from bone marrow and adipose tissue, cancer stem cells (CSCs) and induced pluripotent stem cells (iPS). Services also include providing a Quality Control assays unique to the cell type: Assays such as differentiation assays, colony forming units assay, cell surface markers (FACS analysis) and non-adherence assays (mammospheres, sarcospheres, etc). In addition, consulting services to design your stem cell protocols for IRB, IACUC approvals, publication will be provided. NESCC also offers collaborative opportunities to utilize stem cells for preclinical studies. Users: NESCC works with a broad range of Research fields including Regenerative Medicine, Cancer,

Cardiovascular and Obesity Research, Dentistry, Reconstructive medicine, etc. The Non-Embryonic Stem Cell Core is located at the University of Mississippi Medical Center at Jackson, MS. The cell culture lab is on the 7th floor of the Arthur C. Guyton building in room G752. It is open 9am-5pm Monday-Friday, and services are available to all academic members. Prices available upon request, please contact nesc@umc.edu.

P2.21

IDENTIFICATION OF IL-6 AND IL-10 IN CHANNEL CATFISH, *ICTALURUS PUNCTATUS*

Jeremiah John Reese, David Spencer,
Erin Taylor, Melanie Wilson, and Eva Bengten

University Mississippi Medical Center Jackson, MS, Hinds County USA

Cytokines are small (5-30 kD) soluble proteins responsible for cell to cell communications. Several cytokines have been identified in teleost fish, including rainbow trout (*Oncorhynchus mykiss*) and zebrafish (*Danio rerio*), but have yet to be characterized in channel catfish. We hypothesize that cytokines, including interleukin-6 (IL-6) and IL-10, are present in catfish and perform functions analogous to their mammalian counterparts. Catfish homologs were identified using NCBI's BLAST to search the catfish EST databases against previously published teleost sequences. Briefly, one transcript encodes for a putative catfish IL-6 mature protein of 213 amino acids and contains six instability motifs in the 3' untranslated region (UTR). The predicted protein contains four characteristic alpha helices and possesses the distinct IL-6 family consensus pattern (C-x(9)-C-x(6)-G-L-x(2)-[F/Y]-x(3)-L) and contains two conserved cysteine residues known to form disulfide bonds in mammals. Notably, this disulfide linkage is necessary for biological function, however a cysteine pair forming a second, non-essential disulfide bond in mammals is not present in catfish. The catfish IL-10 transcript encodes a mature protein of 182 amino acids, and contains one instability motif in the 3' UTR. The predicted protein has two IL-10 signature motifs, four conserved cysteine residues implicated in disulfide bond formation, and five alpha helices. Cell line expression of IL-6 and IL-10 was performed with RT-PCR. IL-6 was expressed in mixed leukocyte cultures, while IL-10 was found in B cell lines 3B11 and 1G8, and to a lesser extent in cytotoxic T cell line 32.15. In order to perform functional studies, catfish IL-6 and IL-10 sequences were amplified by RT-PCR, cloned into the pET100 vector that incorporates a N-terminal 6X-histidine tag, and successfully expressed as proteins in *E. coli*. Receptor binding and proliferation studies are ongoing.

P2.22

INVESTIGATING THE ROLE OF M46 IN DRUG RESISTANCE IN THE DIMORPHIC FUNGUS *HISTOPLASMA CAPSULATUM*

Alicia Freeman and Davida Crossley

Alcorn State University, Lorman, MS USA

Histoplasma capsulatum (Hc), a dimorphic fungus, exists in the soil as a saprophytic mold. When it is disturbed it releases spores into the air, and the spores are inhaled into the lungs through the nasal cavity. Once in the lungs, they shift to a parasitic yeast and cause the lung infection histoplasmosis. This experiment focuses on the mold specific gene M46. Since M46

does not have a homolog its function is unknown. To determine its function, a knockout was created by replacing part of its open reading frame with a hygromycin marker. Studies have shown that M46 is not involved in dimorphism, cell growth rate, or morphology. RNA sequencing of the M46 knockout and wild type mold suggest that M46 may be involved in drug resistance. To test this hypothesis the M46 knock out and wild type were grown on various HMM plates with different concentrations of drugs. These results showed that the M46 knockout and wild type grew at the same rate when subjected to the different drugs. Therefore M46 may not be involved in drug resistance. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.23

THE IMPACT PCP1P MUTATIONS HAVE ON MITOCHONDRIAL GENOME STABILITY AND MORPHOLOGY

Pieter Both, Andries Both, and Donna Gordon

Mississippi State University, Mississippi State, MS USA

PCP1 encodes a multi-spanning transmembrane protease that localizes to the mitochondrial inner membrane in the yeast *Saccharomyces cerevisiae*. As a peptidase, Pcp1p is responsible for the processing of two substrates: Ccp1p and Mgm1p. In haploid cells deleted for PCP1, it is the absence of Mgm1p processing that gives rise to defects in mitochondrial morphology and loss of the mitochondrial genome. To understand the structural basis of Pcp1p peptidase activity, a hydroxylamine mutagenesis screen was carried out to identify temperature sensitive PCP1 alleles. Five pcp1 alleles were selected for further analysis based on their varied ability to grow on nonfermentable carbon. Using mtGFP to assess mitochondrial morphology, several of the mutants showed increased mitochondrial fragmentation while others had GFP mistargeted to the cytosol. Poor growth on nonfermentable carbon suggests that these mutants may have acquired mtDNA mutations or have lost their mitochondrial genome altogether. To assay the extent of mitochondrial DNA loss, quantitative PCR was carried out to determine the relative mtDNA copy number. Several of the pcp1 alleles had mtDNA copy numbers that fell between 50-80% of that detected for the wild-type strain, while cells that expressed pcp1 alleles which resulted in respiratory deficiency had a mtDNA copy number of < 30% of a wild-type strain. Quantitative differences in mitochondrial genome content will be qualitatively confirmed by DAPI staining. This data provides insight into the role different amino acids play in influencing Pcp1p peptidase activity and may provide an additional tool to dissect the molecular mechanisms controlling mitochondrial morphology.

P2.24

AN EXAMINATION OF OBESITY-INDUCED EPITHELIAL TO MESENCHYMAL TRANSITION IN MELANOMA CELLS

Steven Sollon Papas and Elizabeth Brandon

Mississippi College, Clinton, MS USA

Studies show that obesity worsens the prognosis of several cancers, including melanoma. Furthermore, cytokines

such as leptin and resistin promote the growth, EMT, and subsequent metastasis of melanoma tumor cells. Our research focuses on extending this understanding by discerning the connection between adipocyteTMs presence and tumor cell proliferation and migration. Additionally, concentrating on mTOR as a means for regulation of EMT, we seek to add detail to the vague mechanisms concerning obesity-associated metastasis of tumor cells. To test the hypothesis that tumor cell proliferation is increased in obesity, we co-cultured adipocytes and melanoma cells. Control and experimental melanoma cells were counted at three time points during their treatments; comparisons of tumor cell growth at 0, 24, and 48 hours, revealed enhanced growth as a result of adipocyte presence. Melanoma cells cultured with adipocytes grew faster than the melanoma cells cultured alone. Growth rates were significantly increased in the co-cultured melanoma cells ($26,326 \pm 3.22$ vs. $20,614 \pm 1.17$ cells/day, Student's T-test $p = 0.01$). Additionally, data suggests that the co-cultured melanoma cells migrate more than melanoma cells cultured alone. Cells undergoing EMT should have increased levels of vimentin and phosphorylated mTOR. Western blotting determined that co-cultured melanoma cells express increased amounts of vimentin, while further tests are being conducted to determine phosphorylated mTOR concentrations. Adipocytes directly promote the growth and migration of melanoma cells. These results support previous finding of increased melanoma tumor growth in obese mice. This may occur because of mTOR activation, which remains to be determined. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P2.25

EXPRESSION AND PURIFICATION OF CCM1P IN ESCHERICHIA COLI

Marta A Piva, Classie Johnson¹, and J. Ignacio Moreno¹
Alcorn State University Lorman, MS USA¹

Ccm1p is a yeast mitochondrial-nuclear encoded protein with moonlighting capabilities. It assists in the removal of the fourth intron of mitochondrial COX1 and COB pre-mRNAs and participates in the stability of 15S rRNA, one of the mitochondrial ribosome components. In order to quantify the intra-mitochondrial molar concentration, a molecular calibrator (MC) is required as standard for enzyme-linked immunoabsorbent assays (ELISA). The MC must be 100% free of protein contaminants to obtain the accurate molar concentration. For this particular purpose, the expression of this protein in a heterologous system is the optimal option. *E. coli* competent cells were transformed with an inducible expression system. The amount and quality of the recombinant protein were assessed by immunoblotting. Preliminary experiments showed that Ccm1p displayed a high degradation profile and insoluble expression products. This work aims to find the best condition for Ccm1p expression in order to obtain only 100% of Ccm1p as a full-length protein in solution. To achieve this goal, a double affinity tag fusion strategy is currently being approached. Expression conditions, stability of the product, and double-affinity purification will be further tested. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of

General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174

P2.26

CCM1P IS REQUIRED TO STABILIZE 15S RRNA BY PROTEIN-RNA INTERACTION DURING MITORIBOSOME BIOGENESIS

Marta A Piva, Jacquais Dukes, and J. Ignacio Moreno
Alcorn State University Lorman, MS USA

Mitoribosome biogenesis is significantly increased in breast cancer cells. The regulation of this process is still unclear. *Saccharomyces cerevisiae* is an excellent model to study molecular aspects of mitochondria proliferation. We have demonstrated the key role of Ccm1p in maintaining the steady state of 15S rRNA, a mitoribosomal component. The present work aims to elucidate the nature of Ccm1p-15S rRNA interaction. We created a system in which the supply of Ccm1p can be regulated to cause transient and reversible mitochondrial dysfunction. Specific association of 15S rRNA to Ccm1p was assessed by affinity-chromatography followed by RT-PCR. CCM1 mRNA and 15S rRNA levels were strongly correlated along with mitochondrial functionality. Affinity-purification showed that 15S rRNA was specifically associated to Ccm1p. We propose that during mitochondrial recuperation, Ccm1p is saturated with 15S rRNA molecules. Currently the Ccm1p-15S rRNA molar ratio is being assessed during this timeframe. The final data will contribute to postulate a model of Ccm1p participation in mitoribosome biogenesis in vivo. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174

P2.27

IDENTIFICATION OF EFFECTOR PROTEINS OF HISTONE LYSINE METHYLATION IN RICE

Udhghatri Kolli and Jiaxu Li

Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Starkville, MS USA

Nucleosome, the repeating unit in eukaryote chromatin assembly is primarily composed of 126 bp of DNA wrapped around the core histones. Histones undergo different post translational modifications. One such modification of histones by addition of methyl groups on to the lysine (K) residues at positions 4, 9, 27, 36 and 79 on histone H3 and lysine 20 on histone H4 and can occur in three different (Mono-, Di-, and Tri-) methylation states. The methyl groups on the amino-terminal end of histones recruit/ effect the binding of chromatin associated proteins in a position and state specific way. The recruited proteins serve as readers of post translational modifications, affecting the chromatin template related process like transcription, DNA repair and genome integrity. We applied Peptide pull-down assay, an unbiased biochemical approach using biotinylated histone peptides to identify the proteins that bind to Histone H3 lysine methyl groups in rice, by using nuclear proteins from rice suspension cells. The proteins bound to peptides were identified by mass spectrometry, and the results indicate the presence to nuclear and ribosomal proteins in the bound fraction. Two

proteins named PO8 and HB20 that have a known histone binding WD domain were tested for their interaction with the lysine modification by using far-western procedure.

P2.28

VERNONIA AMYGDALINA (V. AMYGDALINA): THERAPEUTIC FOOD FOR CANCER THERAPY

Alexis Sanders, Clement Yedjou,² and Paul B. Tchounwou²
¹University of Southern Mississippi, Hattiesburg, MS USA,
²Cellomics and Toxicogenomics Research Laboratory, NIH-Center for Environmental Health, College of Science, Engineering and Technology, Jackson State University, Jackson, Mississippi, USA.

One of the most frightening events that women will ever face is being diagnosed with breast cancer. One in eight women in the USA will be diagnosed with this life-threatening disease during her lifetime. Even with all the advances in pharmaceutical technology, mortality rates for breast cancer have remained stagnant for the past few decades. The development of new drugs from natural products is considered important. Previous studies from our laboratory show that a novel natural product, extracts of *Vernonia amygdalina* (*V. amygdalina*) leaf exerts DNA-damaging anticancer activities against breast cancer. Therefore, the specific aim of the present study was to use MCF-7 cells as test model to explore the therapeutic mechanisms of *V. amygdalina* methanol extracts as anti-cancer agents in the treatment of breast cancer. To achieve our specific aim, we performed both *in vitro* and *in vivo* studies. Acridine orange and propidium iodide (AO/PI) staining were used to visualize living and dead MCF-7 cells with the means of cellometer vision. Data obtained from AO/PI staining indicated that *V. amygdalina* treatment significantly ($p < 0.05$) reduced the viability of breast cancer cells in a concentration-dependent manner. Finding from the present study demonstrates that at therapeutic concentrations, *V. amygdalina* treatment induced apoptosis of breast cancer cells *in vitro*. This research work was supported in part by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476; and in part by a grant from the National Institutes of Health (Grant # G1200MD007581), through the RCMI-Center for Environmental Health.

P2.29

REDUCTION OF LYSOSOMAL ACID SPHINGOMYELINASE ACTIVITY BY 2-HYDROXYPROPYL-B-CYCLODEXTRIN

Jerry W. Reagan, Jr.¹ and Nicholas B Chamberlain²

¹Department of Biological Sciences, Mississippi College, Clinton, MS 39058

²Department of Biology, Middle Tennessee State University, Murfreesboro, TN 37130

Acid sphingomyelinase (aSMase) is a lysosomal hydrolase that selectively cleaves sphingomyelin to yield phosphorylcholine and ceramide. The absence of functional aSMase leads to the development of lysosomal storage disorders (Niemann-Pick disease) that affect intracellular mobilization and utilization of cholesterol and sphingomyelin. In addition, ceramide is a potent lipid second messenger that induces programmed cell death. Consequently, aSMase activity affects

intracellular lipid metabolism and regulates cell proliferation/death decisions. Previous results from our laboratory demonstrate that an elevated lysosomal cholesterol concentration down-regulates aSMase activity through an apparent post-translational mechanism. Therefore, we hypothesized that reducing cellular cholesterol levels with 2-hydroxypropyl- β -cyclodextrin (2HP β CD), an amphipathic molecule routinely used to extract plasma membrane cholesterol or solubilize and deliver hydrophobic drugs, would increase aSMase activity in cultured Chinese hamster ovary cells. However, our data demonstrate that 2HP β CD abolishes aSMase activity in a reversible, time-dependent, and concentration-dependent manner. Furthermore, confocal microscopic analysis of 2HP β CD-treated cells demonstrates that low concentrations of 2HP β CD (2 mM) disrupt normal lipid raft morphology. This suggests that the unexpected down-regulation of aSMase activity in 2HP β CD-treated cells may be mediated by changes in phosphatidyl inositol-3-phosphate (PIP3) concentration, a documented aSMase inhibitor. Indeed, the 2HP β CD-induced reduction in aSMase activity was mitigated by prior exposure of the cells to wortmannin, a potent PI3 kinase inhibitor. These results suggest that 2HP β CD may decrease aSMase activity through the production of PIP3 secondary to deformation of lipid rafts.

P2.30

DECIPHERING THE FUNCTIONAL COLLABORATION OF MID AND BRIC-A-BRAC 2 AS POTENTIAL REGULATORS OF CELLULAR PROLIFERATION WITHIN ADULT DROSOPHILA OVARIES

Petra Visic and Sandra Leal

University of Southern Mississippi, Hattiesburg, MS USA

Stem cell niches are highly organized and specialized stem cell microenvironments detected within specific tissues [1]. In *Drosophila melanogaster*, three distinct stem cell niches are located within the ovary including the germline stem cell (GSC), follicle stem cell (FSC), and escort stem cell (ESC) niches. Recently, Lomas et al. (2013) [2] reported that gurken/epidermal growth factor receptor (EGFR) signaling is modulated within posterior ovarian follicle cells by Midline (Mid). The Mid transcription factor had not previously been associated with the EGFR pathway. The mid gene encodes a T-box transcription factor protein that specifies cell fates in the developing heart [10, 11], central nervous system [12, 13], epidermis [14] and eye of *Drosophila* [15]. The Tbx20 gene represents the conserved vertebrate ortholog of mid. Experimental evidence suggests that Tbx20 regulates cell proliferation within the embryonic chamber myocardium of the mouse. In addition, the modENCODE consortium identified bric-a-brac 1 and 2 (bab-1 and bab-2) as theoretical mid- interacting genes that encode proteins harboring a BTB/POZ-ZF domain in the *Drosophila*'s domain associated with oncogenic activity in humans [20, 21]. We carried out mid and bab2 loss-of-function and gain-of-function studies specifically within ovaries using the UAS-Gal4-binary expression system [22]. Wild-type and mutant ovaries were dissected from three-day old transgenic flies and subjected to a 5- Bromo-2 deoxyuridine (BRdU) proliferation assay. Our results show Mid functions within pathways regulating cell proliferation of the GSC niche.

P2.31

REGULATION OF MICRORNA-1 AND ITS TARGET IN A549 CELLS

Maricica Pacurari^{1,2}, Derreon Johnson¹, and Jelicia Crawford¹

Biology Department, College of Science, Engineering, and Technology, Jackson State University, Jackson, MS USA, ²NIH RCMI-Center for Environmental Health, College of Engineering, Science, and Technology, Jackson State University, Jackson, MS USA

PURPOSE: MicroRNAs are short strands of RNAs that regulate gene expression thus mediating pathogenesis of human diseases, including lung cancer. MicroRNA-1 has been shown to regulate cell proliferation, migration, and apoptosis. Moreover, several studies suggest that microRNA-1 may indeed function as an tumor suppressor microRNA. Using bioinformatics tools, we identified a novel microRNA-1 target trombospodin 1 (TBSH1). TBSH1, a matricellular protein, regulates multiple cellular processes involved in tissue repair and remodeling, particularly regulating cell adhesion, migration and proliferation. In the present study, we investigated whether carbon nanofiber regulate microRNA-1 and its target TBSH1 in human adenocarcinoma cells. **MATERIALS AND METHODS:** Using alveolar epithelial type II cells (A549), the regulation of microRNA-1 by carbon nanofiber and its target TBSH1 were analyzed using real-time quantitative PCR (qPCR), and western blot. SnoU47 was used as endogenous control microRNA. A549 cells were exposed to multi-wall carbon nanotubes (MWCNT) (20µg/ml) for 6 or 24 h. Total RNA was extracted using Trizol method. microRNA cDNA was generated followed by real-time microRNA-qPCR analysis. **RESULTS:** MWCNT dysregulates the expression of microRNA-1 and its target, TBSH1, in A549 cells. **CONCLUSION:** These results suggest that carbon nanotubes/nanofiber regulate microRNA-1 and TBSH1 in alveolar epithelial cells. TBSH1 regulates TGFbeta signaling, thus influences wound healing and fibrosis. These results indicated a possible mechanism for MWCNT pathological effect on lung including lung fibrosis. The proposed mechanism is via microRNA-1/TBSH1/TGFbeta fibroproliferative axis. **Acknowledgements:** This research is supported by Career development pilot grant to Dr. Pacurair through the NIH/NCRR-RCMI Center for Environmental Health at Jackson State University (JSU) (Grant No. G12MD007581).

P2.33

REDUCED OXIDATIVE DEGRADATION OF COATED RETAIL-CUT MISSISSIPPI FARM-RAISED CATFISH FILLET USING ULTRA-HIGH PRESSURE HOMOGENIZED CHEDDAR WHEY AND CHITOSAN FILM

Dipaloke Mukherjee, Zahur Haque, and Soma Mukherjee

Mississippi State University Starkville, MS USA

Antioxidative property of Cheddar-whey solids (CW) is enhanced by Ultra-High Pressure Homogenization (UHPH) due to dramatically increased surface area allowing greater protective interactions. This investigation looks at antioxidative efficacy of edible films containing CW (2%, weight/volume - w/v), with and without chitosan (Ch, 1%, w/v), exposed to various levels of UHPH; nil (control), 70, 140 and 210 megapascals (MPa), in antioxidative protection of retail-cut Mississippi farm-raised catfish fillet. Coated samples exhibited significantly less ($P < 0.05$) carbonyl, contents (CC) following; 0,

1, 3, 5 and 7 days of storage at 4OC, compared to control. Addition of Ch significantly enhanced the antioxidative efficacy particularly when subjected to 140 MPa where CC was held down at 0.158 µmol/g after three days compared to 0.633 and 0.221 µmol/g, respectively for the control and CW only, pressure being the equal. The study can lead to the development of natural preservatives to augment shelf-life of muscle food products.

P2.34

GENETIC MANIPULATION IN THE TWO-SPOT SPIDER MITE

Mosharrof Hossain Mondal and Alex Flynt

The University of Southern Mississippi, Hattiesburg, MS USA

Advances in genetic technologies are permitting experiments that until recently were only reserved for elite genetic systems. There are now opportunities to do sophisticated molecular genetic research in non-model organisms. Outside insects and nematodes the most successful group in superphyla ecdysozoa is likely the arachnids. Arachnids diverged during the pre-cambrian radiation, thus it is likely that they have unique, unappreciated biology. The two-spot spider mite *Tetranychus urticae*, which is a major agricultural pest, could be a great system for studying arachnids genetics. We seek to investigate spider mite genetics with genome engineering technology. We sought to use piggyBAC based transposon system to introduce recombinant DNA, and the CRISPR/Cas9 system to specifically alter loci. We will use the BioRad PDS-1000 biolistics platform to introduce foreign DNAs and RNAs into spider mite embryos. One specific goal is to investigate spider mite morphogenesis via enhancer traps strategy using piggyBAC system. Tissue and developmental stage specific pattern will be observed by expression of GFP. Another outstanding issue we will address is the activity of the RNAi pathway in arachnids. Like other arachnids spider mite posses Rdrp which can amplify RNAi. We will characterize all Rdrp genes and various populations of RNAs associated with Rdrps. We also aim to develop an RNAi-based pest control strategy for spider mite using plant transgenes encoded in chloroplast genome of bean plants.

P2.35

USING A POLYANILINE BASED SENSOR FOR DETECTION OF miRNA EXPRESSION

Partha Pratim Sengupta, Beddhu Murali, and Alex Flynt

The University of Southern Mississippi, Hattiesburg, MS USA

Micro-RNAs (miRNA) are an exciting focus of clinical study not only for targeted therapies but also as biomarkers. Thus, miRNA detection is a promising element in cancer diagnostic technology. Among potential miRNA cancer biomarkers the most broadly useful is likely let-7, due to its role in cell fate maintenance. To take advantage of miRNAs as biomarkers we have developed a platform that utilizes conducting polymers (CPs) to detect miRNA expression. CPs are polyconjugated and charged molecules which are highly sensitive to changes in the polymeric chain environment and conformation. Perturbation of CP chemistry manifests as altered optical and electrical properties. In this research work we have synthesized processable CP polyaniline (PANI) as a transducer element for miRNA sensing. 22 nucleotide DNA which is complementary to let-7 was immobilized onto PANI by electrostatic bonding which was enhanced by UV exposure. The

degree of UV exposure was optimized to provide maximal increase in PANI fluorescence. The increased fluorescence intensity was confirmed by fluorescent microscopy of DNA immobilized PANI coated on glass slides. Next we sought to hybridize complementary DNA oligos to the PANI-DNA complex. Fluorescence quenching and a decrease in resistance were observed for PANI-DNA complex after hybridization. Further experiments showed that after duplex formation DNA dissociated from PANI. Our goal is to exploit these phenomena to produce a low cost, rapid sensor of miRNA expression.

P2.36

SCREENING FOR FACTORS INVOLVED IN MICRORNA PROCESSING

Matthew DeCruz

University of Southern Mississippi, Hattiesburg, MS USA

Most mRNAs in eukaryotic cells are regulated by microRNAs (miRNAs), they target transcripts by mediating complementary base pairing resulting in inhibition of protein expression. Many miRNAs are broadly conserved and are crucial for normal development, therefore alterations in miRNA activity can lead to disease. While most miRNAs are products of the RNase III enzymes Drosha and Dicer, there are many examples of miRNAs being produced by alternate, non-canonical pathways. To identify factors involved in maturation of atypical miRNAs we will use the tailed-mirtron miR-1017. Biogenesis of this miRNA occurs via a multistep process involving intron splicing, debranching, RNA exosome-mediated trimming of the 3' tail, and dicing. In *Drosophilids*, miR-1017 is highly conserved and expressed, making it an ideal candidate for uncovering factors required for expression of atypical miRNAs. To find these factors we will perform a reverse genetic screen based on an integrated sensor of miR-1017 activity in the *Drosophila* larval imaginal wing disc. We will exploit the VgQE promoter to drive a dsRed-based ectopic expression of miR-1017 in the wing pouch of the disc. GFP, that can be targeted by miR-1017, will also be expressed but in a ubiquitous manner. This will provide a platform for monitoring the ability of miR-1017 to repress targets. The sensor will be used to screen a collection of RNAi lines from the Vienna *Drosophila* Resource Center that target genes involved in RNA biology. Identifying factors involved in miRNA processing will help unearth the mysteries of the specific roles miRNAs have in animal development.

P2.37

CHARACTERIZING A MOLD SPECIFIC GENE IN THE PATHOGENIC DIMORPHIC FUNGI HISTOPLASMA CAPSULATUM

Mariah Lloyd and Davida Crossley

Alcorn State University, Lorman, MS USA

Histoplasma capsulatum (Hc) is the dimorphic fungus that is the etiological agent of histoplasmosis. The fungi can exist as a multi-cellular mold at 25°C, or as a uni-cellular yeast form at 37°C. The yeast is the morphology that causes histoplasmosis. The mold spores are found in soils contaminated with bat and bird guano. Once the soil is disrupted, spores are inhaled into the lungs, and shifts to the pathogenic yeast. Because the yeast morphology is pathogenic, it is often studied, and the mold is overlooked. This study focuses on investigation of a mold specific gene. The gene will be characterized via Southern blot

analysis, northern blot analysis, and qRT-PCR. A knockout will be constructed via allelic replacement to determine the gene function. The knockout will be subjected to further characterization which includes morphological studies, growth studies, and expression analysis. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P2.38

FRACTIONATION OF CRUDE CHYMOTRYPTIC HYDROLYZATE OF SODIUM CASEINATE BASED ON HYDROPHOBICITY

Zahur Haque and Wenjie Shao

Mississippi State University Mississippi State, MS USA¹

Hydrophobicity of peptides, which are naturally antioxidative, drives their localization in oil/water interfaces potentially enhancing scavenging of lipid-derived radicals through proximity facilitated electronic interactions. In an effort to obtain hydrophobic peptides for use in subsequent antioxidative studies, this study investigates bulk fractionation of crude enzymatic digests of freshly prepared sodium-caseinate rich in aromatic amino acids that potentially offer electronic conductivity through pi-orbital stacking. Fresh unhomogenized milk was acidified to pH 4.6 using 1M lactic acid and centrifuged at 6000 RPM at 20°C for 20 minutes to collect the casein concentrate that was finally re-dispersed. The sodium-caseinate dispersion was lyophilized to obtain a free flowing powder that was hydrolyzed using alpha-chymotrypsin at an enzyme to protein ratio of 1:200 (w/w) (pH 8) for 60 min at 37°C. The hydrolysis was stopped by adjusting the pH to 2 and immediate freezing at -20°C. Aliquots were loaded on to a XAD-16 preparative column at a concentration of 30 mg/mL (w/v). Ethanol (30-90%) was used as the eluent. Peptide detection was conducted at 280 nm, a wavelength that detects aromatic chromophores of interest. Data showed the best condition for the separation in terms of yield was using 70% ethanol. SDS-polyacrylamide gel-electrophoresis exhibited multiple peptide components in each fraction collected using 50 - 90% ethanol. The fractions were analyzed for their antioxidative activity and persistence. The study can potentially lead to the development of novel products with remarkable antioxidative properties. Key words: Preparative-chromatography, antioxidant, dielectric-constant

P2.39

USE OF MIXED STABILIZATION SYSTEMS TO OBTAIN STABLE NANO-GLOBULAR DISPERSIONS

Zahur Haque and Jingyi Yan

Mississippi State University, Mississippi State, MS USA

Bovine serum albumin (BSA) has been used as an emulsifier (E) to stabilize nano-globular dispersions and works significantly better when a small non-polar surfactant is used as a co-emulsifier (CE) in a mixed stabilization system (MSS). This study investigates the effect of alteration of hydrophobicity of the dispersed phase and its volume fraction and weight percentage of CE to E in the MSS on stability of nano-globular dispersion generated by Ultra-High Pressure Homogenization (UHPH) at 140MPa, 210MPa and 280MPa. Three short chain fatty acids,

namely butyric (C4) (smaller hydrophobic chain, hexanoic (C6) (larger hydrophobic chain) and octanoic acids (C8) (larger hydrophobic chain than C6) at ϕ of 0.1, 0.2 and 0.4, were used. The E [0.01, 0.02, 0.04, 0.08%, 0.4%, 0.6% and 0.8% (w/v)] and CE, (Tween 20) were dispersed separately in 10mM ammonium acetate/acetic acid buffer (pH 6.0) and mixed prior to UHPH to obtain MSS with CE content of 0.5, 1.0, 4.0 and 8.0% (w/w E) compared to E at all concentrations. Results indicated a marked enhancement of stability of the nano-emulsion at 25°C in nano-emulsions containing less hydrophobic C4 in MSS comprising of 0.4% (w/v) E and 1.0% (w/w E) CE with ϕ being 0.4. With C6, where the hydrophobicity was greater than C4 and C8, the CE percentage to E had to be markedly increased to 8.0%, (w/w E). These Data provided valuable clues for the development of stable nano- vesicular emulsion systems for considerably efficient delivery of nutraceuticals and/or drugs. Keywords: nano-emulsion, interfacial stability, protein-functionality.

Friday, February 27, 2014

MORNING

ROOM TC 218B

02.22

8:00 COMPARATIVE ANALYSIS OF QPCR AND DDPCR METHODS FOR QUANTIFICATION OF BACTERIAL LOAD IN TICK TISSUES

Khemraj Budachetri and Shahid Karim

The University of Southern Mississippi, Hattiesburg, MS USA

Ticks harbor native microbiota communities in tick tissues (Budachetri et al 2014). The quantification of overall bacterial load would further provide the basis for microbiome and pathogen interactions. In this study, we want to estimate the bacterial load based on universal 16S ribosomal RNA primers using qPCR standard curve method and newly arrived digital droplet PCR (ddPCR) method. In qPCR, we amplified 16S rRNA gene from *Staphylococcus aureus* and amplified product was serially diluted to prepare standard curve. And, cycle threshold (Ct) values of each amplified samples were used for quantification. We observed that, the bacterial load decreases with the blood meal in tick tissues by qPCR. The validation of this information was also performed by ddPCR and we achieved the similar results trends. The two methods were applied in different conditions to assess the relative advantages between two methods.

02.23

8:15 ELUCIDATING THE ROLE OF REPROLYSIN METALLOPROTEASES IN AMBLYOMMA AMERICANUM

Jaclyn Williams and Shahid Karim

The University of Southern Mississippi, Hattiesburg, MS USA

Background: Ticks, an obligate ecto-parasite of terrestrial vertebrates, has evolved a specialized complex cocktail of compounds secreted as saliva to assist in blood feeding by interfering with host responses including haemostatic and host immune response. Nicknamed the “lone star tick”, *A. americanum* is a competent vector for the transmission of a number of human diseases as well as this tick has been linked

with an emerging syndrome known as Red Meat allergy signifying the significance of understanding the role of tick saliva. Tick salivary metalloprotease have been associated with a variety of activities including fibrin(ogen)olytic activity and disaggregation of platelets. **Methods/Findings:** Five Reprolysin Salivary MPs were identified in an *A. americanum* transcriptome. Total RNA was isolated from female *A. americanum* ticks and was subjected to Temporal Gene Expression for further understanding of their role throughout tick feeding time points. In addition, the sequence homology between the Reprolysin MPs allowed for a Family RNAi Knockdown to further elucidate their role in tick feeding. Reduction in tick weight as well as egg hatching has further validated the importance of Reprolysin Metalloproteases in *A. americanum* tick feeding. **Conclusion/Significance:** The data acquired by Temporal Gene Expression and qRT-PCR showed differential expression of the each metalloproteases throughout various tick feeding time points and RNAi Knockdown significant phenotypic changes. Identifying salivary molecules important for tick-host interactions allows for a better understanding of tick physiology and could open new targets for anti-tick vaccines.

02.24

8:30 CAFFEINE ADMINISTRATION IN A 3-DIMENSIONAL CO-CULTURE SYSTEM MEANT TO RECAPITULATE IN VIVO SIGNALING FROM LUMEN-TO-ENTERIC NERVOUS SYSTEM

Piletz, J.E., Buck, W., Willis, K., Baig, H., Meruvia, W., and Petrosky, P.

Mississippi College, Clinton, MS USA

According to a recent report from the FDA, the average American adult consumes 2-3 cups of coffee/day. After drinking 3x12 oz. cups of McDonald's coffee, at 109 mg caffeine/cup (US FDA), the caffeine concentration in plasma and brain has been approximated to approach 0.1 mM (Rang & Dale's "Pharmacology", 2012) – a dose sufficient to appreciably block adenosine receptors. Herein, we describe a novel 3-dimensional (3D) co-culture system of transformed human colon epithelial cells (Caco-2) grown on a 0.4 micron filter (allowing trans-molecular communication only) that is separated from a human neuroblastoma-derived cell line (SH-SY5Y): which we propose as a model of lumen-to-enteric nerve signaling – in this case focused on caffeine effects. The human Caco-2 cell line, expressive of gut epithelial properties and reportedly expressing A2A adenosine receptors, has been widely studied on insert filters to predict cellular drug transport from the intestine to blood stream. The human SH-SY5Y cell line can be induced to form neurites in culture and has been reported to also express A2A adenosine receptors. *Although caffeine has been studied with many individual cell lines, it has not been investigated previously in co-cultures.* Our preliminary report begins with dose response studies of caffeine on cell viability, and the results align with expected oxidative stress properties of caffeine above the 10 mM range. Additional studies are underway – and hopefully will be reported at the meeting – that focus on effects of caffeine in the 0.1 mM concentration range. Supported by a small grant from Mississippi College.

* John Piletz holds the Ph.D. and is Professor of Biology. The others are students in the lab.

O2.25

8:45 MAKING SENSE OF THE AMBLYOMMA MACULATUM SALIVARY GLAND SIALOPROTEOME

Rebekah Bullard, Chien-chung Chen², Zhiwen Zhang², Jaclyn Williams¹, Khemraj Budachetri¹, Deepak Kumar¹ Wei-Mei Ching², Jose Ribeiro³, and Shahid Karim¹,

University of Southern Mississippi Hattiesburg, MS USA¹, Naval Medical Research Center Silver Spring, MD USA,² and NIAID NIH Rockville, MD USA³

Background: The tick *Amblyomma maculatum*, also known as the Gulf Coast Tick, is a known vector for pathogens such as *Rickettsia parkeri* in humans and *Ehrlichia ruminantium* in livestock. The biological success of ticks requires multiple mechanisms to evade host hemostatic and immune system responses. Establishment of a full blood meal requires attachment, establishment of the blood pool, and engorgement of the tick. Tick saliva contains multiple proteins which counteract the host responses to allow for feeding to take place. These proteins can be studied together in the form of a sialoproteome. **Methods:** Salivary glands from unfed and partially fed females were homogenized and the soluble protein was extracted using centrifugation. Samples from each sample group were subjected to 2D electrophoresis, protein spots were excised from the gel and digested using trypsin. The digested protein fragments were analyzed using LC-MS/MS and sequences were evaluated through multiple databases for sequence homology. **Findings:** Proteins were categorized based on homology information regarding protein family. Overall, nearly 15,900 sequences were found in the salivary glands of unfed and partially fed female ticks. Of these 15,900 nearly 12,000 did not possess a secretory signal peptide indicating they were intracellular and not secreted through the saliva into the host. The remaining 4,000 sequences with the signal peptide are hypothesized to be secreted by the saliva. The classifications of the proteins uncovered in the proteome will be discussed.

O2.26

9:00 PARACRINE SIGNALING IS KEY FOR MELANOMA CELL MIGRATION

Elizabeth Brandon, Omama Ahmad, Yassmin Hegazy, Mawusi Kamassa, Courtney Ross, Ran Wang, and Zachariah Burns
Mississippi College, Clinton, MS USA

Background and Objective Obesity worsens the prognosis of many cancers by altering the levels of circulating hormones, inflammatory cytokines, and adipokines. Paracrine signaling between tumor and stromal cells is key to tumor growth and metastasis. Melanoma is an obesity-associated cancer that is also highly metastatic. Our hypothesis is that inflammatory cytokines and adipokines promote melanoma growth and metastasis. **Methods** B16F10 mouse melanoma cells were synchronized and cultured with the inflammatory cytokines interleukins 4 and 6, resistin, TNF- α , (all at 10 ng/mL) and conditioned medium from macrophages and adipocytes. Growth curves were generated by counting cells at 24, 48, and 72 hours. The same treatments were used to examine melanoma cell migration and proliferation in Boyden chambers. **Results** IL-6, resistin, and macrophage-conditioned medium significantly enhanced proliferation (Student's T-test $p = 0.05$), while TNF- α inhibited it. Co-culture with adipocytes significantly increased

cell proliferation ($p = 0.03$). The data indicate that resistin also increased the expression of Bcl-X_L, a prosurvival factor. Co-culture with macrophages and adipocytes significantly enhanced melanoma cell migration (Student's T-test $p = 0.03$ and 0.05 respectively). **Discussion and Conclusions** Inflammatory signals from macrophages and adipocytes are sufficient for melanoma cell proliferation and migration. The observation that adipocytes stimulated melanoma cell migration whereas adipocyte-conditioned medium did not indicates the importance of paracrine signaling to tumor cell behavior.

Supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health, grant number P20GM103476

O2.27

9:15 EFFECTS OF SURFACTANTS ON PARTICLE SIZE DISTRIBUTION AND ANTIOXIDATIVE POTENTIAL OF PEANUT OIL-IN-WATER NANOEMULSIONS STABILIZED BY WHEY PROTEIN CONCENTRATE

Xue Zhang and Zahur Haque

Mississippi State University, Starkville, MS USA

Bioavailability of nanoemulsions is affected by particle size and distribution. In this study, the effects of non-ionic surfactant Triton X-100 and four different zwitterionic detergents, varying in the level of hydrophobicity, on the particle size distribution and antioxidative properties of oil-in-water nanoemulsions were investigated. The nanoemulsion was prepared by ultra-high pressure homogenization (UHPH) at 210 MPa of 2 % (w/v) Edam whey protein concentrate (EWPC) in 0.2 M McIlvaine's iso-ionic buffer (pH 7.0) containing a dispersed phase, consisting of peanut oil, at a fraction of 0.05, with or without surfactants. Circular dichroism (CD) measurements in the far-UV range suggested that zwitterionic detergents did not prominently change the secondary structure of the proteins in EWPC, while triton X-100 completely disordered protein structure. Nanoemulsion prepared without surfactant exhibited a bimodal particle size distribution with mean particle diameter (dvs) of 90 nm. Supplement of 7.5 % (w/w EWPC) of sulfobetaine 3-10 (SB 3-10) reduced dvs to 73 nm, decreased surface tension and increased antioxidative efficacy based on total radical-trapping antioxidant potential (TRAP) analysis where the relative light unit (RLU) was decreased from 273.99 to 207.94. Importantly a unimodal distribution was achieved when 10 % (w/w WPC) of triton X-100 was further added into the dispersion, although no significant change on dvs, surface tension or antioxidative potential. Data provide important clues for the formulation and processing of stable nanoemulsions for delivery of nutraceuticals. **Keywords:** nano-dispersion, surfactants, mean particle diameter

O2.28

9:30 ISOLATION OF BOVINE α_{S2} -CASEIN AND FRACTIONATION OF ITS TRYPTIC HYDROLYZATES BY SIZE-EXCLUSION HIGH PERFORMANCE CHROMATOGRAPHY

Xue Zhang and Zahur Haque

Mississippi State University, Mississippi, MS USA

Minor bovine milk constituent, α_{S2} -casein is rich in aromatic amino-acid residues that are known to partake in aromatic stacking effects due to pi-orbital interactions. It is postulated that such interactions and resulting electronic continuity would enable antioxidants to more rapidly and forcefully quench reactive oxygen species by effectively donating electron. As a part of an ongoing research area to identify and fractionate hyper-antioxidative peptides, this investigation looks at the isolation of α_{S2} -casein, standardization of its chymotryptic hydrolysis, and fractionation of the hydrolyzates by size-exclusion high performance liquid chromatography (SE-HPLC). Chymotrypsin was used since it selectively cleaves the peptide-bond next to an aromatic residue, increasing the chances for inter-peptide aromatic-stacking effects. Crude α_{S2} -casein was isolated from whole casein by a two-step 1-proponal-precipitation method. Five mg/mL of α_{S2} -casein was then hydrolyzed with chymotrypsin (50 μ g/mL) for 5-60 min (37°C). The original protein exhibited complete hydrolysis within 5 min, evident from Tricine-SDS-PAGE results. Peptide profiles of hydrolyzates were determined by SE-HPLC using a Superdex Peptide 10/300 GL column and 30 % acetonitrile (v/v) as the eluent. Average molecular weight of each fraction was determined by comparing its retention time with those of molecular weight standards. Data depicted an inverse relationship between molecular weight and the duration of enzymatic hydrolysis. Average molecular weight of the smallest fraction at 5 min of hydrolysis was 981 Da, and it gradually reduced to 130 Da after 60 min of hydrolysis. This study is being followed by real-time assessment of total radical-trapping antioxidant potential (TRAP) of the fractions. Keywords: casein hydrolyzate, antioxidant, reactive oxygen species.

02.29

9:45 ELUCIDATING THE ROLE OF PHOSPHATIDYLCHOLINE TRANSFER PROTEIN (PCTP) IN TETRAHYMENA THERMOPHILA CONJUGATION.

Sabrice Guerrier, Matt Wahl¹, Elizabeth Kimbrell¹
John Cannon², and Sam Rosenberg²

Millsaps College Jackson, Ms USA¹ and Carleton College Northfield, MS USA²

Cell-cell fusion is important for the development of complex tissue including muscle and bone and has recently emerged as a method for the progression of various cancers. As a result, there is significant interest in the identification of genes responsible for facilitating cell fusion. To this end, our lab uses *Tetrahymena thermophila*, a fresh water ciliate, that undergoes cell-cell fusion quite readily in the laboratory, to identify novel regulators of cell-cell fusion. Moreover, the availability of the *Tetrahymena* Gene Expression Database (TGED) allows one to identify candidate genes whose temporal pattern of expression is consistent with a role in fusion. Here we report the identification of Phosphatidylcholine Transfer Protein (PCTP) as a novel regulator of cell-cell fusion in *Tetrahymena*. We find that inhibition of PCTP using a small molecule inhibitor impairs mating in *Tetrahymena* cultures, a process that depends on cell-cell fusion. To understand the specific role of PCTP in the mating process, we generated cell lines expressing PCTP-GFP or a mutant form of PCTP in which the lipid transfer activity has been deleted. Preliminary characterization of PCTP-GFP *Tetrahymena* suggest that PCTP-GFP localizes to the

conjugation junction, (the site of cell-cell fusion) and future experiments will determine the effects of PCTP loss of function on *Tetrahymena* mating. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

02.30

10:00 PHENOTYPIC VARIATION OF VIRULENCE IN THE ENTOMOPATHOGENIC BACTERIUM XENORHABDUS NEMATOPHILA

Elizabeth Ann Hussa Ángel M. Casanova-Torres², and Mengyi Cao²

Millsaps College Jackson, MS USA¹ and University of Wisconsin-Madison Madison, WI USA²

The entomopathogenic bacterium *Xenorhabdus nematophila* uses a phenotypic variation pathway called virulence modulation (VMO), in which a single, genetically identical population of the bacterium contains both virulent and attenuated subpopulations. The virulent population is capable of host immune suppression whereas the attenuated population is not. We have shown that this variability in pathogenesis and immune suppression is the result of fluctuations in the expression of a single gene, *lrp*. *lrp* is a transcriptional regulator that influences expression many *X. nematophila* genes, including virulence genes. The attenuated population consistently exhibits an approximately 4-fold increase in *lrp* expression relative to the virulent population, and promoter replacement experiments indicate that differences in *lrp* transcription are sufficient to mediate VMO phenotypes. We are currently using promoter replacement constructs to assess the role of the VMO populations on mutualistic association with the nematode *Steinernema carpocapsae*, which serves as a vector to deliver *X. nematophila* to the insect. Preliminary evidence suggests that the attenuated subpopulation better supports nematode fecundity within the insect cadaver than the virulent population. The VMO pathway of *X. nematophila* may provide a means by which the bacterial population as a whole adapts to life in association with two very different hosts. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, as well as Ruth L. Kirschstein National Research Service Award number FAI084441Z from the National Institutes of Health.

CHEMISTRY AND CHEMICAL ENGINEERING

Chair: Douglas Masterson

University of Southern Mississippi

Vice-Chair: Fengxiang (Frank) Han

Jackson State University

Thursday, February 26, 2015

MORNING

Room TC 216

7:50 WELCOME

O3.01

8:00 DEVELOPMENT OF IN-VIVO TRACEABLE CARRIER FOR GUIDED DELIVERY OF ANTICANCER DRUGS

Manliang Feng¹, Drazen Raucher², Michael Cleveland², and
Karien Dixon²

*Tougaloo College, Tougaloo, MS USA¹, University of
Mississippi Medical Center, Jackson, MS USA²*

Cancer is the 2nd leading causes of death in the USA. Chemotherapy is an essential way for the cure of cancers. The key for effective cancer chemotherapy is to deliver the anticancer drugs at the tumor. Real-time and in-vivo drug delivery vehicle could help to improve the efficacy of anticancer drugs while suppress their side effects. In this research we have engineered two proteins from functional polypeptides using molecular biology approach. The resulting proteins contain three functional polypeptides; a cell penetration polypeptide (CPP), an elastin-like polypeptide (ELP) for thermally targeted delivery and a Gd³⁺ binding polypeptides. The Gd³⁺ binding polypeptides (GdP) which serve as the in-vivo magnetic resonance imaging (MRI) tracer contain amino sequences of DKDGDGTIDERE (an EF-hand motif) and YIDTNDGWIEGDELLA. UV-Vis spectroscopic titration results indicate that the GdP polypeptides when linked with the ELP and CCP retain the high affinity to Gd³⁺ ions which allow them to serve as in-vivo tracing tags. To assess the feasibility of the designed protein in physiological condition, the effects of album protein was also studied. It was found that album protein has on effects suggesting that the GdP peptides bind Gd³⁺ strongly and specifically. The resulting polypeptide also retained the inverse-phase transition properties and the cell-penetration properties, which make them potential carriers for traceable and thermally targeted drug delivery. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476 pentapeptides(VPGXG), where the guest residue X can be any amino acid except Proline. ELP possesses a unique inverse temperature-phase transitionfeature. It is employed in the designed polypeptide for thermal-targeted delivery. The last segment of the polypeptide contains a amino acid sequence that

can binds rare earth metal ions. This segment of peptide when bind to rare earth metal ions such as Eu³⁺ and Gd³⁺ can produce fluorescent and magnetic feature that can be used to trace the designed polypeptide both in-vitro and in-vivo. The designed polypeptide was expressed and purified from E. Coli. The metal binding properties and phase transition properties of this newly designed polypeptide were characterized. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, and by Howard Hughes Medical Institute Precollege and Undergraduate Program (HHMI- 52007562).

O3.02

8:15 DOPING-INDUCED MOLECULAR PACKING OF CONJUGATED POLYMERS

Frederick McFarland¹, Benjamin Brickson², and Song Guo¹

University of Southern Mississippi, Hattiesburg, MS USA¹
and Petal High School Petal, MS USA²

It has been discovered that polythiophene molecules (P3AT) aggregate into 1D nanostructures by solution-induced crystallization. In the case of p-doped P3AT, the doped polymer cations could have different steric arrangements from their neutral forms. The doping-induced conformation change and Coulomb interactions might influence the molecular packing of the P3AT nanostructures. On the other hand, the P3AT π - π stacked structures are more efficient at delocalizing charges, which could also enhance the charge transfer from dopants. Herein the doping-induced molecular packing dynamics are studied by absorption spectroscopy and atomic force microscopy. The absorption spectra show distinctive bands for molecular packing and doping products, respectively. By systematically changing the dopant concentration, quantitative kinetic studies are carried out to correlate the growth dynamics of the two absorption bands. p-doping are shown to substantially facilitate the π - π stacking of the conjugated polymers into 1D aggregates even at marginally low p-dopant concentrations. The impacts of molecular packing on the p-doping kinetics are also explored. Investigation on the cooperative interactions between these two factors during chemical doping will greatly strengthen our understanding on the doping process for conjugated polymers.

O3.03

8:30 USING NMR SPECTROSCOPY TO STUDY PROTEIN STRUCTURE ON NANOPARTICLE SURFACES

Ailin Wang, Karen Woods, Tam Vo, Alex Coats,
and Nicholas Fitzkee

Mississippi State University, Starkville, MS USA

Because of their unique spectroscopic properties and biocompatibility, protein-functionalized gold nanoparticles (AuNPs) have many potential diagnostic and therapeutic applications. Surface-bound proteins can be used both as molecular sensors and drug delivery vectors, and the plasmonic properties of gold enable the detection of very small changes in surface chemistry. Unfortunately, the design of general-purpose, functionalized AuNPs is severely complicated by our limited understanding of protein structure on nanoparticle surfaces.

Some enzymes remain active on AuNPs while others are inactive, and it is currently impossible to predict which behavior will be observed. To address this problem, we have recently developed several new NMR-based approaches for monitoring protein structure on AuNP surfaces. We find that the adsorption capacity of 15 nm AuNPs can be predicted using the native structure, suggesting that proteins remain globular on the AuNP surface. Additionally, we demonstrate that proteins can be displaced from AuNPs by organothiols, supporting a case for reversible binding. Finally, we have used hydrogen/deuterium exchange (HDX) to monitor structural perturbations of two model proteins, GB3 and Ubiquitin, when bound to AuNPs. We find no significant changes in slow HDX rates (5-300 min), suggesting that AuNP-induced structural changes are small for these two proteins. Together, these results support a model where most of a protein's native contacts are preserved upon adsorption, although larger changes may occur over long timescales.

03.04

8:45 MCF-7 CELL VIABILITY STUDY ON VERNONIA AMYGDALINA ETHANOL AQUEOUS EXTRACT AND ITS ENZYMATIC HYDROLYSATES WITH α -AND- β -AMYLASES

Ken S. Lee, Precious D. Cooper, and Naomi F. Campbell

Jackson State University Jackson, MS USA

Vernonia amygdalina (VA) is a natural plant located in Africa and widely used in folk medicine for treatments of many conditions and diseases by drinking its aqueous extract. The aqueous extract of the VA leaves have shown anticancer activity against breast cancer, MCF-7 cells. However, under investigation are the active components of VA responsible for such activities. Previous studies showed a fraction called vernoniosides was isolated from the VA extract and proved to be more potent than the VA extract itself. It is known that enzymatic and/or chemical reactions inside the body can alter the structures and properties in VA after consumption. Such reactions include hydrolysis done by amylases. This research proposes to mimic the hydrolysis of the VA extract inside the body and to convert any glycosides into hydrolyzed products. The hypothesis is that the deglycosylation of vernoniosides and other active glycones by enzymatic hydrolysis enhance its cytotoxicity on MCF-7 cells. To test the hypothesis, MCF-7 cells were treated with VA hydrolyzed extracts and VA EtOH extracts as a control at concentrations of 0.1-2 mg/mL. The cell viability was determined by trypan blue assay after 48 hour incubation. The VA extract and both hydrolysates showed a dose-response relationship. The hydrolysate with α -amylase showed a lesser cell viability (20%) than VA extract (42%) at concentration 2 mg/mL. In the case of β -amylase, it showed no effect on MCF-7 cells. The result suggests that the VA extracts having hydrolysis by β -amylase is more potent than itself.

03.05

9:00 BIOGEOCHEMISTRY OF TRACE ELEMENTS AND HEAVY METALS IN THE GRAND BAY NATIONAL ESTUARINE RESERVE IN THE NORTHERN GULF OF MEXICO

Jacqueline McComb, Christian Rogers, Fengxiang Han, Catherine Thomas, Zikri Arslan, Adeli Ardeshir, Paul Tchounwou

Jackson State University Jackson, MS USA

Estuaries have the highest biotic diversity of habitats and offer a reserve of food resources and commercially significant species. Rapid human civilization has led to accumulation of heavy metals and trace elements in estuaries. The Grand Bay National Estuarine Research Reserve is a national marine protected area in southeastern Mississippi in the Gulf of Mexico. The objectives of this study are to investigate major biogeochemical processes controlling concentrations and distribution of trace elements and heavy metals in the salt marsh and wetland soil/sediment in the reserve. The results show that Hg, Cd and to some extent, As and Pb have been significantly accumulated in soils/sediments. We found strong correlations between total organic matter contents and concentrations of elements: Ni > Cr > Sr > Co > Zn, Cd > Cu > Cs. Strong correlations were also observed between total P and concentrations of Ni, Co, Cr, Sr, Zn, Cu, and Cd. The P spilling accident in 2005 caused a significant increase in P concentrations in Bang Lake site. Lead isotopic ratios matched those of North American coals. The Pb isotopes were in agreement with those reported in sediments of Chesapeake Bay and South Florida Lakes. The present study implies three major biogeochemical processes controlling and contributing to the current loading of trace elements and heavy metals in the region: bioaccumulation process, anthropogenic phosphorus spilling, and atmospheric fallout from coal power plants.

03.06

9:15 ATOMIC FORCE MICROSCOPY AND KELVIN PROBE FORCE MICROSCOPY STUDY OF POLY(3-HEXYLTHIOPHENE) NANOWHISKERS

Frederick McFarland, Benjamin Brickson, and Song Guo

University of Southern Mississippi, Hattiesburg, MS USA

Atomic Force Microscopy and Kelvin Probe Force Microscopy Study of Poly(3-Hexylthiophene) Nanowhiskers
Abstract: Poly(3-hexylthiophene), (P3HT), is a conjugated polymer with semiconductive properties useful in many electronic applications such as organic photovoltaics, organic field emission transistors, and organic light emitting diodes. Prior studies have shown that annealing treatments of P3HT has a pronounced effect on its performance reordering due to the reorganization of π - π^* stacking of thiophene-containing motifs. Our study will present new evidence which highlight the initial growth stages of P3HT in solution. Atomic force microscopy (AFM) and kelvin force probe microscopy (KPFM) are employed to elucidate the structural and electronic dependence of the solvent-induced first and multi-layering of P3HT. AFM topography studies reveal that P3HT form nanowhiskers with lengths of several microns and widths ranging from 20 μ m 60 nm. It is also determined that well-defined multilayered structures are dependent upon the solution aging process. Further analysis of substrate-molecule and molecule-molecule interactions of P3HT deposited on Si reveal that P3HT monolayers are weakly bound by π - π^* interactions while layered P3HT are more strongly bound by alkyl π -alkyl interactions and π - π^* interactions. This conclusion is supported by monolayer P3HT being consistently wider and more disordered than layered P3HT on the surface of Si. The influence of monolayer and multilayered P3HT packing on optoelectronic properties are investigated using KPFM. KPFM reveals that the contact potential difference will increase for

P3HT in areas that are more disordered as a result of irregular packing.

O3.06

9:30 CHARGE DENSITY VARIATION OF HYDROPHILIC-BLOCK-CATIONIC COPOLYMERS FOR TUNING COMPLEXATION WITH SIRNA AND THE EFFECTS ON GENE SUPPRESSION

Keith Hampton Parsons and Charles McCormick

University of Southern Mississippi, Hattiesburg, MS USA

Block ionomer complexes (BICs) formed from electrostatic association between hydrophilic-block- cationic copolymers and small interfering RNA (siRNA) are known to serve as superior vehicles for gene delivery. Such BICs stabilize and protect the siRNA while conferring hydrophilicity and reduced cytotoxicity, and incorporation of a targeting moiety deters nonspecific cellular uptake. Our group has previously demonstrated that BIC stability and siRNA delivery efficacy strongly depend upon cationic block length: increased block length greatly stabilizes the complexes and also increases the time required for gene knockdown. To explore this phenomenon, aqueous RAFT (aRAFT) polymerization was utilized to synthesize hydrophilic-block-cationic copolymers in which the cationic block contains a statistical incorporation of neutral, hydrophilic monomer such that the number of cationic groups remains unchanged but varies in distribution along the polymer backbone. Complexes were characterized with respect to changes in secondary structure and complex stability, and in vitro gene knockdown studies were performed to analyze the effect of increased cationic spacing on drug efficacy.

O3.07

9:45 ANALYSIS OF NMR DATA TO INVESTIGATE PROTEIN DYNAMICS

John Kristian Madsen, Nick Fitkee, and Dinesh Yadav

Mississippi State University Starkville, MS

Proteins sample an equilibrium mixture of folded and unfolded form, but point mutations can disrupt this equilibrium balance. Understanding how proteins fold may lead to treatments in diseases where mis-folding occurs, such as Alzheimer's Disease and cystic fibrosis. Here, we have used NMR spectroscopy to determine the folding and unfolding rate constants of the individual residues of the protein GB3. Our experiments were performed in 2M GdCL, where approximately 50 percent of the protein in solution assumes each respective state. We have investigated the correlation of these kinetic rates to various structural properties, such as solvent accessible surface area (ASA), hydrogen bonding, and native state secondary structure. While in many cases no correlation is observed, ASA values track closely with equilibrium constants in the beta sheet. Combining these folding rates with relaxation dispersion analysis, it is possible to identify otherwise invisible intermediates on the folding pathway. While many residues appear to be strictly two-state, others do not, suggesting that even in highly destabilizing conditions, residual protein structure may exist in GB3. Combined, our observations reveal unique information about the folding pathway of GB3. Work is ongoing to develop a user-friendly software package that enables the mapping of the spectral density function using the data we have collected. This work was supported by the Mississippi INBRE,

funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

10:00

MORNING BREAK

O3.08

10:15 SYNTHESIS AND CHARACTERIZATION OF A NOVEL ANTI-FOULING COATING FOR MARINE VESSELS

Tiera Corey, Emily Matthews, Frederick McFarland, Nicole Mackey, and J. Paige Buchanan

University of Southern Mississippi, Hattiesburg, MS USA¹

Many foulers such as plants, microorganisms, and animals are found on the surfaces of manmade materials in the ocean. Fouling causes frictional resistance, roughness of the surface, increased drag and weight, and also loss of mobility. This leads to an increase in fuel consumption. In order to fix this problem, antifouling coatings are being studied. The goal of this project is to prepare self- decontaminating coatings via synthesis with the incorporation of diallyl quaternary ammonium compounds (QACs), which are disinfectants that exhibit rich biocidal activity against biological species and have the ability to be incorporated into films and coatings. The QACs create a non-leaching biocidal film. All the components were synthesized and characterized via NMR and FT-IR. The morphology of the surface was investigated using atomic force microscopy (AFM), which exhibits features that are affected by the QAC structure. Height and phase were analyzed in order to measure roughness average and the root mean square roughness.

O3.09

10:30 PROGRESS TOWARD THE TOTAL SYNTHESIS OF THE LYCOPODIUM ALKALOID PALHININE A

Matthew Donahue and Anthony Abshire

University of Southern Mississippi, Hattiesburg, MS USA

Palhinine A, isolated from *Palhinhaea cernua*, is a C-16 type lycopodium alkaloid of the fawcettimine class. This natural product exhibits a unique isotwistane core with a sterically hindered spirocyclic quaternary carbon unseen in known lycopodium alkaloids. Natural products, such as Palhinine A, are a gratuitous resource for pharmaceutical research and drug development. The isolation process of a natural product is destructive to the resource the targeted molecule is extracted from. We plan to alleviate the stress that is created on the environment by producing clinically useful quantities of the compound for biological activity testing. Upon retrosynthetic analysis, the scaffold appears amenable to sequential intramolecular Diels-Alder (DA) cycloadditions. To address the problem of the spirocyclic quaternary carbon, a pyrone DA, followed by a retro-DA with concomitant extrusion of carbon dioxide will be attempted.

O3.10

10:45 WINSTEIN-MASAMUNE DEAROMATIZATION APPROACH TO THE SPIROCYCLIC CORE OF THE LYCOPODIUM ALKALOID MAGELLANINE

Matthew Donahue and Erin Realini

University of Southern Mississippi, Hattiesburg, MS USA

Magellanine is a lycopodium alkaloid isolated in milligram quantities from the club moss lycopodium magellanicum. Magellanine contains six contiguous stereogenic carbons embedded in a tetracyclic scaffold. Unique features to this molecule include: an AC ring quaternary spirocyclic junction at C12 and a cis-3,4-disubstituted piperidine. Magellanine shares common features with pharmaceutical drugs used in the treatment of neurological diseases, thus making it an interesting target for further study. To date, the clinical study of this structurally interesting tetracyclic alkaloid has not been widely explored and to our knowledge is no known biological activity reported. Some members of the lycopodium family have shown potential for the treatment of neurodegenerative diseases. Our research program is interested in utilizing a Tsuji-Trost variant of the Winstein-Masamune spirocyclic dearomatization to construct an advanced ACD ring tricycle. To meet this goal, we are investigating the alkylation of protected A ring 4-piperidones with benzylic halides under various conditions. This presentation will update the field on our progress toward preparing complex cis-3,4-disubstituted piperidines. Additionally, our convergent proposal for synthesizing the molecule will be discussed.

O3.11

11:00 INVESTIGATION OF A VINYL SULFOXIDE-CARBODIIMIDE ANNULATION VIA [3,3]-SIGMATROPIC REARRANGEMENT AND RING CLOSURE

Nicholas Jentsch, and Matthew Donahue

University of Southern Mississippi, Hattiesburg, MS, USA

Natural product total synthesis provides an alternative method for obtaining medicinally relevant compounds in a more efficient process with higher yields than what nature can provide. In particular, marine natural products pose significant synthetic challenges due to the unique heterocyclic skeletons with fused and spirocyclic ring systems. Ultimately, efficient methodologies for the synthesis of substructures within natural products of interest will lead to standard synthesis routes. This will provide a readily accessible source of relevant natural products and will allow for further functionalization to form potentially useful analogues. Vicinal diamines have a significant presence among a wide range of natural products and the indications of these natural products include antibiotic activity, anti-cancer properties, and neurological toxicity or excitation characteristics. A method is proposed for the synthesis of carbon-nitrogen bonds to synthesize 1,2-diamines as cyclic ureas. This will be achieved via reaction of a variety of vinyl sulfoxides with dialkyl carbodiimides. Sulfoxide activation via the carbodiimide will lead into a Claisen-type [3,3]-sigmatropic rearrangement to produce a reactive thionium ion intermediate. An intramolecular reaction will then occur to yield our target cyclic ureas. This presentation will discuss current progress toward the activation of the carbodiimide via Br₂, instead and Lewis acids.

O3.12

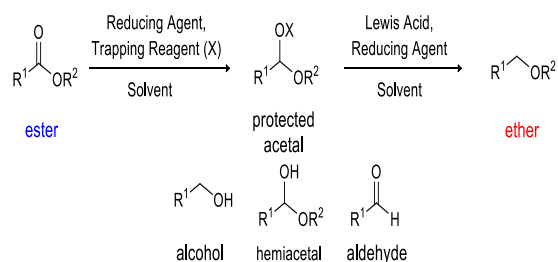
11:15 FINDING A GENERAL AND TUNABLE METHOD FOR ESTER TO ETHER REDUCTION

Sarah Ariel Kelley, and Julie Pigza

University of Southern Mississippi, Hattiesburg, Mississippi US¹

The ether functional group is extremely useful because

of its lack of reactivity and general compatibility. We are interested in developing a synthetically useful and general method for the conversion of esters to ethers. This protocol is particularly relevant as a complementary method to form ethers when other methods for ether formation have failed. While this conversion from esters to ethers has been explored, there are limitations in the published methods which hinder their broad applicability, including: using only non-aromatic esters, only using esters without branching near the carbonyl group, requiring long reaction times at cold temperatures, and/or using reagents with a strong, unpleasant sulfur smell. ReactIR will be employed to monitor the reaction *in situ* for loss of the carbonyl peak. The synthesis of a variety of esters will be described as well as the initial results for the reductive conversion of an ester to ether.



O3.13

11:30 PHOTOCATALYTIC DEGRADATION OF CRYSTAL VIOLET DYE ON POSS CONTAINING TITANIA-THIOL-ENE SUBSTRATES

Jennifer A Jefcoat, LaCrissia Jefferson, J. Paige Buchanan, Anton Netchaev, and Randy Buchanan

University of Southern Mississippi Hattiesburg, MS USA

Light activation of photocatalytic titania nanocomposite coatings results in a surface rich in reactive oxygen species, such as hydroxyl and superoxide anion radicals. These reactive oxygen molecules may be used to photo-degrade organic compounds and other pollutants adsorbed to the substrate surface. For this process, light (~3.2 eV or 380nm), water, and oxygen are required. Select Polyhedral Oligomeric Silsesquioxanes (POSS) were used as dispersants for the titania incorporated into the inorganic-polymer hybrid films. Reflectance characteristics and rates of photocatalytic degradation of select compounds are tailored through thoughtful selection of the POSS dispersant, film composition, and reaction parameters. POSS dispersants selected for this study include aminopropyl isobutyl POSS (API POSS), trisilanol isobutyl POSS (TSI POSS), and trisilanol phenyl POSS (TSP POSS). Correlations between film physical and chemical attributes and photocatalytic activity are revealed. These inorganic-polymer hybrid films were prepared using standard techniques and characterized using scanning electron microscopy (SEM), dynamic light scattering (DLS), UV-VIS reflectance, profilometry, atomic force microscopy, and thermal gravimetric analysis (TGA).

O3.14**11:45 UTILIZING DIRECT AND INDIRECT SOLUTION-BASED ASSAYS TO CHARACTERIZE SINGLET OXYGEN GENERATION FROM FULLERENE THIOL DERIVATIVES**

Ashli R Toles, Danviona King, Emily Matthews, and J. Paige Buchanan

University of Southern Mississippi, Hattiesburg, MS USA

In the presence of molecular oxygen and light, C60 produces singlet oxygen, which has antimicrobial properties,^{1,2} the ability to degrade chemical warfare agents,³ and causes cell death to targeted cells.⁴ The idea of doping polymer films with singlet oxygen generators is of particular interest due to the tunable mechanical properties, processability, and applications of fullerene-polymer networks.¹ A wide range of potential uses, including medical, optical, and electronic devices exists; however, the preparation, characterization, and utilization of C60-polymer nanocomposite films is unduly hindered by C60's insolubility in most solvents and monomers. Therefore, our research focuses on synthesizing thiol derivatives of C60 that possess an increased solubility in common solvents and monomers while preserving or enhancing C60's ability to produce singlet oxygen. Singlet oxygen is a short lived reactive oxygen species that is typically generated through photosensitization.⁵ Direct and indirect solution-based assays were used to assess the ability of the thiolated C60 derivatives to produce singlet oxygen. For the direct method, near-infrared (NIR) spectroscopy was used to detect the phosphorescence emission of singlet oxygen at 1270 nm. For the indirect method, time-dependent aliquots were removed from the photochemical oxidation of 2-methyl, 2-butene via singlet oxygen and analyzed immediately using NMR to monitor the photooxygenated products produced.

12:00 – 1:30

LUNCH

Thursday, February 26, 2015

AFTERNOON

ROOM TC 216

O3.15**1:30 DETERMINING FUNDAMENTAL STRUCTURE-REACTIVITY RELATIONSHIPS IN THE PREPARATION OF NOVEL THIOLATED C60 DERIVATIVES**

Danviona D King, Ashli Toles, Emily Matthews, and J. Paige Buchanan

University of Southern Mississippi, Hattiesburg, MS USA

Fullerenes have become increasingly popular due to their wide range of potential uses in medical, optical, and electronic devices. However, the preparation, characterization, and utilization of C60 is greatly hindered by C60's insolubility in most common solvents and monomers. In order to increase C60's solubility in thiol-ene composites, thiol-C60 derivatives were prepared from the photochemical cleavage of a disulfide synthesized from a mono thiol monomer via oxidation, followed by its subsequent addition reaction with C60 via a thiol-ene click reaction. Thiol-ene click reactions are preferred because they are

economically and environmentally friendly. Thiol-ene click reactions produce near quantitative yields with little to no byproducts, are modular and insensitive to molecular oxygen. Thiol-fullerene adducts were prepared having varying degrees of functionality to determine the correlation between the extent of derivatization and C60's processability. Experimental parameters such as reaction time and wavelength were investigated to determine optimum product yields. The adducts were isolated using flash chromatography and characterized using standard small-molecule techniques. Nuclear magnetic resonance (NMR) and fourier transform infrared (FT-IR) spectroscopy were used to support the successful synthesis of the thiol-C60 derivatives, and thermogravimetric analysis (TGA) was used to determine the number of thiol ligands attached to the C60 cage.

O3.16**1:45 COMPLETE SYNTHESIS OF ANALOGUES OF TUBERCULOSIS MEDICATION, ETHAMBUTOL, WITH KNOWN INTERMEDIATES, DIETHYL ETHYLMALONATE AND DIETHYL PHENYLMALONATE**

Kristina Claire Haney¹, Douglas Masterson¹, and Dale Rosado²

University of Southern Mississippi, Hattiesburg, MS USA¹ and USA Army Vicksburg, MS USA²

Ethambutol is a medication given when diagnosed with tuberculosis and this research presents two pathways that will facilitate a total synthesis of four analogues of this drug. Both pathways use well known malonate intermediates in a five and seven step synthetic route (scheme 1 and scheme 2). The pivotal portion of the synthesis is using a lipase in order to generate an alcohol with stereochemistry around a chiral carbon. The first pathway will take the malonate compound and reduce it into a diol. An acylation with acetic anhydride will take place with the diol and then lipases will react to hydrolyze the compound into an alcohol with a chiral carbon. Once the hydrolysis is completed, the material will be subjected to SN2 conditions in order to replace the hydroxide functional group with an azide. The last step in the first synthetic pathway will be to perform a reduction and the final product will be a ω -amino alcohol. The second pathway is the same as the first until the compound is hydrolyzed. After the hydrolysis a protection of the hydroxide will be performed and then the protected compound will undergo a reduction to yield a terminal alcohol. From there the product will replace the hydroxide group with an azide group through a SN2 reaction. The final step will be to reduce the azide into a terminal amine.

O3.17**2:00 STEREOSELECTIVE PREPARATION OF 3, 5-DISUBSTITUTED PYRROLIDINE-3-CARBOXYLIC ACIDS AS CATALYSTS IN THE ASYMMETRIC ALDOL AND MANNICH REACTIONS**

Hari Kiran Kotapati, Jamarii Robinson, and Douglas S. Masterson

University of Southern Mississippi, Hattiesburg, MS USA

The Aldol and Mannich reactions are very well known to be catalyzed by 2-pyrrolidine carboxylic acid and 3-pyrrolidine carboxylic acids, and their analogues, respectively. Our group had previously reported a novel stereoselective synthetic strategy for 3-methyl pyrrolidine-3-carboxylic acid,

which was reported to be a very efficient catalyst in Mannich reactions providing *anti* selective products predominantly. Our idea is to exploit this synthetic strategy and prepare 3, 5-disubstituted pyrrolidine-3- carboxylic acid and test its catalytic activity in the Aldol and Mannich reactions. Here in, we report the stereoselective synthetic strategy that utilizes very inexpensive and commercially available optically active amino acids as starting materials and the enzyme Porcine Liver Esterase (PLE) for the preparation of 3, 5-disubstituted pyrrolidine-3-carboxylic acid analogues. Substrates with different side chains were prepared and subjected to asymmetric hydrolysis by PLE. We were also able to create two analogues of 3, 5- disubstituted pyrrolidin-2-one-3-carboxylate, with varying substituents at position 5 on the pyrrolidine ring, in a stereoselective manner. We are in the process of converting the 3, 5-disubstituted pyrrolidin-2-one-3-carboxylate to 3, 5-disubstituted pyrrolidine-3- carboxylic acid that will be tested for its catalytic activity in the Aldol and Mannich reactions.

03.18

2:15 SYNTHESIS AND APPLICATION OF (R)-3-METHYLPYRROLIDINE-3-CARBOXYLIC ACID

Shelby Dickerson and Douglas S. Masterson

University of Southern Mississippi, Hattiesburg, MS USA

Organocatalysts have contributed to advancements in green chemistry. The absence of transitions metals in organocatalysts prevents the production of hazardous waste and allowing cleaner synthetic reactions. Another advantage is the chiral centers that allow stereoselective reactions to occur. This research will focus on the production of a unique proline analogue and the potential reactions to be used to explore its reactivity and compare to known proline analogues. This synthesis alkylates diethyl methylmalonate with dibromoethane in an SN₂. Using the Gabriel Synthesis, the halide will be replaced with a phthalimide group by SN₂ reaction. Pig Liver Esterase (PLE) hydrolysis generates the chiral center between the carbonyls and converts one ester into a carboxylic acid. The carboxylic acid then undergoes electrophilic substitution to replace its hydrogen with isobutylene. Hydrazine then allows cyclization. The nitrogen of (R)-Ethyl 3-Methyl-2-oxopyrrolidine-3-carboxylate was then alkylated. Lawesson's reagent was added to replace the oxygen in the carbonyl with sulfur. Raney-Nickel was added to remove the double bond attached to the ring. Lithium hydroxide allowed the ester group to oxidize to a carboxylic acid adjacent to the ring. Finally, reduction of the nitrogen generates a secondary amine. There are many reactions that utilize organocatalyst. These include the Aldol and Michael reactions. One issue with organocatalysts is low solubility organic systems. However, there are reported reactions that occur without the use of solvent systems, specifically with the Michael reaction. Using these reactions, the differences in reactivity of reported proline analogues can be compared to the analogue produced in this research.

03.19

2:30 Ti(III) and Ti(IV) AS NOVEL CATALYST FOR GENERATING CADMIUM VAPOR: IS THIS A REVOLUTION IN CADMIUM COLD VAPOR GENERATION?

Zikri Arslan, Vedat Yilmaz², and LaKesya Rose¹

Jackson State University Jackson USA¹ and Erciyes University Kayseri Turkey²

Vapor generation is an alternative approach for determination cadmium by atomic and mass spectrometry techniques. Extensive research has been done in this area and but generation of Cd vapor is significantly inefficient compared to other hydride vapor forming elements. In this work, Ti(III) and Ti(IV) were used as an additive and a highly efficient vapor generation method is developed for determination of Cd by CVG-ICPMS in complex samples. Ti(III) and Ti(IV) were utilized in the presence of KCN. Acidified sample solutions were mixed online with Ti(III) or Ti(IV) solution and KCN and then reacted with NaBH₄. Vapor generation conditions for Ti(III) and Ti(IV) were examined using different acids. HCl provided conditions for Ti(III)-KCN, whereas highest Cd signals were obtained in HNO₃ for Ti(IV)-KCN. Different manifold schemes were tested to elucidate the impact of Ti solutions. The results indicated that presence of Ti(III) or Ti(IV) was essential regardless of the mixing sequence. Sensitivity was improved about 50-fold. A detection limit of 3 to 4 ppt and 6 to 8 ppt were obtained for HCl-Ti(III) and HNO₃-Ti(IV) system, respectively. Transition and metals had no significant suppression at 1.0 ppm levels. Hydride forming elements were decreased signals above 0.5 ppm levels. The methods were verified by analysis different materials, including seawater, domestic sludge, liver and bone ash, for Cd by CVG-ICPMS.

03.20

2:45 CLEANING THE SURFACE OF GRAPHENE OXIDE BY ELECTROCHEMICAL REDUCTION: AN IN SITU RAMAN SPECTROELECTROCHEMICAL STUDY.

ABM Zakaria and Danuta Leszczynska

Jackson State University, Jackson, MS USA

Recent studies have demonstrated that graphene oxide consists of functionalized graphene sheets are decorated by carbonaceous (oxidative debris) and active metallic impurities. These unpredictable impurities may alter the intrinsic properties of graphene material. To retain the fundamental properties with the clean aromatic backbone, reduced graphene oxide (RGO) has received greater attention in recent years. The aim of this study is to synthesized electrochemically reduced graphene oxide (ERGO) and its electrocatalytic activity towards oxygen reduction reaction (ORR). In this work, graphene oxide has been immobilized on a conducting substrate 3-aminopropyl-trimethoxysilane (APTMS)-modified glassy carbon electrode through a self-assembly method. Then in situ measurements have been carried out to follow the electrochemical reduction of GO to RGO by combining electrochemistry with Raman spectroscopy. After running 30 reduction cycles, a sharp Raman spectra of RGO has been observed with the intensity ratio increased to 1.28 (ID/IG of D and G band for ERGO compared to GO (ID/IG= 0.99)). In order to confirm the cleanliness of RGO we have observed the effect of surface enhanced Raman spectroscopy of gold nanoparticles by electrodeposition on graphene surface. In addition, the ERGO modified electrode has more ORR active than GO/GCE by 171mV positive shift. Preliminary results have shown that in situ Raman spectro-electrochemistry technique established here is amenable for the design and tailoring of electrodes to achieve optimal electrochemical performance. (Grant Award RCMI # 8G12MD007581)

3:00 Divisional Meeting**3:15 Member Recognition and Dodgen Lecture****EVENING****Poster Session****Immediately Following Dodgen Lecture****P3.01****SCREENING OF FULLERENE NANOPARTICLES FOR BIOLOGICAL TARGETS: INVERSE DOCKING STUDY**

Lucky Ahmed, Bakhtiyor Rasulev, and Jerzy Leszczynski

Jackson State University Jackson, MS USA

Fullerene and its derivatives are one of the leading nanomaterials in nanomedicine for pharmaceutical applications. In this study, computational screening has been performed followed by docking studies to explore the most selective fullerene derivatives. 169 fullerene derivatives (FDs) have been modeled and then docked against a series of proteins selected from potential drug target database (PDTD). A set of 14 FDs has been identified as highly potential for four selective proteins. These FDs may act as various drug-like compounds, for example, as a Potassium Ion Channel blocker, Cholesterol lowering drug, Enzyme Inhibitor, and etc. Four proteins such as human nuclear pregnane X receptor (hPXR), membrane protein-ion channel, glutamate transporter and copper amine oxidase have been sorted as FDs target. At this study a few selected FDs have been identified as toxic for most proteins. The details of the present findings will be discussed. A database of potential biological targets for fullerene nanoparticles will be created. The database of pairs (protein - fullerene derivative) with calculated binding affinities will be also formed and prepared to make it available for use by academic and pharmaceutical industry scientists to assist in pharmacological activity or toxicity estimation, as well as for drug delivery agent's development.

P3.02**INVESTIGATION ON AMINE CURED EPOXY POLYMERS AND WATER INTERFACE: A MOLECULAR DYNAMICS APPROACH**Juganta Kumar Roy, Henry Pinto, and Jerzy Leszczynski*Jackson State University, Jackson, MS USA*

Cross-linked epoxy polymer networks are suitable for biomedical applications, such as tissue engineering and actuator for drug delivery. In this work, atomic level molecular dynamics (MD) simulations aimed to investigate the characteristics of cross-linked epoxy polymer in water at 300 K temperature and under 1 ATM pressure. We built an atomistic model of cross-linked epoxy polymer by using JEFFAMINE T-403 (Tri-amine) as cross-linking agent and poly(ethylene glycol) diglycidyl ether (PEGDGE) as resin. Based on the structural restriction of tri-amine, we build four different model of epoxy polymer. The polymer-water interaction, the water dynamics and the diffusion behavior were investigated. We observed that the water molecules at the polymer-water interface possess some structural orientation that differs from the bulk phase of water. The study revealed that the diffusion of the water molecules were facilitated by the hydroxyl groups of the polymer at interface. The water molecules started to diffuse into the polymer matrix through the

nano-channels formed by the amorphous polymer chains; the rate of diffusion was increasing with the simulation time. We found that water molecules inside the polymer tend to locate at the -OH and NH sites, reflected in the increase of hydrogen bonding between polymer and water. Finally, our results suggest that this process is responsible for the increase of the cross section of the system that can be related to the polymer swelling observed experimentally when this polymer is in contact with water.

P3.03**COMPUTING ACIDITIES OF BARBITURIC AND THIOBARBITURIC ACID**

Jonathan Landrum and David Magers

Mississippi College, Clinton, MS USA

For barbituric acid and thiobarbituric acid, the pK_as of the hydrogens bonded to carbon and the hydrogens bonded to nitrogen in each system are computed using an isodesmic reaction with a reference acid. Isodesmic reactions conserve bond number and bond type. Optimum equilibrium geometries, harmonic vibrational frequencies, and the corresponding Gibbs free energies are computed for all of the reactants and products in each isodesmic equation using SCF theory and density functional theory. The DFT functionals employed are Becke's three-parameter hybrid functional using the LYP correlation functional, the M06-2X high nonlocality hybrid functional from Thular and Zhao, and the B97XD functional from Head-Gordon and coworkers which includes empirical dispersion. The basis sets employed are Dunning and coworker's correlation consistent basis sets, aug-cc-pVDZ and aug-cc-pVTZ. The solvation model used is the continuous surface charge formalism for the polarizable continuum model (PCM). Results are presented for different levels of theory and for different basis sets to determine what level of computation is needed for consistent results. In addition, the effect of employing different reference acids is investigated. We gratefully acknowledge support from the NSF (EPS-0903787) and the W.M. Keck Foundation.

P3.04**RELATIVE STABILITIES OF DERIVATIVES OF 9-METHYLANTHRACENE AND 9-METHYLENE-9,10-DIHYDROANTHRACENE**

Amber Morales, Bei Cao, and David Magers

Mississippi College, Clinton, MS USA

In 1949, Clar and Wright reported that 6-methylpentacene exists as 6-methylene-6,13-dihydropentacene at room temperature due to a [1,5]-sigmatropic hydrogen shift (Nature 1949, 163, 921). Thus, the aromaticity of the central ring and the planarity of the overall compound is destroyed by this shift.[1] The same does not occur in anthracene. While the 9-methylene derivative of anthracene is a local minimum, the planar methyl derivative is the more stable. In the current study we want to know if certain derivatives of these systems would stabilize the methylene system relative to the methyl. Derivatives of the two parent isomers are investigated to determine if certain substituents can stabilize the methylene isomer. Specifically, nitro, dinitro, and tetranitro derivatives are investigated. Optimum equilibrium geometries, harmonic vibrational frequencies, and the corresponding zero-point vibrational energies are computed for each set of isomers using density functional theory. The DFT functionals employed are

Becke's three-parameter hybrid functional using the LYP correlation functional and the M06-2X high nonlocality hybrid functional from Thular and Zhao. The basis sets employed are Dunning and coworkers' correlation consistent basis sets cc-pVDZ and cc-pVTZ. We gratefully acknowledge support from the Mississippi College Catalysts, the alumni support group of the Department of Chemistry & Biochemistry.

P3.05

CHEMOENZYMATIC SYNTHESIS OF ETHAMBUTOL ANALOGUES CONTAINING CHIRAL 4-AMINOALCOHOLS

Amy Wilcosky, Dr. Dale Rosado, and David Magers

Mississippi College Clinton, MS USA

Ethambutol is an anti-bacterial / bacteriostatic drug that is composed of two 2-alkyl-2-aminoalcohols connected by an ethylene linker. In the current study, we utilize theoretical and computational chemistry to study this important chemical system. Different isomers of Ethambutol are investigated computationally to determine if the medically relevant isomer is the most stable. Levels of theory include SCF and density functional theory (DFT). The DFT functional employed are Becker's three-parameter hybrid functional using the LYP correlation functional and the M06-2X high nonlocality hybrid functional from Thular and Zhao. In addition to gas phase calculations, solvation is included through the polarizable continuum model. More importantly, we have synthesized a 2-alkyl-4-aminoalcohol to evaluate its anti-mycobacterial properties. Reduction of diethyl 2-benzylmalonate with LiAlH₄ yields a 2-benzyl-1,3-propanediol. Burkholderia cepacia lipase was used to introduce chirality by selectively acylating 2-benzyl-1,3-propanediol to generate the acyl alcohol common intermediate from which both enantiomers of a 2-benzyl-4-amino-1-butanol can be synthesized. Synthesis of the (S)-enantiomer is accomplished through oxidation of the alcohol moiety to an aldehyde, a Wittig reaction, hydrogenolysis and a Curtius reaction. Synthesis of the (R)-enantiomer proceeded through TBDMS protection of the free alcohol and removal of the acyl protecting group by treatment with K₂CO₃. The free alcohol can then be subjected to the same oxidation / Wittig / Curtius sequence to give the (R)-enantiomer. Future work will involve the incorporation of 4-aminoalcohols into Ethambutol analogues. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P3.06

DI-HEME PROTEIN MAUG AS A DUAL MRI CONTRAST AGENT

Karien Dixon, Michael Cleveland, and Manliang Feng *Tougaloo College Tougaloo, MS USA*

Iron and gadolinium compounds are two main group of magnetic resonance (MRI) contrast agents that are used to improve the image resolution in cancer diagnosis and cancer treatment. Gadolinium contrast agents are predominantly used to shorten the T(1) relaxation time while iron based contrast agent are used to shorten T(2). Development of a multifunctional agent allowing for dual-contrast T(1)- and T(2)-weighted targeted magnetic resonance (MR) imaging could significantly improve the diagnosis accuracy. In this study, MauG a di-heme protein

was studied for its potential as a dual-contrast agent. MauG is found in *P. denitrificans* that catalyzes the biosynthesis of tryptophan tryptophylquinone. It contains a tightly calcium ion between the two hemes. Our goal was to replace the Ca²⁺ with Gd³⁺ to convert MauG into a dual MRI contrast agent. Native MauG was treated with EDTA/EGTA to remove calcium ion. The calcium-depleted MauG was then re-constituted with Gd³⁺. The calcium depletion and gadolinium reconstitution was verified with UV-Vis and resonance Raman spectroscopy. Our results indicate that it is possible to create a protein based dual MRI contrast agent for cancer diagnosis and therapy. This idea could be extended to other proteins and contain metal ion binding site and develop more bio-compatible MRI contrast agents. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P3.07

AN EF-HAND MOTIF AS IN-VIVO TRACING TAGINPOLYPEPTIDE-BASED ANTICANCER DRUG CARRIER

Michael Cleveland, Ms. Karien Dixon, and Manliang Feng

Tougaloo College, Tougaloo, MS USA

Chemotherapy is currently the main approach for the cure of cancers. A major drawback of this method is the site-effects of anticancer drugs on normal cells. Drugs that combine guided-delivery, in-vivo tracing and therapeutic functions are highly desirable for effective cancer chemotherapy. Radioactive and optical tracers have been used for tracing. In this research, we used a EF-hand motif as a binding ligand for Gd³⁺ which can be traced in-vivo using magnetic resonance imaging (MRI). The EF-hand motif was conjugated with a cell penetration polypeptide and a elastin-like polypeptide (ELP) to form a multi-functional polypeptide-based drug carrier for targeted drug delivery and in-vivo tracing. The cell penetration segment contains a SynB1 peptide with a amino acid sequence of RGGRLSYSRRRFSTSTGRA. The target delivery segment contains a elastin-like polypeptide (ELP) consist of repeated sequence of pentapeptides (VPGXG). The EF-hand motif contains a amino acid sequence of DKDGDGTIDEREI. The DNA sequences for the three functional segments were cloned into pET-25B(+) plasmid and protein was expressed and purified from *E. coli*. UV-Vis spectra-titration results indicate that the designed protein strongly binds Gd³⁺ while also retains the phase transition properties of the ELP making it an ideal drug delivery vehicle. This work was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P3.08

DEVELOPMENT OF IN-VIVO TRACEABLE CARRIER FOR GUIDED DELIVERY OF ANTICANCER DRUGS

Manliang Feng¹, Drazen Raucher², Michael Cleveland¹, and Karien Dixon¹

Tougaloo College Tougaloo, MS USA¹ and University of Mississippi Medical Center, Jackson, MS USA²

Cancer is the 2nd leading causes of death in the USA. Chemotherapy is an essential way for the cure of cancers. The key for effective cancer chemotherapy is to deliver the anticancer drugs at the tumor. Real-time and in-vivo drug delivery vehicle

could help to improve the efficacy of anticancer drugs while suppress their side effects. In this research we have engineered two proteins from functional polypeptides using molecular biology approach. The resulting proteins contain three functional polypeptides; a cell penetration polypeptide (CPP), an elastin-like polypeptide (ELP) for thermally targeted delivery and a Gd³⁺ binding polypeptides. The Gd³⁺ binding polypeptides (GdP) which serve as the in-vivo magnetic resonance imaging (MRI) tracer contain amino sequences of DKDGDGTIDERE (an EF-hand motif) and YIDTNNDGWIEGDELLA. UV-Vis spectroscopic titration results indicate that the GdP polypeptides when linked with the ELP and CCP retain the high affinity to Gd³⁺ ions which allow them to serve as in-vivo tracing tags. To assess the feasibility of the designed protein in physiological condition, the effects of album protein was also studied. It was found that album protein has on effects suggesting that the GdP peptides bind Gd³⁺ strongly and specifically. The resulting polypeptide also retained the inverse-phase transition properties and the cell-penetration properties, which make them potential carriers for traceable and thermally targeted drug delivery. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476 pentapeptides(VPGXG), where the guest residue X can be any amino acid except Proline. ELP possesses a unique inverse temperature-phase transition feature. It is employed in the designed polypeptide for thermal-targeted delivery. The last segment of the polypeptide contains a amino acid sequence that can binds rare earth metal ions. This segment of peptide when bind to rare earth metal ions such as Eu³⁺ and Gd³⁺ can produce fluorescent and magnetic feature that can be used to trace the designed polypeptide both in-vitro and in-vivo. The designed polypeptide was expressed and purified from E. Coli. The metal binding properties and phase transition properties of this newly designed polypeptide were characterized. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, and by Howard Hughes Medical Institute Precollege and Undergraduate Program (HHMI- 52007562).

P3.09

CONVENTIONAL STRAIN ENERGIES OF THE OXAPHOSPHETANES AND THE OXADIPHOSPHETANES

Mason Boone¹, Carley Hydrick¹, Samuel Walters¹, Marissa Westrope¹, Shelley Smith¹, and David Magers²

Copiah-Lincoln Community College, Wesson, MS USA¹
and Mississippi College, Clinton, MS USA²

The conventional strain energies of 1,2-oxaphosphetane, 1,3-oxaphosphetane, 1,2,3-oxadiphosphetane, and 1,2,4-oxadiphosphetane are determined within the isodesmic, homodesmotic, and hyperhomodesmotic models. Optimum equilibrium geometries, harmonic vibrational frequencies, and corresponding electronic energies and zero-point vibrational energies are computed for all pertinent molecular systems using SCF theory, second-order perturbation theory, and density functional theory and employing three correlation consistent

basis sets of Dunning and coworkers: cc-pVDZ, cc-pVTZ, and cc-pVQZ. Single point fourth-order perturbation theory, CCSD, and CCSD(T) calculations employing the cc-pVTZ and the cc-pVQZ basis sets are computed using the MP2/cc-pVTZ and MP2/cc-pVQZ optimized geometries, respectfully, to ascertain the contribution of higher-order correlation. Three DFT functionals, B3LYP, ?B97XD, and M06-2X, are considered to determine if they can yield results similar to those obtained at the CCSD(T) level. We gratefully acknowledge support from the NSF (EPS-0903787).

P3.10

THE ESCHERICHIA COLI yfdXWUVE OPERON

Alexa Engel, Rafael Fernandez Garcia, Maryam Quresh , and Cory Toyota

Millsaps College, Jackson, MS USA

YfdW from *Escherichia coli* is an oxalate:formyl-CoA transferase and YfdU is an oxalyl-CoA decarboxylase. These enzymes contribute to an oxalate-dependent acid resistance system. We predict that the other gene products from the yfdXWUVE operon also contribute protection to pH or osmotic strength stress. Our work suggests that these enzymes may contribute to increased pathogenesis of virulent E. coli consumed with oxalate-containing foods like spinach. We are now working to clone, over-express, and characterize the remaining three proteins encoded by the yfdXWUVE operon. Proteins will be amplified from genomic DNA, topo-cloned into expression vectors, and used to transform an expression strain of E. coli. Proteins will be over-expressed from E. coli and purified by affinity chromatography and characterized by steady-state enzyme kinetic analysis. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P3.11

MICROWAVE-ASSISTED ALKYLATION OF ANILINES: ALKYLATION OF 2,4-DIMETHYLANILINE WITH VINYLARENES

Brandon Hackett, Jonathan Grayson, Dominique Foster, and George Armstrong

Tougaloo College, Tougaloo, MS USA

Ortho-alkylation of substituted 2,4-dimethylaniline was carried out in a matter of minutes under solvent-free conditions in a conventional household microwave oven. Styrene, 4-chlorostyrene and 4-tert-butoxystyrene were used as alkylating agents with triflic acid (CF₃SO₃H) as catalyst. Products were easily recovered in good yields and characterized using proton NMR.

P3.12

SYNTHESIS OF CO₂-RESPONSIVE POLYMERIC MICELLES VIA RAFT POLYMERIZATION

David Siefker, Brooks Abel, Phillip Pickett, and Charles McCormick

University of Southern Mississippi, Hattiesburg, MS USA

Recent efforts in our group have focused on the synthesis of polymeric surfactants to serve as unimeric micelles

for oil spill remediation applications. Previously, we have prepared anionic amphiphilic copolymers (polysoaps) via reversible addition-fragmentation chain transfer (RAFT) polymerization which allowed for molecular weight control and narrow molecular weight distributions. Initial studies have shown that polysoaps prepared from hydrophobic dodecyl acrylamide and hydrophilic AMPS monomers form micelles in water that can sequester hydrophobic, organic molecules. Also, we have recently synthesized sulfonamide-containing homopolymers by RAFT polymerization that exhibit changes in aqueous solubility in response to a CO₂ stimulus. Upon purging with CO₂ these homopolymers become water insoluble as indicated by polymer precipitation or phase separation. By incorporating a functional sulfonamide into a well-defined polysoap backbone, a CO₂ responsive polysoap may be prepared and potentially used for advanced oil recovery in open sea water. Current efforts are being explored to develop these types of responsive polysoaps using acrylamido-sulfonamides as the hydrophilic monomer and 4-hexyl-phenyl methylacrylamide as the hydrophobic monomer. By varying the composition and structure of the hydrophobic/hydrophilic monomers incorporated into the polysoaps, the behavioral properties and CO₂ dependence of micelle formation and precipitation can be determined. The conceptual aspects of this approach, as well as the synthesis, characterization and behavioral properties of micelle formation and precipitation will be discussed.

P3.13

AMPHIPHILIC COPOLYMERS CAPABLE OF FORMING MICELLES TO SERVE AS UNIMERIC-DISPERSANTS OR GELATORS FOR OIL SPILL REMEDIATION APPLICATIONS

Phillip Pickett, David Siefker, and Charles McCormick

University of Southern Mississippi, Hattiesburg, MS USA

Conventional surfactants used for oil spill remediation are inefficient due to enormous dilution effects when applied in open sea waters. This work circumvents the dilution effect by developing concentration-independent surfactants that form unimeric micelles in water. Both anionic and cationic amphiphilic polymers (polysoaps) have been prepared via reversible addition-fragmentation chain transfer (RAFT) polymerization resulting in controlled molecular weights and narrow molecular weight distributions. Initial studies have shown that polysoaps prepared from hydrophobic dodecyl acrylamide monomer and hydrophilic AMPS or APTAC monomers form micelles in water that can sequester hydrophobic, organic molecules. Several of the anionic polysoaps exhibit unimolecular micelle behavior with increased capability of sequestering hydrocarbon and up to 60x less cytotoxicity as compared to the small molecule surfactant analog, SDS. When separately applied, the anionic and cationic polysoaps work well as dispersants in water; however, when mixed together in oil, these have potential to serve as gelators. By varying the composition and structure of the hydrophobic/hydrophilic monomers incorporated into the polysoaps, the behavioral properties and concentration dependence of the micelle formation and gelation can be determined. The conceptual aspects of this approach, as well as the synthesis, characterization and behavioral properties of the uni- vs. multi-molecular micelles and gelation will be discussed.

P3.14

PLASMONIC NANOCRYSTALS WITH PRECISE GOLD ATOMS

Chanaka Kapila Kumara, Xiaobing Zuo², David Cullen³, and Amala Dass¹

Department of Chemistry and Biochemistry, University of Mississippi Oxford, Mississippi USA¹, X-ray Science Division, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois USA², Materials Science and Technology Division, Oak Ridge National Laboratory Oak Ridge, Tennessee USA³

Plasmonic nanoparticles have potential application in nano-optics, solar cell, catalysis, drug delivery and cancer treatment. Among those, thiol protected gold nanocrystals draw greater attraction due to their superior stability and ability to control the composition with atomic precision. However, the challenges in the synthetic protocol and lack of atom quantification techniques hinder the determination of atomic composition. For the first time, we were able to determine the atomic composition of the three different gold nanoparticles in the size regime of 2-4 nm. The composition was found to be Au₃₂₉(SR)₈₄, Au₅₀₀(SR)₁₂₀ and Au₉₄₀(SR)₁₆₀ by electro-spray ionization mass spectrometry. All of these nanocrystals exhibit surface plasmonic resonance at around ~500 nm. Size-dispersity of the gold nanocrystals was confirmed by mass spectrometry, synchrotron based small angle X-ray scattering and scanning transmission electron microscopy analysis. Possible atomic arrangements of these nanocrystals were determined by high-energy X-ray based pair distribution function analysis. These largest gold nanocrystals with known composition will pave the way to the understanding the origin of surface plasmon resonance and will have greater potential towards application in catalysis and optical devices.

P3.15

ELECTRO-KINETIC ENHANCED PHYTOREMEDIATION FOR THE RESTORATION OF MULTI-METALS (CD, PB, AS AND CS) CONTAMINATED SEDIMENTS

Xinyu Mao

Jackson State University, Jackson MS USA

The electro-kinetic remediation is usually used to enhance phytoremediation and the technology (EK- phytoremediation) is promising for the restoration of heavy metals in contaminated soils and sediments. Generally, EK-phytoremediation techniques contains the application of a low intensity electric field adjoined to growing plants in contaminated soil. The removal of contaminants performed by plants in EK-phytoremediation technology are enhanced by increasing the bioavailability of the contaminants through the effect of electric field. In addition, with proper design of electrode configuration, metals which are deeper than roots can be reached and metals leaching can be prevented. Assisted amendments and electric parameters which can influence the remediation effects are studied in this work. Sediments with contaminated metals of Cd, Pb, As and Cs are used in the study. A 2D electrode configuration is designed with cathode placed on the surface of the soil and anodes vertically installed in four corners of a rectangular chamber. Indian mustard, sunflower, spinach and Chinese cabbage are chosen for the selection of plants with better remediation performance using

this technology. Plants growth rate, biomass production and metals accumulation in roots and shoots are measured to determine the metals accumulation ability of plants. Amendments which are mainly biodegradable chemicals (organic amendments) and fertilizer are added. Their effects on improving metals mobilization and plants accumulation are compared with EDTA. In addition, electric parameters such as AC/DC electric fields, electrode materials and electric intensity are varied to observe their influence on metabolism of the plant and metals uptake.

P3.16

EFFECT OF CHAIN LENGTH, NUMBER OF CHAINS AND CHARGE ON THE IN VITRO CYTOTOXICITY OF SURFACE COATING AGENTS USED ON NANOPARTICLES

Ying Zhang, Salma Begum, Makiesha James and Hongtao Yu
Jackson State University, Jackson, MS USA

The research and application of nanotechnology has grown tremendously in the last decade. Surface coating agents (surfactants) are an integral part of nanoparticles for shape and size control, surface protection, and stability. Therefore, the study of nanoparticle toxicity must consider the effects from the surfactants used. Here we report the in vitro cytotoxicity of both cationic (alkyl ammonium salts) and anionic (alkyl sulfates) surfactants in two cell lines: human skin keratinocytes (HaCaT) and blood T lymphocytes (TIB-152) with consideration of chain length, number of chains and charge. Both cationic and anionic surfactants with chains length of 8 C are not cytotoxic on both cell lines. The cytotoxicity of the surfactants increases with the increase of the chain length from 10 to 12 carbons, and then levels off from 12 to 18 carbons, except the cationic surfactants on HaCaT cells where the leveling off chain length is 14 carbons. The cationic di-dodecyl surfactant is slightly more cytotoxic than the mono-dodecyl surfactant, while the cationic di-octadecyl (18) surfactant is not cytotoxic due to micelle formation in the concentration range tested. For HaCaT cells, the cationic surfactants are more cytotoxic than anionic surfactants with the same chain length, but for TIB-152 cells, both classes of surfactants are on the same cytotoxicity level. Both of these two classes of surfactants are more cytotoxic to TIB-152 cells than to HaCaT cells. There appears to be a threshold concentration for some surfactants that cytotoxicity is not observed until it reaches this threshold concentration.

P3.17

TOXICITY OF GOLD NANOPARTICLES AND GOLD IONS TO BACTERIA

Thabitha P Shareena Dasari, Neil Hammond, and Hongtao Yu
Jackson State University, Jackson, MS USA

Gold nanoparticles (AuNPs) have applications in the fields of chemistry, biology, engineering, and medicine as catalysts and an agent for imaging, labeling, drug delivery, and sensing. There are many publications on the toxicity of AuNPs; however, majority of the research failed to disclose the information of Au (III) ion present with AuNPs. Here we report the effect of Au (III) ion on the toxicity of AuNPs to various bacteria. Bacteria used in this study include non-pathogenic and multidrug resistant *E. coli*, multidrug resistant *Salmonella* DT104, and the multidrug resistant *Staphylococcus* (MRSA). We

compared the inhibition of bacterial growth of synthesized AuNPs centrifuged 1-4 times at 5000 rpm for 45 min each to remove excess Au (III). Spread plate counting method was used to determine the inhibition of bacterial growth. We also investigated the concentration and time dependent inhibition of Au (III) in all bacteria. Purified AuNPs (4Å— centrifugations) do not show any bacterial growth inhibition compared to the less than 2Å— centrifuged samples. We found that Au (III) itself induced both concentration-dependent and time dependent inhibition of all bacterial growth. This means that Au (III) is toxic to bacteria and maybe explored for antibacterial purposes. It also suggests that test of AuNPs toxicity must carefully separate co-existing chemicals especially Au (III). Keywords: Gold nanoparticles, Gold (III), antibacterial, toxicity.

P3.18

THE ADSORPTION OF CESIUM, STRONTIUM AND COBALT BY MESOPOROUS MATERIALS

Kai Guo, Fengxiang Han, Zikri Arslan, Christian Rogers, and Hongtao Yu

Jackson State University, Jackson, MS USA

With rapid global population and fossil energy consumption, global warm has become a first environmental challenge to all the nations. Nuclear energy emerges as a clean zero emission energy. However, the most recent Japanese Fukushima nuclear power plant accident issues an environmental concern. Here presents two schemes to tackle the radioactive elements, Sr, Co and Cs, polluted water. One is the exploration of functionalized mesoporous modified SBA-15 & MCM-41. Thioglycolic acid, phosphoric acid and polyethylenimine are applied as functional groups SH, PO₄ and NH₂, respectively. The adsorption capacities of Cs, Sr, and Co show that phosphoric acid and thioglycolic acid functionalized mesoporous silicates could be potential choices for remediation. Besides, (3-mercaptopropyl)trimethoxysilane is another modification source of MCM-41 in the preliminary study and the maximum adsorption capacity of Cs could reach to 21.55mg/g. FTIR and Raman Spectra confirm that the SH groups successfully bound to the surface of MCM-41. The other one is the synthesized nanocarbon, of which ferulic acid is the carbon source and SBA-15 is the template carbonized in N₂ atmosphere. The adsorption capacities of Co, Sr and Cs arrive up to 12.14mg/g, 15.9mg/g and 23.87mg/g, respectively. Likewise, FTIR confirmed that carbonyl groups existed on the nanocarbon, which would improve the adsorption efficiency. ZetaSizer is applied to measure the particle size and zeta potential. We will discuss the potential applications of these modified functionalized mesoporous silicates and nanocarbons in remediation of polluted water.

P3.19

PREPARATION AND CHARACTERIZATION OF THIOL-ENE POLYMER MICROBEADS USING AN ACOUSTIC EXCITATION MODEL

Patrick Michael Lowe, Amber Windham, J. Paige Buchanan, Anton Nechaev, and Randy Buchanan

University of Southern Mississippi, Hattiesburg, MS USA

Polymer microbeads (PMB) have many uses, such as drug delivery, disease detection, cosmetics, personal care products, paints, and chromatography. Monodispersity of PMBs

is crucial to their performance in their desired application and each application requires a different size range. Much attention has been given to PMB production methods that yield PMBs within a narrow diameter range. Our lab focuses on the acoustic excitation flow focusing (AEFF) method, which utilizes acoustic frequency paired with a continuous flow phase to produce monodisperse thiol-ene click PMBs. The advantages of click reactions are the cost effective reagents, high selectivity, high yields, insensitivity to molecular oxygen and water, and mild reaction conditions that are often solvent free. Thiol-ene chemistry combines the advantages of click chemistry with the convenience of photopolymerization. Currently, we are characterizing experimental parameters of AEFF technique and the effect of those parameters on the PMB diameter. The PMBs were characterized using Dynamic Light Scattering (DLS), Optimal Microscopy, and Differential Scanning Calorimetry (DSC).

P3.20

NOVEL NITROGEN-FLUORINE-CODOPED TiO₂ FOR DEGRADATION OF BPA UNDER VISIBLE LIGHT

Xiaojia He,¹ Winfred Aker, Miguel Pelaez,² Yunfeng Lin¹, Dionysios Dionysiou² and Huey-min Hwang¹

Jackson State University, Jackson, MS USA¹ and University of Cincinnati, Cincinnati, Ohio USA²

Synthesized nitrogen-fluorine-codoped-TiO₂ (N-F-TiO₂) nanoparticles, in comparison to commercial Sigma TiO₂, were used to investigate the photocatalytic degradation of bisphenol A (BPA) as a model pollutant in aqueous solutions responding to visible light. The physicochemical properties of TiO₂ were characterized using TEM, XRD, BET nitrogen adsorption method, FT-IR, DLS, PALS, and UV-vis spectroscopy. The photocatalytic activities were first evaluated by studying the degradation of pure BPA under simulated sunlight (SSL) and visible light (VL). The onset of absorption by N-F-TiO₂, in relation to the pure, shifted to the visible light region. The visible-light-driven-degradation of BPA with N-F-TiO₂ was much higher (61.21%) after 4 h of irradiation than that with Sigma TiO₂ (19.18%).

P3.21

INVESTIGATION ON AMINE CURED EPOXY POLYMERS AND WATER INTERFACE: A MOLECULAR DYNAMICS APPROACH

Jugata K. Roy, Henry Pinto and Jerzy Leszczynski

Jackson State University, Jackson, Mississippi 39207-0510, USA

Cross-linked epoxy polymer networks are suitable for biomedical applications, such as tissue engineering and actuator for drug delivery. In this work, atomic level molecular dynamics (MD) simulations aimed to investigate the characteristics of cross-linked epoxy polymer in water at 300 K temperature and under 1 atm pressure. We built an atomistic model of cross-linked epoxy polymer by using JEFFAMINE T-403 (Tri-amine) as cross-linking agent and poly(ethylene glycol) diglycidyl ether (PEGDGE) as resin. Based on the structural restriction of tri-amine, we build four different model of epoxy polymer. The polymer-water interaction, the water dynamics and the diffusion behavior were investigated. We observed that the water molecules at the polymer-water interface possess some structural orientation that differs from the bulk phase of water. The study revealed that the diffusion of the water molecules were facilitated

by the hydroxyl groups of the polymer at interface. The water molecules started to diffuse into the polymer matrix through the nano-channels formed by the amorphous polymer chains; the rate of diffusion was increasing with the simulation time. We found that water molecules inside the polymer tend to locate at the -OH and -NH sites, reflected in the increase of hydrogen bonding between polymer and water. Finally, our results suggest that this process is responsible for the increase of the cross section of the system that can be related to the polymer swelling observed experimentally when this polymer is in contact with water.

P3.22

DECARBOXYLATIVE PHOTOCYCLIZATION OF CATIONIC PHTHALIMIDE AND QUINOLINE/ISOQUINOLINE OMEGA-CARBOXYLIC ACIDS

Austin M. Deskewies, Eli A. Smith, Philip Schwartz, David S. Sandlin, Axel G. Griesbeck, and Wolfgang H. Kramer*

Department of Chemistry and Biochemistry, Millsaps College, Jackson, MS, USA 39210

Institut fuer Organische Chemie, Universitaet zu Koeln, Cologne, GER

The decarboxylative photocyclization is an elegant photochemical way to synthesize small to medium sized heterocycles. The photochemical starting material is a phthalimide chromophore and a ω -carboxylic acid. 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. An interesting Memory of Chirality effect via a 1,7-triplet biradical has been observed during the course of the photochemical cyclization to yield pyrrolo-[1,4]-benzodiazepines. 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 using cationic precursors as well as different chromophores. Cationic precursors have the regular phthalimide as the chromophore but contain an alkylated pyridinium moiety. We are also exploring the use of quinoline, isoquinoline and phenanthridine as new chromophores for the decarboxylative photocyclization. It has been shown that electron transfer fluorescence quenching does take place in quinoline betaines compounds. This indicates the potential for photochemical cyclization reactions which also would give access to new classes of compounds. The synthesis of the precursors as well as the photochemical transformations are discussed.

Acknowledgement: "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476."

P3.23

ANALYSIS OF THE DNA-CLEAVING EFFICIENCIES OF BIFUNCTIONAL DNA-CLEAVING REAGENTS

Courtney B. Mullins, Gurjit Kaur, Lauren M. Hoth, B. Woods Curry, Emily H. Stewart, Jonathan P. Giurintano, and Wolfgang H. Kramer*

Department of Chemistry and Biochemistry, Millsaps College, Jackson, MS, USA 39210

Current Photodynamic therapy uses sensitizers to generate singlet oxygen which causes cell death. The hypoxic environment of most cancer tissues makes oxygen a limiting reagent for this approach and several methods have recently been developed to circumvent this problem. The photoinduced homolytic N-O bond cleavage of N-Heteroaromatic compounds with an N-alkoxy substituent (onium salts) leads to the formation of a heteroaromatic radical cation and an alkoxy radical. Both of these species have been shown to induce DNA cleavage, each with a different mechanism. The synthesis of the nitrogen onium salts includes the oxidation of the heteroaromatic nitrogen and subsequent O-alkylation. To increase the DNA cleaving efficiency by enhancing ground-state association we synthetically attached a known DNA-binder, 1,8-naphthalimide. Several bifunctional compounds have been synthesized and their photochemistry has been investigated. Here we present the DNA cleaving efficiency of a series of bifunctional DNA-cleavers which has been analyzed by gel electrophoresis and CD spectroscopy. Interestingly, the bifunctional compounds appear to be double-strand cleavers. An interesting thermal effect is explained by molecular docking studies. Acknowledgement: "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476."

P3.24

PHOTOCHEMISTRY OF PYROMELITTIMIDES

Gurjit Kaur and Wolfgang H. Kramer

Department of Chemistry and Biochemistry, Millsaps College, Jackson, MS, USA

Pyromelittimides are similar to phthalimides, but their preparative photochemistry has not been explored so far. Their ω -carboxylic acid derivatives should react similarly to the phthalimides and thus should make a large group of heterocyclic compounds accessible via the decarboxylative photocyclization. A simple condensation reaction leads to the formation of the photochemical starting material which is irradiated as the carboxylate in water. The subsequent decarboxylation leads to the formation of a triplet ω -biradical. After intersystem crossing the radicals combine to form a heterocycle. The various regio- and stereoisomers are analyzed and their mechanism of formation is discussed. The use of pyromelittimides as chromophors in the decarboxylative photocyclization will allow the photochemical synthesis of multiple heterocyclic compounds and also will solidify mechanisms for phthalimide reactions.

Acknowledgement: "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476."

P3.25

1,8-NAPHTHALIMIDE FLUORESCENCE IN REVERSE MICELLES

Melinda K. Solomon, Anna K. Allred, Irene S. Corrao, James P. McVaugh, Emily H. Stewart, B. Woods Curry, and Wolfgang H. Kramer*

Department of Chemistry and Biochemistry, Millsaps College, Jackson, MS, USA 39210

The moderate fluorescence of 1,8-Naphthalimides can be used to localize conjugated compounds in various environments. Our DNA-cleaving nitrogen onium salts are connected to 1,8-naphthalimides which should allow us to track their movement in tissues due to the variable fluorescence. 1,8-naphthalimide fluorescence is strongly influenced by solvent polarity, an ideal requirement for a fluorescence sensor system. To obtain more information about the quenching process, intermolecular quenching experiments are employed. Quenching of N-methyl 1,8-naphthalimide with various pyridine derivatives with electron donating and withdrawing substituents shows that certain substitution positions are more efficiently quenching than others. The electron-rich N-oxides are efficient fluorescence quenchers. The substitution position plays an important role and several interesting aggregation effects were observed.

To mimic the membrane environment we analyzed the fluorescence of 1,8-naphthalimides in reverse micelles. AOT as an anionic surfactant in reverse micelles electrostatically attracted the cationic nitrogen onium moiety, but the fluorophore appears to localize in the hydrophobic part of the system. Further experiments in various reverse micelles need to be undertaken to verify these findings.

Acknowledgement: "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476."

P3.26

BIOACCUMULATION OF HEAVY METAL AND METALLOID IN CRASSOSTREA VIRGINICA IN THE GULF OF MEXICO

Turquoise C. Perlote¹, Fengxiang Han^{1,2} and Paul B. Tchounwou¹

¹Jackson State University, Department of Environmental Science, Jackson, Mississippi

²Jackson State University, Department of Chemistry and Biochemistry

Metal and metalloid including arsenic (As) and zinc (Zn) are naturally occurring in estuarine ecosystems. There remains an insufficient amount of research data on the bioaccumulation and detoxification of As and Zn on the eastern oyster, *Crassostrea virginica*, particularly in the context of anthropogenic loads from water pollution such as industrial offshore oil spills. Working in the Grand Bay NERR located in the northern Gulf of Mexico, we aim to assess the following regarding As and Zn exposure in oysters: 1) determine the concentrations of As and Zn in sediments and soft tissue; and 2) elucidate the mechanisms of sub cellular distribution following laboratory exposure of oysters to As and Zn. Preliminary X-Ray Fluorescence (XRF) analyses indicate a differential accumulation of Zn in tissues, gills and kidneys that may translate into respective differences of metal detoxification. Among aquatic invertebrates, metals bioaccumulate in various forms, including metal-rich granules (MRG), in complex with metallothioneins (MT), or metallothionein-like proteins (MTLP). While MTs are involved in metal detoxification, the reactivity of the different detoxified metals remains unknown. We are exploring the differential modes of As and Zn bioaccumulation in oysters

tissues, to further resolve the relationship between metal and metalloid bioaccumulation and metal toxicity.

P3.27

NOVEL NITROGEN-FLUORINE-CODOPED TiO_2 FOR DEGRADATION OF BPA UNDER VISIBLE LIGHT

Xiaojia He¹, Winfred Aker¹, Miguel Pelaez², Yunfeng Lin³, Dionysios Dionysiou², and Huey-min Hwang¹

¹ Department of Biology, Jackson State University, Jackson, Mississippi USA

² Environmental Engineering and Science Program, School of Energy, Environmental, Biological and Medical Engineering, University of Cincinnati, Cincinnati, Ohio USA

³ Department of Chemistry, Jackson State University, Jackson, Mississippi USA

Synthesized nitrogen-fluorine-codoped- TiO_2 (N-F- TiO_2) nanoparticles, in comparison to commercial Sigma TiO_2 , were used to investigate the photocatalytic degradation of bisphenol A (BPA) as a model pollutant in aqueous solutions responding to visible light. The physicochemical properties of TiO_2 were characterized using TEM, XRD, BET nitrogen adsorption method, FT-IR, DLS, PALS, and UV-vis spectroscopy. The photocatalytic activities were first evaluated by studying the degradation of pure BPA under simulated sunlight (SSL) and visible light (VL). The onset of absorption by N-F- TiO_2 , in relation to the pure, shifted to the visible light region. The visible-light-driven-degradation of BPA with N-F- TiO_2 was much higher (61.2%) after 4 h of irradiation than that with Sigma TiO_2 (19.2%), ($p < 0.01$). Moreover, the role of reactive oxygen species (ROS) is also discussed and illustrated. Superoxide ($\text{O}_2^{\cdot-}$) was recognized to be the major ROS in degrading BPA under visible light. The correlation between visible-light-driven photocatalytic degradation and the physicochemical properties of N-F- TiO_2 was discussed as well. In this study, enhanced catalytic activity under visible light was found to be strongly dependent on surface-area-to-volume-ratio, visible light absorption, and superoxide formation, induced by N- and F-doping. In addition, the potential field application of N-F- TiO_2 was investigated using river water. The results highly demonstrated the use of N-F- TiO_2 in environmental remediation as a green and sustainable alternative. This study was supported by a grant received from NSF-CREST program (National Science Foundation-Centers of Research Excellence in Science and Technology) with grant #HRD-0833178.

P3.28

MORPHOLOGY-PROPERTY RELATIONSHIP FOR BINARY ORGANIC FILMS

Alyssa Griffin, Frederick McFarland, and Song Guo

The University of Southern Mississippi, Hattiesburg, MS USA

This study focuses on the morphology of a fullerene/oligomer blend of Phenyl-C61-butyric acid methyl ester (PCBM) and dihexyl-sexithiophene (DH6T). The oligomer/fullerene mixture is studied as a model system for bulk heterojunction OPV devices. The binary films are prepared by spin casting a series of solutions of varying concentration ratios of PCBM versus DH6T onto HOPG. Atomic Force Microscopy (AFM) analysis of the films shows that different concentration ratios lead to varying morphologies on the film. Consistent sub-micron island-shaped features and ridge-shaped features are

observed for mixture samples. The differences in packing and phases are probably result from intermolecular interactions variations between the fullerene, the oligomer, the substrate, and the solvent. This possible model system for the DH6T/PCBM is also studied by Kelvin Probe Force Microscopy (KPFM), analyzing the films for relations of topographical height to surface potential. These features lead to possible models through consistent surface potential data in the samples despite changes in concentration of the PCBM in the film and heights of the ridge and island features in the film. The KPFM measurements show a direct correlation to the ridge-shaped features and the sub-micron island-shaped features and shown repeatable surface potentials in relation to these morphological features. Many models have been made throughout the height and potential analysis to fit the data. This concludes with a possibility that the ridges as being PCBM-rich and the islands as being mostly DH6T in a vertical orientation.

P3.29

DISCOVERING CHEMICAL CONSTITUENTS OF THE PASSION FLOWER *P. LUTEA*

Chuan Chen,* and Julie A. Pigza†

*Oak Grove High School, Hattiesburg, MS 39402

†University of Southern Mississippi, Hattiesburg, MS 39402

Natural products have a long-standing history of providing medicinally important compounds from aspirin all the way to taxol. Our group has an interest in identifying medicinally relevant compounds in plants that are native to the southern Mississippi region. *Passiflora incarnata*, a member of the passion flower family, has been used widely as a home remedy for treating anxiety due to its calming effect. While *P. incarnata* has been researched widely, *P. lutea* has remained largely unstudied. Since these flowers both belong to the same family, they may possess similarly interesting biological properties. We are interested in discovering *P. lutea*'s chemical constituents and determining the properties of these constituents to learn more about this plant family. *P. lutea* specimens were collected from its natural habitat at Lake Thoreau and were dried, extracted over several iterations, and the fractions were screened for antimicrobial activity. Extracts are currently being further purified to identify unique compounds by NMR and MS. This poster will describe the isolation, purification, and biological testing of *P. lutea*.

P3.30

ICP-MS ANALYSIS OF METAL CONTAMINATION IN SOFT TISSUES AND BONY PARTS OF FISH FROM THE MISSISSIPPI RIVER

Jeremy White¹, Zikri Arslan¹ and Jeremiah Billa²

Jackson State University, Jackson, MS USA¹ and Alcorn State University, Alcorn, MS USA²

The Mississippi River is the country's most important waterway where under normal conditions about \$7 billion worth of commodities is shipped on the river in December and January alone. The river is the home for many freshwater fish. Locals catch fish, especially catfish, and consume on daily basis. There is an active nuclear plant along the river at the city of Port Gibson, MS. Further, the river carries loads of sediment, contaminants and dissolved substances generated by natural and anthropogenic sources. Such activities are major contamination

to the fish and their habitats. In this study, catfish, buffalo fish and garfish samples collected from the river nearby the city of Port Gibson were analyzed for metals. Soft tissues, gills, muscle and eyes, and bony parts including scales and otoliths were analyzed after acid digestion by ICP-MS. Soft tissues showed high levels of Fe, Mn and Zn. Muscle and eye were higher in Fe and Zn while gills contained high levels of Mn and Ag. Heavy metals, such as As, Pb, Hg, Ag and U were found in the scales or skin of the fish. Lead showed the highest levels in the scales. The otoliths contained Ag, Cd, Pb, and to some extent radionuclides Th and U which could be indicative of presence of radiogenic isotopes in the water column. Otoliths also showed very high levels of Ag and Pb indicating a constant exposure of local fish to these metals throughout their life.

P3.31

DETERMINATION OF CADMIUM AND LEAD IN TABLE SALTS AND MULTI-MINERAL SUPPLEMENTS BY ICP-MS AFTER SOLID PHASE EXTRACTION WITH A NEWLY SYNTHESIZED CHELATING RESIN

Vedat Yilmaz², Zikri Arslan¹, and Fahmida Zereen¹

Jackson State University, Jackson, MS USA¹ and Erciyes University, Kayseri, Turkey²

In this study a new chelating resin is synthesized via immobilization of 4-(2-thiazolylazo)resorcinol (TAR) on Chromosorb 102. The resin was utilized in solid phase extraction of cadmium and lead in table salts and multivitamin/mineral supplements for determination by ICP-MS. The chelating resin was used as a mini-column packing material in a sequential injection system. The effects of various experimental parameters, such as load pH, eluent concentration, and sample and eluent flow rates were examined and optimized. The metal ions were quantitatively retained on the column at pH 5.5 and then eluted with 1.0 mL of 1% (v/v) HNO₃. The maximum sorption capacities of the resin were found to be 74.6 $\mu\text{mol g}^{-1}$ and 64.0 $\mu\text{mol g}^{-1}$ for Cd and Pb, respectively. The detection limits (3 σ) were 0.0015 ng g⁻¹ for Cd and 0.0066 ng g⁻¹ for Pb. The relative standard deviations (n= 5) were 4.3 and 6.2%, respectively. The method was validated by analysis of Near shore Seawater certified reference material (CASS-4) and successfully applied to the determination of Cd and Pb in table salts and multivitamin/mineral supplements.

P3.32

A NOVEL SALICYLALDEHYDE FUNCTIONALIZED CHELATING POLYMER FOR SOLID PHASE EXTRACTION OF URANIUM(VI) AND THORIUM (IV) IN SEAWATER SAMPLES FOR ICP-MS DETECTION

Vedat Yilmaz², Zikri Arslan¹, Ismet Basaran³, and Md Alamgir Hossain¹

Jackson State University, Jackson, MS USA¹ and Erciyes University Kayseri Turkey² and University Balikesir Turkey³

A new chelating resin was prepared by anchoring salicylaldehyde onto N-{2-[Bis(2-aminoethyl)amino]ethyl} aminomethyl} polystyrene resin through -C=N- group. The resin was characterized by FT-IR, and was used as packing for a minicolumn for on-line solid phase separation and extraction of uranium(VI) and thorium(IV) in seawater samples. The influences of various analytical parameters including load pH,

eluent concentration, sample and eluent flow rates were investigated on the retention of U(VI) and Th(IV). The metal ions were quantitatively retained on the column at pH 6.0, eluted with 2.0 mL of 5% (v/v) HNO₃ and then determined by ICP-MS. The developed method was validated by analysis of Nearshore Seawater certified reference material (CASS-4) and successfully applied to the determination of U(VI) and Th(IV) in coastal seawater and estuarine water samples.

P3.33

GENERATION OF VOLATILE CADMIUM SPECIES IN ACIDIC MEDIA WITH THE AID OF Al(III), Sc(III), Y(III) IN THE PRESENCE OF KCN FOR ICP-MS MEASUREMENT

Ahmet Celik and Zikri Arslan

Jackson State University, Jackson, MS USA

In this study, a new vapor generation method has been developed for measurement of low levels of Cd by inductively coupled plasma mass spectrometry. Cadmium is one of the most toxic elements known and thus the closely monitored in water, food and health care products. Vapor generation is a novel approach to improve the sample introduction efficiency to atomic and mass spectrometric determination of hydride and vapor forming elements, but the efficiency in the Cd vapor generation was problematic as opposed to many other hydride forming elements, such as arsenic and selenium, and mercury. In this study, Al(III), Sc(III) and Y(III) were examined for generation of volatile Cd species in the presence of potassium cyanide (KCN) followed by reaction with sodium borohydride (NaBH₄). The effect of solution acidity was examined from 0 to 12% HCl. Cadmium vapor formed between 3 to 7% HCl range. Al(III) appeared more effective than Sc(III) and Y(III). Experimental evidence indicated that metal ions act as catalyst in generation of Cd vapor from reaction of acidic samples solutions with NaBH₄. An improvement up to a factor of 10 was achieved. The interferences from transition metals ions were investigated on generation of Cd vapor. The method is validated by analysis of seawater samples and various complex samples ranging from purely organic to inorganic by ICP-MS.

P3.34

IMPACT OF LIGHT EXPOSURE AND CHELATING LIGANDS ON ION RELEASE PROPERTIES OF SILVER NANOPARTICLES

Terriana Covan¹, Zikri Arslan¹, Ahmet Celik¹, and Vedat Yilmaz²

Jackson State University, Jackson, MS USA¹ and Erciyes University Kayseri, Turkey²

AgNPs are found in many consumer products and used for technological applications (biosensors). There has been increasing research on toxicity or safety of AgNPs, in most reports they are found toxic at environmental relevant concentrations. However, the information regarding the toxicity is highly dependent on the stability of AgNPs. How is this affected from environmental conditions is relatively unknown. Here, the effects of UV light exposure and common chelating agents, including EDTA, citric acid, NTA and L-cysteine, were investigated on dissolution of uncoated (20-30 nm), PVP-coated (20-30 nm) and oleic acid-coated (30-50 nm) Ag NPs. Stock NPs were suspended in pure octanol. Treatments were prepared by

taking small samples of the stock NP and re-suspending in equal volume of water/octanol mixture (total 5 mL). Light exposure (365 nm UV light) was performed under different pH conditions for 12, 24 and 48h. Similarly, the AgNPs were treated with EDTA, NTA, citric acid and L-cysteine under different pH conditions. The results indicated that dissolution of AgNPs in water is minimal in the absence of light exposure and chelates. Exposure to UV-light drastically reduces surface stability leading to release of substantial Ag ions to water. Oleic acid coated NPs were found most stable against light treatment while uncoated NPs dissolved significantly. Chelating ligands were also found to increase dissolution of AgNPs. EDTA and NTA led to significant dissolution while citric had minimal effect.

P3.35

THE ADSORPTION OF CS, SR AND CO BY MESOPOROUS SILICA MODIFIED BY THIOLGLYCOLIC ACID AND NANOCARBON SYNTHESIZED BY VANILLIC ACID

Stephanie Njemanze, Kai Guo, and Fengxiang Han

Jackson State University, Jackson, MS USA

Industrial accidents such as nuclear disasters release radionuclides into water sources. Although those metals exist naturally, the high concentration of those deposited into the environment from industrial waste can pose serious health concerns. This project explores the use of functionalized mesoporous modified SBA-15 and a nanocarbon synthesized by vanillic acid in removing the radionuclides Cs, Sr and Co. The silica is functionalized by thioglycolic acid, which is applied as functional group $-SH$. The adsorption capacities of Cs, Sr and Co suggest that mesoporous silica functionalized by thioglycolic acid could remediate these radionuclides in polluted water. Results from FTIR spectroscopy confirm that the $-SH$ groups successfully bond to the surface of SBA-15. In addition, FTIR confirms the presence of carbonyl groups on the nanocarbon, which was synthesized using vanillic acid via SBA-15 as the template. In our previous methods we modified the SBA-15 after the synthesis of SBA-15. Currently, we are exploring the possibility of synthesizing and modifying SBA-15 in one step. We will also research additional carbon sources for the synthesis of the nanocarbon. We will discuss the potential applications of these functionalized mesoporous silica and nanocarbons in the remediation of radionuclides in polluted water.

P3.36

OPTICAL AND MASS SPECTROSCOPIC METHODS FOR HALIDE BINDING WITH TRIPODAL-BASED COPPER(II) COMPLEXES

Yazhou Zhang, Robert L. Bolhofner, Menase Daemo, Syed Haque, Hiroyasu Tachikawa and Md. Alamgir Hossain*

Jackson State University, Jackson, MS USA

The anion recognition with synthetic receptors is one of the frontier research areas in chemical science because of the significant roles of anions in many chemical, biological, and environmental systems. Thus, there is an acute need in designing sensitive and selective receptors for the detection and monitoring of anions and consequently, this area has rapidly expanded over past years. A diverse variety of noncovalent interactions such as hydrogen bonding, electrostatic, Lewis acid-base, and metal-ligand interactions are commonly employed for selectively binding anions at the molecular level. In particular, designed

receptors with integrated optically sensing groups have recently received considerable attention in anion binding chemistry, since they interact with certain anions strongly and selectively via reversible non-covalent interactions under variety of conditions. Indeed, the optical sensing is a quick and cost-effective method to detect an analyte without the involvement of expensive instruments which often require time-consuming sample preparation. Our continuing efforts in designing highly sensitive optical receptors led us to explore copper(II) complexes with simple and readily obtainable multidentate ligands for anion recognition. Herein, we describe simple tripodal-based copper(II) complexes integrated with different spacers and their anion binding studies by optical and mass spectroscopic methods. Acknowledgements: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.37

A NEW HEXAFUNCTIONAL UREA-BASED RECEPTOR FOR SULFATE BINDING

Bobby Portis, Maryam Emami Khansari and Md. Alamgir Hossain

Jackson State University, Jackson, MS USA

Sulfate plays an important role in both environment and biology. However, because of the high hydration energy of sulfate, it is often difficult to bind to a synthetic receptor. Therefore, it is highly desirable to develop a synthetic molecule that selectively binds a sulfate anion. During this course of this study, a new hexaurea-based urea has been synthesized and characterized. As investigated by NMR titrations, this new molecule shows high a selectivity for sulfate over other common anions. This presentation will describe the synthesis and anion binding studies of this receptor. Acknowledgements: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.38

SYNTHESIS AND BINDING EVALUATION OF BIS-3,5-TRIFLUOROMETHYLPHENYL TRIPODAL UREA ANION RECEPTORS

Corey R. Johnson and Md. Alamgir Hossain

Jackson State University, Jackson, MS USA

Molecular recognition of anions is a current area of research since they are important in environment, medicine and biology. Previous studies have shown that urea-based receptors serve as excellent hosts for selectively binding of certain anions under neutral conditions. The capability of such molecules to transport chloride anions across cell membranes identified them as potential leads for anticancer drug discovery. During this study, we have synthesized tris(3-amino(bis-3,5-trifluoromethylphenyl)propyl)urea (L1) and tris(3-amino(bis-3,5-trifluoromethylphenyl)propyl)thiourea (L2) through refluxing of tris(3-aminopropyl)amine and bis-3,5-trifluoromethylphenyl isocyanate and bis-3,5-trifluoromethylphenyl isothiocyanate in dichloromethane overnight. These molecules have been studied for anions by NMR titration method. This poster will focus on the details of the synthesis and characterization of the new receptors, and its binding affinity for anions. Acknowledgments:

The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.39

SULFATE BINDING AND EXTRACTION STUDIES BY A TRIPODAL TRIS THIOUREA RECEPTOR

Maryam Emami Khansari¹, Douglas R. Powell² and Md. Alamgir Hossain*¹

¹Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39217

²Department of Chemistry and Biochemistry, University of Oklahoma, Norman, OK 73019

The design and synthesis of artificial organic hosts for the selective binding and extraction of anions is a currently active topic in supramolecular chemistry. Tripodal receptors bearing urea/thiourea functional groups are neutral receptors which can bind anions strongly by hydrogen-bonding interactions. They also benefit from the directional conformation of two NH groups. During the course of this study, we have synthesized a novel tripodal 4-cyanophenyl thiourea-based receptor. The new receptor has been examined to evaluate its binding affinity for environmentally important anions by ¹H NMR titrations in solution, showing high selectivity for sulfate. It has also been shown structurally that the receptor forms a dimeric capsule stabilized by twelve H-bonds with sulfate anion. Further, it has been used to extract sulfate from aqueous phase. Acknowledgements: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.40

OXALATE DETECTION WITH A NEW MACROCYCLE-BASED DINUCLEAR COPPER (II) COMPLEX

Harold Owens, III, Md Mhahabubur Rhaman, Douglas R. Powell and Md. Alamgir Hossain*

Jackson State University, Jackson, MS USA

Some foods naturally contain oxalate which serves as a nutrient in the human body. But an excess consumption of oxalate may cause in a number of pathological conditions including renal failure, cardiomyopathy disorder, and the development of kidney stones. Human body also produces oxalate as a result of cellular metabolism. Since there is no enzyme that can metabolize oxalate, it is excreted by the kidney into urine. Therefore, the quantitative information of oxalate in urine is widely used in identifying several diseases including *hyperoxaluria*, *vulvodynia*, and kidney stones. It is known that the normal level of urinary oxalate excretion is 110 to 460 μmol in 24 hours. The oxalate content is clinically determined in urine using several techniques including high performance liquid chromatography, gas chromatography, ion chromatography and enzyme assays which are quite expensive instruments and often require time-consuming sample preparation. Indicator displacement assay (IDA) using metal complex could be a useful technique to detect anions selectively. During this study, a copper(II) complex of biphenyl-based hexaaza macrocycle was synthesized and studied by indicator displacement assay (IDA)

using Eosin Y to detect oxalate. The receptor binds oxalate anions in water-methanol at neutral pH. The receptor is also capable of detecting the oxalate anions displaying a visual color change. Acknowledgements: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.41

COLORIMETRIC AND FLUORESCENCE DETECTION CYANIDE BY INDICATOR DISPLACEMENT ASSAY USING A SIMPLE CU(II) COMPLEX OF 2,2'-DIAMINO-N-METHYLDIETHYLAMINE

Jamal Keyes, Md Mhahabubur Rhaman, and Md. Alamgir Hossain

Jackson State University, Jackson, MS USA

Cyanide is very toxic detrimental anion and can directly cause to death of human beings in very short time. It is known that 0.5-3.5 mg of cyanide per Kg of body weight is fatal for humans. Nevertheless, cyanide is widely used in many industries, such as metallurgy, electroplating, plastics manufacturing, gold and silver extraction, tanning, resins, and herbicides. Therefore, cyanide is industrially produced in very large quantities every year and after using, it is released into water as a toxic byproduct. Unfortunately cyanide does not decompose in the environment. This leads to possible contamination in drinking water. The World Health Organization (WHO) has set the maximum contaminant level (MCL) to 1.9 μM for cyanide in drinking water. Cyanide is also used in warfare making detection very important for Home Land Security. Since the cyanide anion is strongly nucleophilic and capable of forming stable complexes with many transition metals, it could be detected by a suitable metal complex-based chemosensor. In our study we have synthesized a simple Cu(II) complex of 2,2'-diamino-N-methyldiethylamine to detect cyanide in water by indicator displacement assay (IDA) using commercially available dye mordant black 17. This poster will highlight the results of cyanide detection in water. Acknowledgements: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

P3.42

THEORETICAL STUDIES OF UREA AND THIOUREABASED TRIPODAL RECEPTORS FOR ANION BINDING

Azmam Alamgir,¹ Jing Wang,² Jerzy Leszczynski² and Md. Alamgir Hossain²

¹Madison Central High School, Madison, MS 39110

²Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39217

Molecular recognition and selectivity of anions with synthetic receptors is an area of current research in supramolecular chemistry, because of the key roles played by anions in the chemistry and biology. In particular, receptors with urea/thiourea functional groups are useful to bind anions by directional hydrogen-bonding interactions under neutral conditions. During the course of this research, we have

performed computational theoretical studies on two dipodal urea/thiourea receptors for common oxoanions including sulfate, hydrogen sulfate, dihydrogen phosphate, nitrate, perchlorate, and acetate anions. Our studies suggest that each receptor is capable of encapsulating an anion in its molecular cavity by hydrogen-bonding interactions, exhibiting strong selectivity for dinegatively charged sulfate. **Acknowledgement:** The NSF-PREM (DMR-0611539) grant is acknowledged for supporting Jerzy Leszczynski, as well as for summer research support of Azmain Alamgir in 2014 for the computational work described in this paper.

Friday, February 27, 2015

Room TC 218 A

O3.21

8:30 VISUAL SENSING OF ANIONS BY SYNTHETIC RECEPTORS

Md. Alamgir Hossain, Corey R. Johnson, Md Mahabubur Rhaman, Maryam Emami Khansari and Syed A. Haque

Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39212

Anion coordination chemistry is an important area of research at the interface of chemistry and biology. Because of the fundamental roles played by anions in chemical, biological, medicinal, and environmental applications, the selective recognition and sensing of anions is an important aspect in supramolecular chemistry. In particular, the sensing of anions with molecular receptors via colorimetric and spectroscopic techniques is a rapid and cost-effective way for anion detection at very low concentration in solution. Therefore, a significant effort has been made towards the design of *chromogenic and fluorogenic receptors* that can selectively recognize anions and act as sensors. During course of our study, we synthesized different types of receptors which were investigated for their abilities to detect environmentally important anions by simple color change. This presentation will highlight anion sensing and selectivity with synthetic receptors. **Acknowledgements:** The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

O3.22

8:45 COLORIMETRIC AND FLUORESCENT SENSING OF CITRATE BY A MACROCYCLE-BASED FOLDED DINUCLEAR COPPER(II) COMPLEX IN WATER

Md Mahabubur Rhaman,¹ Azmain Alamgir,¹ Chinyere D. Jones,¹ Douglas R. Powell² and Md. Alamgir Hossain*¹

¹*Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39217*

²*Department of Chemistry and Biochemistry, University of Oklahoma, Norman, OK 73019*

Selective anion sensing is an important area of frontier research due to the pivotal role played by anions in diverse areas of chemical, biological, medicinal and environmental sciences. For example, citrate in urine is considered to inhibit the crystallization of calcium salt and a low amount of citrate in

urine is associated with the increased risk of kidney stones. During the course of this study, a water soluble macrocycle-based dinuclear copper complex **1** has been synthesized and characterized by X-ray crystallography, exhibiting the macrocycle folded with a boat-shaped empty cavity suitable to detect anion. The anion sensing properties of **1** has been studied by fluorescence and colorimetric titrations in an indicator displacement approach using Eosin Y (EY) in water at pH 7.0. The addition of citrate to **1**.EY adduct led to a large fluorescence enhancement, displaying a sharp colour change under both visible and UV lights, while this effect is smaller in case of other anions under identical conditions. The results reveal an unprecedented high binding constant ($K = 6.5 \times 10^5 \text{ M}^{-1}$) for citrate over a wide range of inorganic and carboxylate anions, exhibiting the binding order as citrate > oxalate > glutamate > phosphate > adipate > tartrate > acetate > benzoate. This oral presentation will focus on synthesis, complexation and detection mechanism of citrate. **Acknowledgements:** The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

O3.23

9:00 THIOPHENE BASED EXTENDED ACYCLIC AND MACROCYCLIC RECEPTORS FOR ANION BINDING

Syed Ataul Haque¹, Douglas R. Powell² and Md. Alamgir Hossain*¹

¹*Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39217*

²*Department of Chemistry and Biochemistry, University of Oklahoma, Norman, OK 73019*

Anions play important roles in many physiological and environmental systems. Therefore, sensing and monitoring of these anions are necessary in order to regulate them. Although a number of receptors are reported in literature, there still remain some drawbacks including their lack of water-solubility, complicated synthesis procedures and cost-effectiveness. During this study, we synthesized a series of thiophene-based water soluble polyamine receptors with different dimensions which upon investigation was found to efficiently capture different anions from the water system. This presentation describes the details of solution state and solid state anion binding studies of these receptors. **Acknowledgements:** The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. The analytical core facility at Jackson State University is supported by the National Institutes of Health (G12MD007581).

O3.24

9:15 THE PHOTOCHEMISTRY OF N-SUBSTITUTED HETEROAROMATIC SALTS

Wolfgang H. Kramer, Courtney B. Mullins, Lauren M. Hoth, Melinda K. Solomon, Priya P. Patel, GeNita N. Finley, Muzamil A. Khawaja, Irene S. Corrao, Emily H. Stewart, B. Woods Curry

Department of Chemistry and Biochemistry, Millsaps College, Jackson, MS, USA 39210

Photoactivatable organic compounds are becoming

increasingly popular as Photodynamic Cancer Therapy (PDT) agents. PDT is a non-invasive cancer treatment. Current FDA-approved Photodynamic Therapy agents are singlet-oxygen sensitizers and the photoinduced toxicity consequently depends on oxygen availability. Since oxygen levels are usually low in tumors, our approach for a PDT reagent uses N-substituted heteroaromatic salts which do not require an external oxygen source. N-substituted heteroaromatic salts contain a fragmentable nitrogen-oxygen bond that yield a heteroaromatic radical cation and an alkoxy radical upon photoinduced homolytic cleavage. Both transient species are known DNA cleavers and have been individually used for DNA cleaving applications. Despite the efficient production of transient species, DNA cleaving efficiency with the simple salts based on quinoline, isoquinoline, phenanthridine is extremely low. This is likely caused by weak ground-state association which causes the transient species to decay without interacting with DNA. An aromatic imide attached with a flexible linker increased ground-state association with DNA. DNA binding was determined by UV/VIS and fluorescence titration with the isoelectronic, photostable N-ethyl derivative. CD spectroscopy was used to observe changes in the three-dimensional structure of DNA. To analyze the DNA-cleaving mechanism, gel electrophoresis experiments have been used. All experiments indicate that our bifunctional compounds are double strand-cleavers, even though the exact mechanism is still unclear. Acknowledgement: "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476."

9:30 Student Awards Ceremony for Best Oral and Poster Presentations

ECOLOGY AND EVOLUTIONARY BIOLOGY

Chair: Paul Mack

Mississippi University for Women

Vice-Chair: Brent Hendrixson

Millsaps College

Thursday, February 26, 2015

MORNING

Room Union C

O4.01

9:00 HABITAT USE AND SEASONAL FOOD HABITS OF COYOTE (*CANIS LATRANS*) IN DAHOMEY NATIONAL WILDLIFE REFUGE, MISSISSIPPI

Shawnee Gundry, Megan Clark, and A.H.M. Ali Reza

Delta State University, Cleveland, MS, USA

As a nuisance species declared by Mississippi Department of Wildlife, Fisheries and Parks, coyotes (*Canis latrans*) may be hunted, trapped, taken, killed, chased, or pursued on private lands. Even though coyotes are subjected to intensive hunting pressure, their distribution ranges have expanded rapidly within the past 50 years throughout the southeast part of the USA. However, not many scientific studies are available on coyote habitat use and seasonal food habits in Mississippi. To investigate the habitat use and food habits, we collected coyote scats from different habitat types in Dahomey National Wildlife Refuge in northern Mississippi since April 2014. A total of 42 scats have been collected until November 2014. Scats were evaluated in the field and later analyzed in the laboratory to identify the food contents. Having opportunistic feeding habits, coyotes utilize whatever food items available to them, which vary with seasons and weather. Our analysis is still in progress however, we have noticed the abundance of plant materials in the scats, especially *Diospyros virginiana* (persimmon). Unlike the northern USA where coyotes have been reported to select grassland habitats, coyotes in Dahomey National Wildlife Refuge prefer to travel on gravel road and open areas close to water bodies.

O4.02

9:15 ENERGETICS OF DRY FOREST BIRDS ON THE YUCATAN PENINSULA, MEXICO

Zach Cuda¹, Thomas Martin², and Markus Tellkamp³

¹Millsaps College, Jackson, MS, USA, ²University of Mississippi, Oxford, MS, USA, ³Yuchay University, Urcuqui, Ecuador

The energetics of birds in tropical regions remains poorly studied. One study suggested that tropical species from the humid lowlands have a lower basal metabolic rate (BMR) than temperate species. However, birds from other tropical ecosystems remain understudied; tropical dry forest birds are virtually unstudied. Here we report on data obtained on 23 species measured during the rainy season in three different years (2010, 2012, 2014). We found that the BMR of many species were higher than expected as predicted from an all-bird regression curve between body mass and BMR. Although year to

year variability was low in some birds (e.g., Clay-colored Thrush, *Turdus grayi*), for most species with multi-year samples, BMRs tended to be lower in 2014 compared to the previous years. We observed the most notable drop in the Blue-crowned Motmot (*Momotus momota*) in which 2014 values were 57% of those obtained in 2010 and 2012. Although small sample size precludes statistical inference, these changes may be due to the timing of the molting cycle: whereas breeding condition did not appear to affect BMR, non-molting individuals tend to have lower rates than molting ones. More data are needed to elucidate the patterns of BMR in highly seasonal tropical dry forest.

O4.03

9:30 TESTING THE “CAVES AS MICROREFUGIA” HYPOTHESIS: PHYLOGEOGRAPHY OF THE FUNNEL-WEB SPIDER EUAGRUS CHISOSEUS IN CENTRAL TEXAS

Harrison Olinger, Dustin Garig, and Brent Hendrixson

Millsaps College, Jackson, MS, USA

A recent study of scorpions in Central Texas suggests that dispersal-limited organisms may have used caves as microrefugia during unfavorable climates in the Pleistocene. To further test this hypothesis, we investigated the phylogeography of *Euagrus chisozeus*, a troglomorphic funnel-web spider that overlaps in distribution and habitat with those scorpions. We sequenced approximately 1000 base pairs of mitochondrial DNA from 61 individuals spanning 23 different localities across the Edwards Plateau. Based on our results, multiple lines of evidence (e.g., descriptive measures of genetic diversity, population genetics statistics, phylogeographical reconstructions, species distribution models) support predictions made by the “caves as microrefugia” hypothesis.

O4.04

9:45 PREVALANCE OF AVIAN MALARIA IN MOSQUITOES AT ROSS BARNETT RESERVOIR

David Larson, Diana Outlaw, and Jerome Goddard

Mississippi State University, Starkville, MS, USA

The vectors of avian malaria (Haemosporidia) are an extremely understudied component of wildlife disease ecology, infecting every lineage of terrestrial vertebrates. Previous studies suggest that the diversity of malaria may match or even exceed that of their hosts. I am investigating malaria parasite diversity in Mississippi. These parasites have an extremely complex, multistage life cycle. Blood-feeding flies serve as the vector and primary host of malaria, and vertebrates designated secondary hosts. Malaria is ingested by a female mosquito taking a blood-meal. The parasite develops and is then transferred to a bird host when the saliva is injected by the mosquito taking a blood-meal. Most studies of avian malaria have focused on the secondary bird hosts. This imbalance leaves a significant gap in our knowledge and understanding of the other half of haemosporidian life cycles and ecology. This study focuses on mosquito (Culicidae) vectors of avian malaria in the state of Mississippi. Mississippi claims 61 known species of mosquitoes, none of which have been locally screened using molecular methods for malaria parasites. Here I present a portion of my master’s research where I use molecular techniques to determine potential mosquito vectors of avian malaria. Mosquitoes were collected using CO₂ baited CDC traps at the Pearl River Wildlife Management Area in Madison County, Mississippi as part of a broad statewide survey. Seven

common species of mosquitoes will be screened via PCR for the presence of malaria parasites: *Aedes vexans*, *Anopheles crucians*, *Anopheles quadrimaculatus*, *Coquilletidia perturbans*, *Culex erraticus*, and *Uranotaenia sapphirina*.

10:00 BREAK

O4.05

10:15 AN ASSESSMENT OF MALARIA PARASITEMIA AND PREVALENCE IN A POPULATION OF TUFTED TITMICE (BAEOLOPHUS BICOLOR)

Kayla Fast, and Diana Outlaw

Mississippi State University, Starkville, MS, USA

Haemosporidians, including the avian malaria parasites, are an incredibly diverse group of blood parasites that infect terrestrial vertebrates on every continent except for Antarctica. One remarkable characteristic of avian malaria parasites is their complicated life cycle which requires very specific dipteran insects to vector different parasite genera. This intricacy generates numerous host-parasite interactions that produce variability in parasite prevalence (parasite presence) and parasitemia (infection intensity). These host-parasite interactions include parasite lineage virulence, host health, and other characteristics of the bird host. The extent of the parasite’s detriment to the avian host is also irregular and can range from virtually inconsequential to lethal. Among the suitable hosts for this parasite is the Tufted Titmouse (*Baeolophus bicolor*), which belongs to the group of birds with the greatest assortment and prevalence of malaria parasites. Parasites are detected and quantified using microscopy and amplification of the cytochrome b gene. Several different lineages of malaria parasites have been found in Tufted Titmice, which may include both specialists and generalists. Prevalence in this species is relatively high and circulating parasite levels are low. Infection in this bird as observed in a natural population, provides details on host susceptibility that is applicable to the understanding of malaria parasites in other avian hosts collectively.

O4.06

10:30 DISTRIBUTION AND PREVALENCE OF HAEMOSPORIDIAN PARASITES IN THE NORTHERN CARDINAL (CARDINALIS CARDINALIS)

V. Woody Walstrom, and Diana C. Outlaw

Mississippi State University, Starkville, MS, USA

Avian malaria parasites provide a model system for understanding ecological and evolutionary host-parasite interactions. The diversity and distribution of these parasites is largely unknown, and we provide the first range-wide assessment of avian malaria in a continentally distributed host, the Northern Cardinal (*Cardinalis cardinalis*). We specifically address the following three questions: 1) what is the prevalence of avian malaria parasites in the Northern Cardinal and does it vary between host subspecies populations? 2) What is the lineage diversity and biogeographic distribution of these parasites? 3) Is there evidence of parasite lineage structuring with respect to host subspecies? Based on molecular techniques, we show geographical differences in prevalence and lineage diversity between host subspecies and identify several novel lineages. We use phylogenetic reconstruction to show where these lineages fit into the expanding evolutionary tree of known avian malaria lineages. All except one subspecies of Northern Cardinal are

highly parasitized by a wide diversity of *Plasmodium* and *Parahaemoproteus*. Compared to published studies that used microscopy to determine prevalence in this host, we find a much higher number of infected individuals (66.3% versus 45% or less). Consistent with previous studies, *Parahaemoproteus* from the Northern Cardinal was found to be highly host specific and geographically structured, whereas *Plasmodium* was less host specific and spread across a large geographic range.

10:45 BUSINESS MEETING

Poster Session (11:00 AM)

P4.01

PLETHODON WEBSTERI IN MISSISSIPPI

Madeline Balius¹, Duc Anh Doan¹, Margaret Cosnahan¹, Sheena Feist², Tom Mann², Debora Mann¹, Cory Toyota¹

¹Millsaps College, Jackson, MS, USA and ²Mississippi Museum of Natural Science, Jackson, MS, USA

Samples from *Plethodon websteri*, lungless, woodland salamanders, were collected from three disjunct locations within a 28 km radius near Jackson, MS, and a fourth disjunct population was sampled from Legion State Park in Louisville, MS, 136-160 km east northeast of the 3 Jackson vicinity populations. The southernmost of the Jackson-area populations was assigned to *P. websteri* by Highton (1986), based on electrophoretic similarity to those included within the original description of *P. websteri* (Highton 1979), and which included the population at Legion State Park, which was the only MS population known at the time. The other two Jackson area populations were assumed to be *P. websteri* based upon their proximity to the tested, southernmost population. Color patterns of the Legion State Park animals are highly variable, and those in the 3 Jackson-vicinity populations are relatively homogeneous. Also, behavioral differences between the Louisville-area population and the Jackson-area populations are manifest during photography sessions. It is hypothesized that despite electrophoretic similarity the Louisville and Jackson-area populations have differentiated to some degree, and that the Jackson-area populations are more similar to one another than they are to the Louisville population. Samples of *P. ventralis* were also collected as an out group. Phylogenetic analysis was undertaken by comparing three mitochondrial genes, CYTB, Cox1, and ND2. Results were compared with literature analysis (Kozak 2006), and support the hypothesis that the more southwesterly populations are more similar to each other than they are to the Louisville-area population, but all populations still cluster as *P. websteri*.

P4.02

DIVERSITY OF BIRD SPECIES AT BEAR PEN PARK, CLEVELAND, MISSISSIPPI

Rhandi Ball, Walthena Bruce, Dylan Eads, Darryl Hall, Jeffrey Hughes, Kenneth Patterson, and Nina Baghai-Riding

Delta State University, Cleveland, MS, USA

The decline of bird populations has been a major concern to Conservation Biologists in recent years due to their specific niche. Birds are regarded as sentinel species and fulfill many ecological functions such as plant reproduction and seed dispersal, maintaining sustainable population levels of their prey, and providing food for scavenger species. The Mississippi Delta

offers a wide range of habitats that appeal to a variety of species, and is part of the Mississippi Flyway. From 2008 to Fall 2014, a group of Conservation Biology students at Delta State University and 4-H members conducted mid-afternoon surveys of birds at Bear Pen Park in Cleveland, Mississippi. This park, which is around 44 acres, is regarded as a stopover site for migratory landbirds and is a permanent residence to other bird species. Areas surveyed within the park include the pond, the trackway, and the baseball fields. The birds were observed nesting, bathing, perching in trees or on shrubs and fences, and feeding on the open ground or in the pond. Over the span of seven years, 39 species have been observed. Some of the species worth noting were *Turdus migratorius* (American Robin), *Cyanocitta cristata* (Blue Jay), *Branta canadensis* (Canada Goose), and *Picoides pubescens* (Downy Woodpecker). More than 100 birds were counted on each survey. Bird groups observed included perching, upland/ground, ducks/geese, gull-like, wading, and raptors.

P4.03

ADAPTIVE MOVEMENTS AND THERMOREGULATION IN RAFINESQUE'S BIG-EARED BATS

Cody Jordan

University of Mississippi, Oxford, MS, USA

Bats, like many other animals, frequently live in groups. We expect them to incur both costs and benefits to group-living. While many benefits have been proposed, I hypothesize that the evolution of group-living has been driven in Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) primarily for thermoregulation. Thermoregulation should be of paramount importance for these bats because 1) flying is energetically expensive; 2) they have small body size, high metabolic rates, and high surface area-to-volume ratio; and 3) because food supply is greatly limited in winter. While a number of other benefits (decreased predation risk, increased foraging efficiency, allogrooming, etc.) likely exist, I propose that thermoregulation is the most important benefit for this species. In environments where temperatures can drop below freezing and roosts are not well-insulated from outside temperatures (unlike caves), these animals require behavioral reduction of conductance, which is made possible through close proximity to other individuals. *C. rafinesquii* is a forest-dwelling species of bat that typically roosts in trees or abandoned manmade structures. They are relatively uncommon and appear quite selective in their roost choices. They are frequently observed forming several clusters within a large roost. Preliminary observations indicate that the size and positioning of these clusters is dynamic. I hypothesize that within-roost clustering and movements, in addition to foraging patterns (distance, duration, and foraging location), are functions of thermal conditions. Using marking, biometric data, radio telemetry, roost temperature data, and recording bat activity on infrared video cameras, I have collected data in order to test these hypotheses.

P4.04

INVASIVE SPECIES VERSUS NATIVE SPECIES PRESENT ON DELTA STATE UNIVERSITY CAMPUS IN CLEVELAND, MISSISSIPPI

Amanda Bishop, Joseph Cummings, Megan Clark, Michael Manly, Rebecca Simpson, Rebekah Napier-Jameson, Steve Moretan and Nina Baghai-Riding

Delta State University, Cleveland, MS USA

Invasive/non-indigenous species are a worldwide threat to ecosystems with regards to altering habitats. The Delta State Conservation Biology Class of Fall 2014 conducted a study of woody plants on the campus of Delta State University to determine if invasive species are a major concern. The study occurred over two lab sessions. Fifty one individuals from 15 species were randomly surveyed on the main campus and golf course. Measurements and observations recorded included canopy spread, diameter at breast height (dbh), height, GPS location, general condition, and category (native/invasive/exotic). On the main campus, 12% of the trees were exotic, 68% were native to the Mississippi Delta, and 20% were native to other areas of Mississippi. On the golf course, 77% were native and 23% were native to other areas of Mississippi. *Pyrus calleryana* Decne (Bradford pear), an exotic species, occurs on the main campus. *Betula nigra* L. (river birch), *Quercus alba* L. (white oak), *Quercus coccinea* L. (scarlet oak), and *Quercus michauxii* Nutt. (swamp chestnut oak) also were noted only on the main campus. A clump of *Pinus taeda* L. (loblolly pine) occurred on the golf course; these trees were probably planted as they are not native to the Mississippi Delta. Native species common to both areas included: *Acer rubrum*, L. (red maple), *Quercus nigra*, L. (water oak), *Quercus phellos* L. (willow oak), and *Taxodium distichum* L. (bald cypress). Similar percentages of native and exotic species were found in surveys conducted in 2011 and 2012.

P4.05

AQUATIC INVERTEBRATE STUDY OF CHRISTMAS LAKE BRANCH, DAHOMEY NATIONAL WILDLIFE REFUGE, BOYLE, MISSISSIPPI

Amanda Kandies, Sara Beth Little, Tyler Stevens, Mary Huff, Nina Baghai-Riding

Delta State University, Cleveland, MS, USA

Freshwater aquatic invertebrates are vital links in the aquatic food chain; conveying nutrients from plants and algae to larger organisms such as fish, frogs, salamanders, reptiles, birds, and mammals. Many fish depend on aquatic invertebrates for food. Some aquatic invertebrates may live entirely beneath the water or they may live near the surface or on the plants surrounding it. Some breathe air, others have gills. To move, they may walk, swim, float, fly, or glide on their stomachs, or some may not move at all. They are important water quality indicators of streams, ponds, and lakes. Stoneflies, mayflies, caddisflies, riffle beetles, and water pennies, for example, are associated with good water quality, whereas dragonflies can exist in fair water quality. Conservation Biology classes at Delta State University, from 2006-2014, have monitored aquatic freshwater invertebrates using passive leaf traps and Hester Dendies at Christmas Lake Branch at Dahomey National Wildlife Refuge. Results from the 2014 study yielded 124 individuals and seven different species. The majority of the species were mollusks and snails indicating fair water quality. The data were collected and the results were compared to the results of studies done since 2007. The amount of species collected in 2014 was significantly smaller compared to past years, 10 in 2007, eight in 2008, 11 in 2009, and 12 in 2011. The lower diversity may be due to a combination of factors: eutrophication, reduced water volume, and dry summers.

P4.06

RESULTING TOXICITY STUDIES OF THE NEW ORLEANS NINTH WARD THAT WAS SUBMERGED IN HURRICANE KATRINA WATERS

Mack Felton

Mississippi Valley State University, Itta Bena, MS, USA

This ten year study examines the transition of New Orleans ninth ward after Hurricane Katrina. Soil and water samples were taken from areas submerged with hurricane waters and analyzed for toxicity. Five year samples were taken and analyzed. Ten year samples were taken and compared with the five year samples. Samples were analyzed using a Delta Tox System which is used to screen and monitor environmental samples using *Vibrio fischeri* NRRL B-11177 (*V. fischeri*) to determine toxicity. Bacteria bioluminescence is tied directly to cell respiration, any inhibition of cellular activity results in decreased rates of respiration and a corresponding decrease rates of luminescence. Percent light gained indicate less toxicity and percent light loss indicate more toxicity. Forty five percent (45%) B-Tox procedure was used with all samples. This procedure was used throughout this ten year study. The toxicity of the water samples taken in 2005 ranged from -53% to +7% bioluminescence. After ten years the toxicity of the water samples taken ranged from -14 to -10% bioluminescence. The toxicity of the soil samples taken in 2005 ranged from -33% bioluminescence to +70% bioluminescence. After ten years, the toxicity of the soil ranged from +6% to -14% bioluminescence. Seventy five percent of all sites sampled became less toxic after ten years. Twenty five percent of samples taken became more toxic between the fifth and tenth year. Data indicate that both the soil and water are decreasing in toxicity. Samples should be taken in five years to ascertain trends.

P4.07

TOXICITY ANALYSES OF MISSISSIPPI GULF COAST WATER AND SOIL SAMPLES TAKEN FROM HURRICANE KATRINA ACTIVITIES

Taynara Matos, Renata Cardoso, Mack Felton, and Louis Hall

Mississippi Valley State University, Itta Bena, MS, USA

This ten year study examines the transition of New Orleans ninth ward after Hurricane Katrina. Soil and water samples were taken from areas submerged with hurricane waters and analyzed for toxicity. Five year samples were taken and analyzed. Ten year samples were taken and compared with the five year samples. Samples were analyzed using a Delta Tox System which is used to screen and monitor environmental samples using *Vibrio fischeri* NRRL B-11177 (*V. fischeri*) to determine toxicity. Bacteria bioluminescence is tied directly to cell respiration, any inhibition of cellular activity results in decreased rates of respiration and a corresponding decrease in rates of luminescence. Percent light gained indicate less toxicity and percent light loss indicate more toxicity. Forty five percent (45%) B-Tox procedure was used with all samples. This procedure was used throughout this ten year study. The toxicity of the water samples taken in 2005 ranged from -53% to +7% bioluminescence. After ten years the toxicity of the water samples taken ranged from -14 to -10% bioluminescence. The toxicity of the soil samples taken in 2005 ranged from -33% bioluminescence to +70% bioluminescence. After ten years, the toxicity of the soil ranged from +6% to -14% bioluminescence.



Seventy five percent of all sites sampled became less toxic after ten years. Twenty five percent of samples taken became more toxic between the fifth and tenth year. Data indicate that both the soil and water are decreasing in toxicity. Samples should be taken in five years to ascertain trends.

Friday, February 27, 2015

AFTERNOON

Room TC 228

PANEL DISCUSSION (Joint Presentation with History and Philosophy of Science)

2:30 PRACTICAL AND THEORETICAL CONSIDERATIONS FOR METHODS IN BIOLOGY

This panel discussion addresses some methods in science, especially pertaining to biological evolution and phylogenetic systematics. The three presentations preceding this panel discuss some nineteenth century roots of scientific method, the influence of those roots on present practice, and early to mid-twentieth century development of phylogenetic systematics as espoused by Willi Hennig. These presentations will serve as a basis for the panel's discussion of current practices in evolutionary and phylogenetic systematics research with respect to interpretation of evidence, nature and collection method for data available, use of inference in historical reconstruction, and use of induction and deduction in creating and evaluating hypotheses. Panel members include Dr. Mac Alford (biologist), Dr. Brian Kreiser (biologist), and Dr. Paula Smithka (philosopher of biology).

GEOLOGY AND GEOGRAPHY

Chair: Omar R. Harvey

University of Southern Mississippi

Vice-Chair: David Dockery III

Mississippi Department of Environmental Quality

Thursday, February 26, 2015

MORNING

Room Union D

05.01

9:45 EEMIAN/SANGAMONIAN INTERGLACIAL HIGHSTAND AND THE MISSISSIPPI COAST 130,000-115,000 YEARS AGO.

David T. Dockery, III

Mississippi Department of Environmental Quality, Office of Geology, Jackson, MS USA

A period of high sea level during the Eemian/Sangamonian Interglacial Period 130,000-115,000 years ago sculpted the present Mississippi coastline. On opposite sides of the coastline are the Clear Point Delta of the Pearl River, a present-day prominence in the west, and Point Belle Fontaine

Delta of the Pascagoula River in the east. Both deltas preserve the levee deposits of the ancient river courses that created them, and both deltas have cheniers of reworked delta and levee deposits due to sea-level fluctuations. The most prominent coastal features are beach ridges, as shown in old (1942) aerial photographs and in recent lidar surveys. The Gulfport Beach Ridge trends southwest to northeast and is truncated by the Biloxi Beach Ridge, which trends west to east. North of the beach ridges, the "Wade" Coastal Terrace contains a westward projecting spur called Big Ridge, which has wave-cut straight and steep seaward boundary. The highest beach-related feature is Sandhill Crane Island resting on top of the Wade Terrace. To make this feature an island today would require a sea-level rise of 47 feet.

05.02

10:00 3D BUILDING EXTRACTION FROM LIDAR DATA FOR ACCURATE DAMAGE ESTIMATION IN CASE OF A NATURAL DISASTER

Abdulaleem Rida Sherif

Mississippi State University, Starkville, MS USA

Accurate estimation of property damage is very important in the aftermath of a natural disaster such as hurricane or tornadoes. To measure the property damage timely and accurately, we need a highly accurate data sources. LiDAR data have been used in many studies to determine heights of structures. Other source of data that is available for this kind of analysis is the oblique imagery, which is not often used to measure heights of structures. The objectives of my research is to use LiDAR data to accurately extract 3-dimensional structure of buildings in Mississippi State University campus and compare it with data extracted from oblique imagery. The preliminary results from the data extracted for 30 buildings on campus indicate that LiDAR data is capable of extracting more detailed structure of the buildings. While oblique image fails to provide accurate dimensions of buildings when the building have complex roof structures. The results of this research can be applied to many other applications including base mapping, floodplain mapping, natural resources management, transportation and utility corridor mapping and urban modeling.

05.03

10:15 FIRE AND FUELS IN THE ZUNI MOUNTAINS

Luke Wylie and Bandana Kar

University of Southern Mississippi Hattiesburg, MS USA

Fire is a core component of many ecosystems on Earth, especially in the western USA. Unfortunately, many of these ecosystems have been radically altered by human involvement. The Zuni Mountains represent one such ecosystem. Studies conducted in this area have demonstrated that fire was prevalent in the area until the late 1920s and has since been drastically reduced in both frequency and spatial extent. These changes are most likely due to improvements in fire suppression techniques such as smoke jumping and other disturbances like timber harvesting and livestock grazing that reduce biomass and thus fuel sources in the area (Rother, 2010). However, an unintended consequence of this large scale ecological change in these historically fire-prone ecosystems is that the area experiences a buildup of fuel sources which often results in catastrophic fires. In order to mitigate the effects of these catastrophic fires, rangers

in the Zuni Mountains have begun selectively removing trees in this area to reduce basal area and ignition sources. This study focuses on implementing a predictive fire spread model to spatially and temporally model fire in the region and to depict how vegetation types that are most prone to fire have changed in the past years. Such knowledge will help propose effective management techniques to reduce wildfire hazard in this area. Preliminary results reveal that there are three distinct vegetation types in the Zunis that are highly prone to large fires, moderately prone to large fires, and not prone to large fires.

10:30 BREAK

05.04

11:00 CHANGES IN WATER QUALITY ACROSS LAND-USE CLASSES ALONG GORDON'S AND GREEN'S CREEKS IN THE HATTIESBURG-PETAL AREA

Steven Lowery, Nicholas Rinderer, Bandana Kar, John Ables, Dmitri Mavrodi and Omar Harvey

University of Southern Mississippi Hattiesburg, MS USA

As population pressures increase there are concerns as to how environmental quality will be impacted. One of the most notable concerns is the potential negative impact of urbanization and suburbanization on local surface water quality. A wide variety of pollutants can enter local creeks and streams from commercial and domestic developments. Such pollutants include; 1) heavy metals and petroleum derivatives from parking lots, 2) pesticides and nutrients from lawns and, 3) viruses, bacteria, and nutrients from pet waste and failing septic systems. In this presentation, data on temporal changes in water quality at 12 sampling locations along two creeks in the Hattiesburg Metropolitan Statistical Area will be presented. The two creeks (Gordons and Greens) are the two main surface water bodies draining urban, domestic, and rural areas in Hattiesburg and Petal, respectively. Both are unregulated tributaries of the larger, Leaf River which eventually discharges into the Gulf of Mexico via the Pascagoula River. To our knowledge, water quality and how it changes with land use along both streams is unknown. We hypothesized that concentrations of nitrate, phosphate, and total coliform within Gordon's and Green's Creeks will be proportional to the ratio of commercial to domestic land use upstream from a given sampling location. Bacterial data thus far point to total coliform being significantly higher in domestic areas (6.13×10^6 cfu/100 ml) compared to urban (4.76×10^6 cfu/100ml) or rural (7.0×10^4 cfu/100ml) areas.

05.05

11:15 THE IMPACTS OF SEASONAL FLOODING ON THE MISSISSIPPI DELTA AND FUTURE ADAPTATION MANAGEMENT PLANNING

Ricky Dixon

Mississippi Valley State University Itta Bena, MS USA

Flooding has been a major part of the Mississippi Delta's history. One of the worst floods occurred in 1927 when the levee in Greenville, Mississippi, the heart of the Delta and my birthplace, broke and flooded the town much like what happened in New Orleans during hurricane Katrina. Typically from December to July the Delta has many floods. My main

goals for this project were to to better understand the weather and climate in the Mississippi Delta and its impacts on flooding, as well as to give insights on adaptation measures for future flooding. In order to reach these goals there are some I first had to learn more about climate and get a better understanding of flooding. In order to do this I analyzed reports of past projects on flooding that were sponsored by the Sectoral Applications Research Program. Once I analyzed the reports I then broke them down and put them in a database that now serves as an archive for the SARP team. Next I will began interviewing decision-making professionals and stakeholders from the Mississippi Delta as well as NOAA staff and researchers in the area for information on flooding and how the public has dealt with it in the past. This included speaking to hydrologists and climatologist as well as the USA Army Corps of Engineers. I also interviewed my grandfather, Roosevelt Parker, as a means of getting the story from the view of a resident who had lived through the floods that have occurred in the Mississippi Delta. This information has been used to write an article that I will be attempting to have published to the CPO website in the future.

11:30 LUNCH

Thursday, February 26, 2015

AFTERNOON

05.06

1:15 FLOOD ANOMALY PROXYS IN CLARK LAKE, SHARKEY CO., MISSISSIPPI

Jeb Galtney and Stan Galicki

Millsaps College, Jackson, MS

Clark Lake is located within a meander of the Big Sunflower River at the confluence with the Yazoo River. The 12 ha lake is in an advanced stage of eutrophication with water depths averaging less than 30 cm. Preliminary core analyses including dry bulk density, organic carbon, magnetic susceptibility, and isotopic dating using ^{137}Cs and ^{210}Pb were conducted on a 1.3 m sediment core. Dry bulk density values range from $0.07 - 0.88 \text{ g cm}^{-3}$ and increase steadily with depth. Organic carbon values fluctuate between 6.6 and 23.5% and are greatest at a depth of approximately 100 cm. Magnetic susceptibility is variable but exhibits a major peak between depths of 44-64 cm. The profile of the ^{137}Cs curve is typical of southern lake sediment and yields an average rate of sediment accumulation of 0.94 cm yr^{-1} since 1963/64. The Ln excess ^{210}Pb curve, while displaying a general decrease in excess ^{210}Pb with depth, displays several anomalies indicative of slumping or fluxes of older sediment. If the anomalies are ignored the rate of sediment accumulation based on ^{210}Pb is 0.98 cm yr^{-1} . The observed anomalies may be related to great flood events in 1927 and 1973 on the Mississippi River which inundated the area and likely deposited sediment in Clark Lake. The large spike in magnetic susceptibility correlates with the deepest ^{210}Pb anomaly and occurs beneath the 1963/64 peak in ^{137}Cs . The second ^{210}Pb anomaly is shallower and may be related to the 1975 Mississippi flood event.



O5.07

1:30 ALLUVIAL SEDIMENTATION ASSOCIATED WITH HISTORICAL LOGGING IN LOW GRADIENT WATERSHEDS IN DESOTO NATIONAL FOREST, MISSISSIPPI

Andrew Simmons and Franklin Heitmuller

University of Southern Mississippi Hattiesburg, MS USA

Forestry and related businesses are an important factor of Mississippi's economy, contributing between \$11 and \$14 billion annually (Mississippi Forestry Commission, 2006). The timber industry is not only important in Mississippi but is an important sector of the economy throughout the Gulf Coast region. Along with providing positive economic benefits to the region, the forestry industry can also negatively affect soil properties, hillslope stability, and increase sedimentation rates in local streams and rivers. This research aims to identify if floodplain sedimentation rates along small order streams in the DeSoto National Forest have changed since the introduction of logging in the region. Commercial logging in southeastern Mississippi began in the mid-1800s and peaked in the early 20th Century (Hickman, 1962), and has maintained a strong presence to date. Methods and the technology of logging have greatly changed, from oxen-drawn carts and rafting to rail lines, heavy machinery, and road access. Despite the long history of commercial logging in Desoto National Forest, there has been limited row-crop cultivation in the region, which therefore nullifies explanations of historical sedimentation from runoff over plowed fields. Floodplain sediment cores have been extracted along small, low-order stream channels and have been analyzed for grain size distribution, organic content, and magnetic susceptibility, to help determine if there are any specific depositional patterns that directly relate to the effects of logging.

1:45 BUSINESS MEETING

Ballroom II/III

3:15 MEMBER RECOGNITION AND DODGEN LECTURE

HEALTH SCIENCES

Co-Chair: Denise Krause

University of Mississippi Medical Center

Co-Chair: Stacy Vance

University of Mississippi Medical Center

Co-Vice Chair: Jana Bagwell

University of Mississippi Medical Center

Co-Vice Chair: Olga McDaniel

University of Mississippi Medical Center

Thursday, February 26, 2015

MORNING

Room Ballroom II/III

POPULATION HEALTH SYMPOSIUM -- IMPROVING HEALTH OUTCOMES IN MISSISSIPPI

FACILITATOR: Claude Brunson, M.D.

8:45 WELCOME AND OPENING REMARKS

9:00 KEYNOTE SPEAKER – MARY CURRIER, MD, MPH, STATE HEALTH OFFICER

9:45 BREAK

10:00 INVITED SPEAKER – KRISTI HENDERSON, DNP, CHIEF TELEHEALTH & INNOVATION OFFICER

10:30 INVITED SPEAKER – MICHAEL FORSTER, PHD, MSW, DEAN, SCHOOL OF PUBLIC HEALTH, USM

11:00 DISTINGUISHED PANEL DISCUSSION

11:45 MOVEMENT IS LIFE

12:00 LUNCH BREAK

Thursday, February 26, 2015

AFTERNOON

PARALLEL SESSIONS

PLENARY SESSION I

Room TC 214

O6.01

1:00 FROM INDIVIDUAL CARE TO POPULATION HEALTH: INTEGRATING COMMUNITY HEALTH CENTERS AND POPULATION RESEARCH TO IMPROVE MATERNAL-CHILD HEALTH OUTCOMES

John Green¹, Aurelia Jones-Taylor³, Sannie Snell⁴, Mobalaji Famiyude², Molly Phillips⁵, and Lauren Camp¹

University of Mississippi Oxford, Mississippi USA¹, University of Mississippi Medical Center Jackson, Mississippi USA², Aaron E. Henry Community Health Services Center, Inc. Clarksdale, Mississippi USA³, Women and Children Health Initiatives,

Inc. Jackson, Mississippi USA⁴, and Dreyfus Health Foundation of the Rogosin Institute New York, New York USA⁵

Individual clinical services are critical to people's health and wellbeing, yet health disparities persist. The ever-growing body of literature focused on population health documents socioeconomic and spatial disparities in health outcomes, but strategies for using these findings to inform on-the-ground services are often lacking. This presentation will focus on the efforts of a network of organizations seeking to address this gap in the realm of maternal-child health, especially in regard to the connections between poverty, poor birth outcomes, and challenges with breastfeeding. Analysis of vital records, survey, and focus group data from the Mississippi Delta show that the socioeconomic factors associated with poor birth outcomes are also associated with low breastfeeding rates. The unique partnership to connect nonprofit organizations, community health centers, and hospitals to address these problems will be described.

O6.02

1:15 A STUDY OF THE RELATIONSHIP BETWEEN THE PRIMARY CARE WORKFORCE AND OBESITY PREVALENCE RATES IN MISSISSIPPI

Hwanseok Choi, Yue Xie, and Amy Arrington

University of Southern Mississippi Hattiesburg, MS USA

Obesity is a major public health concern in the USA. Since 1960, the prevalence of adult obesity has nearly tripled from 13% to 36%. For the last decade, Mississippi has had the highest obesity rates in the nation. Although various approaches have been adopted to combat obesity, efforts thus far have only achieved a cessation in the upward trend of obesity prevalence. To reduce population obesity, alternative approaches need to be examined. One such possibility may be to increase the use of primary care, through the addition of primary care providers (PCP), to monitor and prevent obesity. However, past research on the direct relationship between primary care workforce and obesity prevalence is limited. The purpose of this study is to verify the existence of this relationship. Obesity prevalence rates for all states (2012) and those for Mississippi counties (2010 to 2012) were estimated based on available Centers for Disease Control and Prevention (CDC) data. PCP's per 100,000 by state and by Mississippi county were also tabulated. A linear regression was performed for analyses. The results indicate that, at the state level, there is a statistically significant linear relationship between the number of PCP per 100,000 and the obesity prevalence rate ($r^2 = 0.23$, $F = 14.619$, $p < 0.000$). However, the findings were not duplicated at the county level. As an effort to combat obesity and other public health issues, policy makers should continue to support increasing the primary care workforce at the state level.

O6.03

1:30 TOBACCO CONTROL AND PREVENTION INITIATIVES AT MISSISSIPPI HOSPITALS

Ellen Jones, Lydia West, and Clinton Smith

MSPHI Madison, MS USA

After this presentation, participants will be able to: 1. List the specifications of the Joint Commission Tobacco Cessation Performance Measure-Set; 2. Explain the reasons these measures increase the probability that a patient will stay quit from tobacco products after discharge from the facility; and 3.

Describe the process the Mississippi State Department of Health, Office of Tobacco Control utilized to support hospitals in Mississippi regarding patient tobacco cessation and control resources. Background: The Joint Commission Tobacco Cessation Performance Measure-Set was updated in 2012. The specifications of this measure set include: screening inpatients for tobacco use; providing cessation treatment during the hospital stay and at discharge; and following-up with patients after discharge. The support regarding tobacco cessation patients receive while admitted in hospitals can help them permanently stay quit from tobacco products, consequently improving overall health status. Methods: An online survey to assess facility policies related to tobacco use status of patients and tobacco cessation resources provided through hospital facilities was distributed to 57 Mississippi hospitals with Joint Commission accreditation. Results: Sixty-one percent ($N=35$) of the facilities responded to the survey. Most facilities indicated that there is a standard of care to screen patients for tobacco use status and provide evidence based treatment options while patients are admitted to the hospital. Conversely, the majority of the respondents indicated that there is not standard of care to contact the patient after discharge regarding tobacco use. Staff at the facilities also indicated whether or not the facility would be interested in participating in a pilot project related to tobacco cessation services. Conclusion: Information gathered from this survey was used to identify the variety of tobacco cessation services Mississippi hospitals offer and provide support for those facilities related to the Joint Commission Tobacco Cessation Performance Measure-Set. The techniques and lessons learned through this project will serve as a model for other health care facilities.

O6.04

1:45 A PROFILE OF COMMUNITY HEALTH WORKERS IN MISSISSIPPI

Sandra Hayes and Johnnie Hawkins

Tougaloo College Tougaloo, MS USA¹

Background: Today, many health programs are utilizing community health workers (CHWs) for their unique ability to serve as conduits between target communities and health care and public health services. Numerous studies have shown the effectiveness of CHWs on improving quality of care and health outcomes. CHWs have contributed to significant improvements in community members' access to and continuity of care, screening and other health-related behaviors, and adherence to treatment for control of various conditions and diseases as well as reduced health care costs. **Methodology:** This profile is a description of the community health worker workforce in Mississippi. The profile was created using a cross sectional study design as part of the Community Health Worker (CHW) Workforce Survey. The survey was conducted by the Tougaloo College Central Mississippi Area Health Education Center as part of its "Reducing Health Disparities through Capacity Building using Community Health Workers" program. Original data were obtained from approximately 85 surveys collected from health care organizations and social services agencies in Mississippi. **Results:** The results from the workforce survey indicated that the majority of residents being served by CHWs were African American (36.5%) followed by Non-Hispanic White (24.7%) and Hispanic (18.8%). Findings from the workforce assessment also indicated that most of the CHWs

in the state were employed in local and state health departments (30.7%), followed by community-based organizations (23.5%), hospitals/clinics and faith-based organizations (11.3% respectively), and nonprofit organizations (10.5%). Of the agencies that employed CHWs in Mississippi, 82% were nongovernment organizations; and 27% used a mix of paid and volunteer CHWs. CHWs are being integrated into healthcare delivery to address a variety of health issues in the state including diabetes (12.7%), hypertension (10.1%), heart disease (8.5%) and obesity (8.5%). Additionally, CHWs assisted consumers in gaining access to medical or healthcare services, provided culturally appropriate health education, and assisted uninsured children in enrolling in the State Children's Health Insurance Program (SCHIP). Nearly 10% of CHWs in Mississippi had high school diplomas; 25% had bachelor's degrees. The hourly wage ranged from \$7.70 to \$14.50 per hour; and some CHWs earned as much as \$53,000 annually. Although the majority of CHW services were not eligible for reimbursement, CHWs working with organizations such as Medicaid and Medicare are eligible. **Conclusions:** Mississippians suffer from a high burden of chronic disease. Community health workers are uniquely suited to strengthen existing community networks for care, provide community members with social support, education, and facilitate access to care and communities with a stimulus for action. In Mississippi, CHWs are currently used in a variety of settings as part of a multidisciplinary health care delivery team

O6.05

2:00 CLINICAL COMMUNITY HEALTH WORKER INITIATIVE: IMPROVING HEALTH OUTCOMES WITH A TEAM-BASED APPROACH

Tameka Walls¹, Amanda Cole¹, Augusta Bilbro², Vincent Mendy¹, and Cassandra Dove²

Mississippi State Department of Health - Delta Health Collaborative Greenwood, MS USA¹ and Mississippi State Department of Health, Jackson, MS USA²

Background: The Mississippi State Department of Health implemented the Clinical Community Health Worker Initiative (CCHWI) to improve clinical cardiovascular disease outcomes through self-management of A1C, blood pressure, cholesterol, and smoking. Historically, there has been limited data on the impact of CHWs on clinical outcomes in rural settings. We report on the impact of our clinical community health worker initiative (CCHWI) in the Mississippi Delta region. **Methods:** Patients from 8 participating healthcare systems, including Federally Qualified Health Centers, Rural Health Centers, and private providers, were selected based on diagnosis of uncontrolled hypertension, or diabetes, dyslipidemia. The CHWs visited consented patients within 7 days of referral, quarterly and as needed. CHWs conduct Chronic Disease Self-Management workshops, teach proper techniques for measuring blood pressure and hemoglobin A1C, encouraged compliance, collected Body Mass Index and waist circumference measurements. Information is documented and shared with clinical providers. Abnormal or elevated measures are immediately reported. **Results:** We observed statistically significant improvements (baseline vs most recent value) for diastolic blood pressure ($p=0.0045$), total cholesterol ($p=0.0014$), LDL cholesterol ($p=0.0117$), and triglycerides ($p=0.0255$). Mean

age of participants was 57.6 (range 20-89) years; 71.1% were female, and 91.9% were black. The majority of the participants were diagnosed with hypertension (82.4%) and diabetes (72.0%) and more than half (57.2%) with high cholesterol. One in five (21.1%) participants had only one condition, 46.3% had two conditions and a third (32.6%) had all three conditions. **Discussion:** CHWs may be useful in rural settings to improve cardiovascular clinical outcomes in rural settings.

O6.06

2:15 DEVELOPMENT OF AN INTERACTIVE, SPATIAL, WEB-BASED TOOL FOR PHYSICIAN WORKFORCE PLANNING, RECRUITMENT, AND RESEARCH

Denise D. Krause^{1,2}, John R. Mitchell^{1,2}, and Diane K. Beebe.¹

University of Mississippi Medical Center¹ Office of Mississippi Physician Workforce²

Objective. To develop a web-based, interactive physician workforce surveillance application for the Office of Mississippi Physician Workforce (OMPW) using geographic information systems (GIS) to serve as a tool for effective workforce planning, recruitment, and health services research, to improve access to health care. **Methods.** The Mississippi Board of Medical Licensure provided licensure data on all active physicians practicing in the state. From these and other publicly available data, an ArcGIS 10 server application was developed in JavaScript which can run on most platforms, including mobile devices, to query and visualize the geographic distribution of the physician workforce. **Key Findings.** The application allows users to identify and query geographic locations of physicians filtering by selected criteria, to perform drive-time or buffer analyses, and to explore sociodemographic population data by geographic area of choice. The application is particularly useful to medical students and residents, the Rural Physician and Dentist Scholarship Program, the Mississippi State Health Department, and the OMPW. **Implications.** This application visually represents the physician workforce and its attributes and provides access to much needed information for state-wide health workforce planning and research. It is an expandable tool that enables Mississippi to become more proactive in addressing the needs for physicians throughout the state. **Future Directions.** We plan to incorporate more advanced analysis methods, such as linear programming optimization techniques, to examine inequalities in physician availability to population demographics and determine optimal numbers needed. We plan to measure use statistics over time and administer satisfaction and usability surveys to user groups.

PARALLEL SESSIONS

PLENARY SESSION II

Room TC 227

O6.07

1:00 ELUCIDATING THE NATURAL HISTORY OF ATHEROSCLEROSIS: THE ATHEROSCLEROSIS RISK IN COMMUNITIES STUDY

Kenneth Butler

University of Mississippi Medical Center, Jackson, MS USA

O6.08

1:15 HIGH BLOOD PRESSURE AWARENESS IN THE MISSISSIPPI DELTA REGION AMONG BLACKMEN: (BARBERS REACHING OUT TO EDUCATE ON ROUTINE SCREENING)

Jackie Hawkins, Brianna Perryman, and Cassandra Dove

Mississippi State Department of Health, Jackson, MS USA

Background BROTHERS was initiated to address uncontrolled hypertension, one of the most prevalent causes of premature disability and death among African-Americans (AA). Research has shown that AA men regularly gather at barber shops, which can be an ideal location to conduct health outreach and education. BROTHERS seeks to reduce risk factors for hypertension among AA males, identify AA males identified at risk for hypertension, and increase the number of AA males with hypertension under control. **METHODS** Barbers in the Mississippi Delta were recruited through face-to-face initiation to offer free blood pressure screenings on-site at their barbershop and encourage doctor visits for follow-up. The patron and the barber shops are offered monetary incentives for participating in blood pressure screening, health education, and physician referral. The recruited barbers were trained as Community Health Advocates through University of Mississippi Medical Center, including how to measure blood pressure accurately, and received training on the screening protocol, blood pressure readings, education and referrals. **RESULTS** Since the inception, 20 barbershops in 16 counties have been engaged; 1,172 Individual screenings conducted from September 2012-September 2014; Mean age: 35.17 years; African Americans: 95.6%; African American Male: 83.55 %; Mean Systolic: 131.82 mm; Mean Diastolic: 84.51 mm; and 36.66 % had hypertension **CONCLUSION** BROTHERS serves as an avenue for reaching AA males at risk for hypertension. Barbers are developed into community health advocates who educate their counterparts and customers on blood pressure awareness and link to local healthcare providers for clinical diagnosis and treatment.

O6.09

1:30 IMPACT OF EARLY ELECTIVE DELIVERIES ON BIRTH OUTCOMES IN MISSISSIPPI

Amy Radican-Wald¹, Charlene Collier³, and Dick Johnson²

Center for Mississippi Health Policy Jackson, MS USA¹, Mississippi State Department of Health Jackson, MS USA², and University of Mississippi Medical Center Jackson, MS USA³

Mississippi continues to grapple with overcoming the highest infant mortality rate in the nation. The largest proportion of the state's infant deaths occurs within the first 28 days after birth, the neonatal period of early life. A growing body of research documents the delay of non-medically necessary early deliveries until 39 weeks of completed gestation to be associated with lower neonatal intensive care unit admissions and infant deaths. No studies have demonstrated an increased rate of stillbirth or other poor birth outcomes by eliminating non-medically indicated deliveries before 39 weeks gestation. This study examined the practice of early elective deliveries performed in Mississippi and their impact on infant deaths during the neonatal period. Early elective deliveries were defined as inductions or cesarean sections performed without a documented medical indication at 37 or 38 weeks of gestation in Mississippi.

Linked birth and death certificate records from 2007 to 2011 were analyzed by age of gestation at the time of elective delivery, and then compared by neonatal death rates. A three-fold higher neonatal death rate for non-medically indicated deliveries at 37 weeks gestation (2.1 per 1,000; 95% CI=1.200339-3.410274) was discovered compared to 39 weeks of gestation (0.6 per 1,000; 95% CI=0.42666-0.820218) during the study period selected, a statistically significant difference. The evidence suggests postponing elective deliveries to 39 weeks of gestation could lower neonatal death rates in the state.

O6.10

1:45 SOCIO-DEMOGRAPHIC PREDICTORS OF NUTRITIONAL RISK: CROSS SECTIONAL ANALYSES FROM THE UAB STUDY OF AGING II

Buys DR^{1*}, Russell, KJ¹, Kennedy RE², Williams CP², Brown C^{2,3}, and Locher JL^{2,3}

Mississippi State University, Starkville, MS ¹; University of Alabama at Birmingham, Birmingham, AL²; Veterans Affairs Hospital, Birmingham, AL³; Department of Health Care Organizations and Policy Birmingham, AL⁴

Background. Socio-demographic factors may disparately affect nutritional risk by race and gender groups. This study assesses what factors put different groups of older adults at nutritional risk, measured by the Mini Nutritional Assessment (MNA). **Methods.** Data are from 276 participants in the baseline assessment of a study of community- dwelling persons 75+ in Alabama, USA. Descriptive analyses were conducted on the full sample and by African American Men (AAM), African American Women (AAW), White Men (WM), and White Women (WW) for independent variables and the MNA. Ordinary least squares regression analyses were used to examine correlates of the MNA full scores. **Results.** Participants' mean age was 81.7. Mean scores for the full MNA ($p<.001$) differed by groups: AAM: 24.2 (SD:3.2); AAW: 24.4 (3.4); WM: 27.2 (2.7); and WW: 26.2 (3.1). Differences were also found in the percentage of those at nutritional risk or malnourished according to the MNA Screener ($p<.05$): AAM: 65.8%; AAW: 66%; WM: 36.9%; and WW: 53.1% and in the categories for the full assessment ($p<.01$): AAM: 26.7%; AAW: 37.6%; WM: 12.2%; and WW: 20.1%. Multivariable analyses indicated that for AAMs, Lifespace community mobility ($\beta=.063$, $p=.014$) and religious attendance ($\beta=-2.073$, $p=.007$) mattered; for AAW, there were no significant predictors; for WMs, Lifespace ($\beta=.03$, $p=.025$) and education ($\beta=1.11$, $p=.021$) mattered; and for WW, transportation difficulties ($\beta=-1.56$, $p<.001$), Lifespace ($\beta=.04$, $p=.001$) and age ($\beta=-.128$, $p=.036$) mattered. **Conclusions.** Social factors affect nutritional risk differently by race and gender. Efforts to provide more personalized nutritional risk screening and treatment for older adults may be warranted.

O6.11

2:00 PUBLIC HIGH SCHOOL FOOTBALL, NOT SOCCER, PROMOTES LINEMEN OBESE BODY MASS INDEX (BMI) TO THE SAME EXTENT IN MISSISSIPPI AS IN LEAN STATES

George Moll and Teresa Moll

University of Mississippi Medical Center, Jackson, MS USA

Background: American football is tradition for many Public High School (PHS) males, but PHS football can promote

obesity health concerns for Linemen. National Health and Nutrition Survey (NHANES) 2007-2008 estimated 16.9% of children are obese by Body Mass Index (BMI) and at risk to become morbidly obese adults. National Health Statistics 2007-2010 identified leanest State (LS) at 19.1% obese and Mississippi (MS) at 33.8% obese. We hypothesized LS & MS PHS football participants have statistically similar BMI highlighting elevated Linemen BMI while soccer participants have uniform BMI. **Methods:** PHS 2013-2014 vital statistics with team rosters displaying individual positions, height and weight are available for free public internet access. We located four MS PHS with complete football and soccer team rosters and four LS PHS with complete male football rosters but only one also had a complete soccer team roster. Individual BMI's were calculated and compared mean football vs soccer overall and for football player positions (Quarterback (Q), Backfield (B), Linemen (L)). **Results:** No significant mean differences were noted for soccer positions nor overall, Q, B, L between MS and LS: LS overall BMI 26.6 +/- 0.4 vs MS overall BMI 26.8 +/- 0.3. LS and MS mean differences were significant ($p < 0.01$) for Q or B or overall soccer positions vs L (LS 29.9 +/- 0.6 and MS 31.6 +/- 0.5). **Conclusions/Implications:** PHS football Linemen have similar elevated BMI whether in MS or LS. Setting BMI upper limits and rotating a participant among all football positions could reduce unhealthy BMI differences.

O6.12

2:15 IDENTIFYING AND REDUCING RACIAL DISPARITIES IN CARDIOVASCULAR DISEASE: THE JACKSON HEART STUDY

Kenneth Butler

University of Mississippi Medical Center, Jackson, MS USA

2:30 BREAK

2:45 BUSINESS MEETING

EVENING

POSTER SESSION I

Immediately Following Dodgen Lecture

P6.01

A SYSTEMATIC REVIEW ON THE EFFECTS OF TRANSCRANIAL MAGNETIC STIMULATION IN PATIENTS WITH NEUROPATHIC PAIN

Brownlee, B., Davis, M., Gunter, N., Harrison, R., MacNeill, R., Smith, F., and Adah, F.

University of Mississippi Medical Center, Jackson, MS USA

Background and Significance: Neuropathic pain can be a major, debilitating type of chronic pain for which conventional medical treatment has proven to be relatively ineffective; transcranial magnetic stimulation (TMS) may be a promising alternative for treatment thereof. The purpose of this systematic review was to evaluate the effects of transcranial magnetic stimulation (on) decreasing neuropathic pain. **Methods:** PubMed database was searched from January 2001 through February 2014 to find studies using transcranial magnetic stimulation to treat neuropathic pain. Specific search

terms and combination strategies are presented. Electronic limitations included English language, humans, and randomized controlled trials (RCT). Inclusion criteria included are neuropathic/neurogenic pain, motor cortex stimulation, studies that compare TMS to sham stimulation or placebo control, provided specific frequencies of TMS used, and measured analgesic effects. Study quality was evaluated using PEDro scale criteria. PEDro is an 11-point scale (10-point scale measures internal validity; 1-point measure(s) of external validity) for internal validity of physical therapy intervention studies. Only internal validity measures are used for total PEDro score. Higher scores indicate higher quality internal validity. Each study was also scored using the 2011 Centre of Evidence Based Medicine (CEBM) scale. This 5-level scale (lower numbers indicating higher levels of evidence) identifies a study's level of evidence based primarily on study design. **Results:** The average PEDro score for the 5 included studies is 7, with a range of scores from 4 to 9. The frequencies of CEBM levels of evidence of the studies are three studies with a level of II and two studies with a level of IV. **Conclusion:** The studies produced consistent results in terms of pain relieving effects of rTMS. The evidence therein suggests that temporary neuropathic pain relief can be achieved through rTMS applied to different areas within the primary motor cortex. Maximal neuropathic pain relief time frames ranged from 15 minutes to 180 minutes with beneficial effects found using frequencies of 5 to 10 Hz and intensities of 90 percent to 110 percent of resting motor threshold. The studies demonstrated CEBM levels of II and IV, rendering this evidence in this systematic review a grade of B, in consideration of relatively high PEDro scores for three of the five studies. The collective results indicate that rTMS could potentially be utilized to decrease pain levels in patients with neuropathic pain of different origins. This short term pain relief may be utilized in a clinical setting for the introduction of other physiotherapeutic modalities that would have been poorly tolerated without the rTMS

P6.02

VERRUCA LOCALIZATION PREDOMINATELY IN BLACK TATTOO INK

Kristen Ramey, Robert Brodell, and Jamil Ibrahim

University of Mississippi Medical Center, Jackson, MS USA

There have been many reports of verruca localized in tattoos, yet none offered statistical evidence. Therefore, this study aimed to determine if warts preferentially located in black tattoo ink in patients identified to have warts in tattoos. A secondary analysis focused on verrucae preference in colored inks. Five patients were included in this retrospective case series assessing whether the appearance of verruca in tattoo ink is a matter of chance. For each patient, the wart count, wart size, and inked regions' surface area were recorded relative to black ink, color ink, or normal skin. 181 warts were identified in 5 patients. The average number of warts per 1,000 mm² (s.d) reported with 95% confidence demonstrated a statistically significant difference (0.012). The black area had approximately 7 times more warts per 1,000 mm² compared to the colored and normal areas combined. Also, the percentage of area involved by warts per mm² demonstrated a statistically significant difference (0.024) between black ink and combined colored ink and normal skin. Approximately 4.16% of the black areas were involved

compared to <1% for both colored and normal areas. This study suggests localization of verruca to black ink within tattoos is not a chance phenomenon. Black ink likely suppresses local immunity favoring the growth of warts. With increased awareness of the association of verruca and black tattoo ink, this may well prove to be a significant side effect of tattoos. This phenomenon could also provide a novel method of inducing therapeutic immunocompromised districts in the future.

P6.03

SYNTHETIC CANNABINOIDS SAFETY: A DANGEROUS PERCEPTION AMONG ADOLESCENTS

Robert Eubanks and Sireesha Chinthaparthi

University of Mississippi Medical Center, Jackson, MS USA

Recreational use of synthetic cannabinoids has remained prevalent in the last few years, with 7.9% of high school seniors reporting use in 2013 and nearly three thousand exposures already reported nationally in 2014. A variety of products available online and in “head shops” are falsely advertised as “fake marijuana” that is “legal and safe to use.” Synthetic cannabinoids, marketed as “Spice,” “K2,” and “Mojo,” cannot be detected by routine urine drug screen which has fostered the belief they are a safe and legal alternative to marijuana. Synthetic cannabinoids have a higher potency and greater agonistic activity at CB1 and CB2 receptors than marijuana. There is evidence that these substances are causative agents responsible for seizures and hallucinations among other psychoactive effects. Case description: A 15-year-old male presented with new-onset seizures after using “Mojo.” He had multiple episodes of generalized seizure activity with hallucinations and suicidality following exposure two weeks apart. His urine drug screen, EEG and head imaging were normal. His history and symptoms were consistent with acute synthetic cannabinoid overdose. Patient was discharged after monitoring on oral levetiracetam. Synthetic cannabinoids were banned in Mississippi in 2012 and most forms are illegal in other states, yet they are still accessible to children and young adults. Public education on the harmful and potentially fatal side effects of synthetic cannabinoids is needed, especially in the pediatric population where there is a false sense of safety and lawfulness. Additionally work on rapid detection using standard urine screening is needed.

P6.04

ASSESSING A VASCULAR PHYSIOLOGICAL OPERATING RANGE FOR CARDIOVASCULAR HEALTH: A CLINICAL PERSPECTIVE

Daniel Credeur, Preston Bell, David Dolbow, and Scott Piland

University of Southern Mississippi, Hattiesburg, MS USA

Cardiovascular disease (CVD) is considered the number one cause of morbidity and mortality in the Southeast USA. Disruption within the vascular endothelium is an early initiating event for CVD development, including atherosclerosis. The technique known as flow-mediated dilation (FMD) is considered the non-invasive ‘gold standard’ assessment of vascular endothelial function in humans. With use of Doppler-ultrasound, FMD examines the vasodilatory responsiveness of an artery (e.g., brachial artery) to an increase in blood flow and shear stress, mediated through temporary circulatory arrest of a limb via pneumatic cuff inflation, performed adjacent to a scanned artery. The concept of FMD implies that increases in

shear stress induce endothelial cell release of vasodilators, most notably nitric oxide, resulting in smooth muscle relaxation with subsequent vasodilation. Importantly, FMD has high prognostic value such that for every 1% change in the measurement translates to a ~17% change in CV risk, such as myocardial ischemia and stroke. However, novel assessment strategies beyond this traditional approach have the potential to provide added mechanistic insight into CVD risk, as well as overall cardiovascular health. Recent evidence suggests that assessing an artery’s vasoconstrictor responsiveness to various physiological stimuli may also be clinically relevant. One can determine a vessel’s physiological operating range by examining the peak and nadir diameter of a conduit artery achieved through vasodilatory and vasoconstrictor stimuli, respectively. This approach could potentially improve upon traditional measurements of vascular function and serve as a clinical and research tool for assessing cardiovascular disease risk in a variety of populations.

P6.05

NORMATIVE VALUES FOR NASALANCE AND RATE OF SPEECH IN THE SOUTHERN DIALECT

Ramesh Bettagere

University of Southern Mississippi, Hattiesburg, MS USA

The purpose of the present study was to obtain normative values for nasalance and rate of speech for speakers with Southern (American English) dialect in structured conditions as there was a lack of studies in the areas. Nasalance, which is a ratio between the oral and nasal sound pressures, is expressed as a percentage value. The nasalance value has been positively and moderately correlated with perceived nasality of speech. To obtain nasalance values, a nasometer (Kay Nasometer II 6400) was used. Speech samples were recorded from 164 adult female participants from Louisiana and Mississippi for a variety of speech stimulates nasal and non-nasal syllables, words, sentences, and paragraphs. To obtain rate of speech values, speech samples were recorded from another 51 adult female participants for three different conditions such as reading, monologue (narration), and conversation. The rate of speech was calculated in terms of number of words per minute (WPM) and number of syllables per minute (SPM) for each condition. Data were analyzed and statistical analyses were performed. The results showed that the nasalance values were similar to the North American dialects except for the Mid-Atlantic dialect and rate of speech values were lower than the North American dialects. The results of the study can have important clinical applications in providing guidelines for speech-language pathologists in evaluating and treating female adult clients who speak the Southern dialect with voice/resonance, fluency and articulation disorders or differences.

P6.06

DETECTING MALINGERING WITH THE MILLER FORENSIC ASSESSMENT OF SYMPTOMS TEST

Chasity Lynne Torrence and Jon Corey Jackson

University of Mississippi Medical Center, Jackson, MS USA

Malingering is the intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external incentives. Although easily defined, malingering is not so easily diagnosed. It should be suspected when there is marked discrepancy between an individual’s claimed stress or disability and the objective clinical findings. As

medical and mental healthcare costs continue rising, more efficient and accurate diagnoses in a timely manner are important. Laboratory results do not aid in exclusion of malingering; however, neuropsychological testing has proven effective in determining the likelihood of feigning symptoms in some cases. The Miller Forensic Assessment of Symptoms Test (M-FAST) is a relatively new tool with a high sensitivity and negative predictive power when demonstrating probable psychiatric feigning verses honest groups and is thus effective in screening for manipulation of symptoms. This case demonstrates how clinical judgment combined with objective testing can assist in diagnosing malingering. As the inequality of reimbursement for mental health services combined with shrinking mental health budgets remains, physicians' duties remain to care for patients who are rendered non-functional with debilitating illnesses while making accurate diagnoses to protect the integrity of our community.

P6.07

SPATIAL-TEMPORAL ANALYSIS OF INFLUENZA VIRUS IN THE STATE OF MISSISSIPPI

Philip Nittala, Russell Bennett, and Delicia McGee

Jackson State University, Jackson, MS USA

Influenza virus has become a major public health concern in past decade. The efficiency of the remedial measures can be improved when the spatial and temporal distribution of the disease spread is known. In this paper we investigate a model of disease transmission through a population. The demography, socio-economic determinants are important in understanding the disparities of influenza spread. Revealing any possible underlying socio-economic factors for the spread can help the emergency managers/officials to plan appropriate measures for avoiding/minimizing the disease outbreak effect. We aimed to find the relationship between the spread of influenza and neighborhood characteristics using GIS. Geographical Information System provides a powerful platform for such epidemiological studies with numerous spatial/statistical analyst tools. This study aims at collecting the influenza virus hospitalization data and by using spatial analyst/tracking analyst tools, the spatial-temporal distribution of the outbreak will be analyzed. Further, the study intends to analyze if any socio-economic factors are responsible for the spread pattern and to derive conclusions from the results.

P6.08

HOUSING AND PHYSICAL DISABILITY

Josephine Obamwonyi Russell Bennett, and Delicia McGee

Jackson State University, Jackson, MS USA

Background: The problems associated with chronic physical disability can be exacerbated by poor housing quality. The Fair Housing Act has made clear recommendations to be included in present day houses to make allowance for individuals with disabilities. The objective of this study was to see if there are any regional differences in the physical components of the houses found in the U.S using guidelines from the Fair Housing Act. **Methodology:** A secondary analysis of data on regional housing from the American Housing Survey archives of 2011 was done, all the variables were assessed for residences in the 4 regions (Northeast, West, South and East) of the US. The total number of occupied units

surveyed (n= 114, 907) combined renters (33.78%) and owner occupied houses (66.22%). The south had the most households surveyed (37.06%), while the northeast region had the lowest (18.33%). The southern region reported greater use of entrances, ramps or elevators (11.8%) and the most accessibility problems (48.58%) experienced with these features. Differences between regions in accessibility problems reported were statistically significant ($p=0.003$). **Results:** There was no correlation between housing accessibility features and accessibility problems reported in the regions ($p=0.832$). **Conclusion:** Adherence to the Fair Housing Act guidelines for building is lacking in all regions especially in the south. Government policies aimed at enforcing building codes, stiffer penalties for non-compliance and increasing the proportion of houses under the guidelines will improve quality of houses.

P6.09

HOW CAN HEALTHCARE DISPARITIES OF WOMEN BE SOLVED AND HOW CAN THE QUALITY OF LIFE BE EQUITABLE ACROSS GENDER LINES IN AMERICA?

LaVonne Brown, Melinda Williams, Russell Bennett, and Delicia McGee

Jackson State University, Jackson USA

The research methodology applied in this study is qualitative through reasoning and analysis of primary and secondary sources. Governmental reports such as Kaiser Family Foundation: Woman and Healthcare, Healthy People 2010 and Healthcare Access Among Women were analyzed and examined. Furthermore, relevant data was gathered from current articles, textbooks and Community Outreach programs to gather further findings relevant to this study. This study investigates and probes the issue of healthcare disparities faced among women in the USA. The main research question is: How can healthcare disparities of women be solved and how can the quality of life be equitable across gender lines in America? To facilitate the main research question three sub questions were developed. The first sub-question determines the causes of healthcare disparities experienced by women. The second sub-question reveals the barriers that women must overcome in order to achieve equitable healthcare in America. The final question determines how America can overcome the barriers which exist in the delivery of equitable healthcare for women. The researcher found that there is a positive correlation with a woman's reading level and effective communication which is relevant when relaying information to a physician regarding ailment or condition. The researcher also found that one reason that coronary heart disease in women is misdiagnosed is because women present with different symptoms than their male counterparts. Furthermore, this study addresses the key factor in overcoming the disparities faced by women is the management of one's own health in conjunction with the physician. Finally, women's affiliations with Outreach organizations such American Heart Association and the National Cancer Institute are discussed in this research.

P6.10

ASSESSMENT OF PROVIDER COMPLIANCE WITH PROPHYLACTIC AND THERAPEUTIC TREATMENT RECOMMENDATIONS FOR CARE OF ADOLESCENT VICTIMS OF SEXUAL ASSAULT

Kina Johnson, Russell Bennett, and Scott Benton
Jackson State University, Jackson, MS USA

The purpose of this study is to investigate factors associated with offering of tests and post-exposure prophylaxis, including emergency contraception, as supported by current national care guidelines for adolescent victims of sexual assault. Emergency departments are a primary source of medical care for adolescent victims of sexual assault. A retrospective analysis of medical records will be conducted for adolescents who were admitted < 120 hours post-sexual assault to the University of Mississippi Medical Center's (UMMC) Emergency Department between July 2012 and July 2014. Previous studies have demonstrated a number of factors associated with suboptimal care delivery; however, findings were primarily extrapolated from adult-based studies. Further, follow-up data for adolescent victims of sexual assault is limited. The findings from this study may provide valuable insight into the quality of care provided for an at-risk population and yield an opportunity to modify or develop essential secondary prevention strategies that will aid in the treatment of sexually transmitted infections, including HIV, and unintended pregnancy.

P6.11

CHARACTERISTICS OF DENTISTS PRACTICING IN URBAN, LARGE RURAL, SMALL RURAL, AND ISOLATED AREAS OF MISSISSIPPI

Niketa A. Thompson and Denise D. Krause

University of Mississippi Medical Center, Jackson, MS USA

Purpose. To examine characteristics of dentists licensed in Mississippi by geography, specifically urban, large rural, small rural, and isolated areas, to determine which characteristics might predict dentist locations. **Hypotheses.** The majority of specialists are located in urban areas. Dentists located in rural and isolated areas are older than those in urban areas. There are no gender differences in geographic distribution. The ratio of non-White dentists is more evenly geographically distributed than White dentists. **Methodology.** Dental licensure data were obtained from the Mississippi State Board of Dental Examiners and cleaned. We geocoded dentist practices and used ArcGIS by ESRI® to map these data. We downloaded a four-category classification scheme of urban, large rural, small rural, and isolated areas by zip code. These data were merged with dentist's licensure data to classify each provider as practicing in one of these four areas in Mississippi. We then mapped combined data in ArcGIS 10.2 and calculated population statistics and dentist-to-population ratios. Descriptive statistics were created in Tableau 8.1 to display results. **Results.** The majority of specialists are located in urban areas. No significant differences were found in geographic distribution between older and younger age groups. There are 4x as many males dentists as females. Female dentists are more likely to practice in urban areas than male dentists. More non-White dentists tend to practice in urban areas compared to White dentists. **Future Implications.** Results of this study can assist current and future practicing dentists, dental school administrators, and policy-makers in making informed decisions in health workforce planning and placement.

P6.12

HUMAN SUBJECTS RESEARCH IN A SOUTHERN ACADEMIC MEDICAL CENTER: ETHICAL OBSERVATIONS ON SELECTED DEMOGRAPHIC CHARACTERISTICS

A. R. Tucker and R. H. Didlake

The University of Mississippi Medical Center, Jackson, MS

A cornerstone of biomedical research involving human subjects is that the burden and benefit of research studies must be equally distributed across society. This principle demands that no group within a society should be exploited, abused, or unduly burdened in the design or conduct of investigations. This is a particularly sensitive issue in the American Deep South with its legacy of inappropriate human subjects research (HSR). In order to determine the equity of research burden across demographic groups, an analysis of HSR protocols at the University of Mississippi Medical Center (UMMC) was undertaken. Using the UMMC IRB database, all active protocols renewed in 2011 or 2012 (n=401) were abstracted and selected demographics for all participants enrolled (n=13,084) were tabulated. Comparisons across demographic groups were made to state population data and to UMMC patient demographics. The participant group did not differ significantly in gender distribution when compared to the general patient population (p=0.0702) but did differ from the gender distribution of the state (p<0.0001). The participant group also differed from both the general patient population and the state population in racial distribution (p<0.0001) with individuals self-identifying and black or African-American being over represented among participants. Factors contributing to this difference allow numerous observations on the ethical status of bioscience research in a Deep South state.

P6.13

ADDRESSING THE BURDEN OF COLORECTAL CANCER IN MISSISSIPPI

Fazlay Faruque¹, Xu Zhang¹, Elizabeth N. Nichols², Denae L. Bradley³, Royce Reeves-Darby⁴, Vonda Reeves-Darby⁵ and Roy J. Duhé¹

University of Mississippi Medical Center, ¹Jackson, MS, USA; Vanderbilt University, Nashville, TN, USA ²; University of Mississippi, Oxford, MS, USA ³; University of Pennsylvania, Philadelphia, PA, USA ⁴; GI Associates & Endoscopy Center, Jackson, MS, USA ⁵.

To better understand why Mississippi has the highest colorectal cancer (CRC) mortality rate in the U.S.A., the geographic distribution of CRC screening resources and the geographic- and population-based CRC screening characteristics in Mississippi were investigated. Using telephone surveys to verify the primary practice sites of licensed gastroenterologists and the addresses of licensed medical facilities offering on-site colonoscopies, CRC screening resource data were geocoded and analyzed using Geographic Information Systems. Correlation analyses were performed to detect the strength of associations between CRC screening resources, CRC screening behavior and CRC outcome data. Age-adjusted colorectal cancer incidence rates, mortality rates, mortality-to-incidence ratios, and self-reported endoscopic screening rates were significantly different for Black and White Mississippians; Blacks fared worse than Whites in all categories throughout all nine Public Health

Districts. Self-reported CRC screening rates were negatively correlated with CRC incidence rates and CRC mortality rates. The availability of gastroenterologists varied tremendously throughout the state, and regions with the poorest CRC outcomes tended to be underserved by gastroenterologists, as measured by verified primary practice site locations. Significant population-based and geographic disparities in CRC screening behaviors and CRC outcomes exist in Mississippi. The effects of CRC screening resources are related to CRC screening behaviors and outcomes at a regional level, whereas at the county level, socioeconomic factors are more strongly associated with CRC outcomes. An effective approach to decrease the CRC burden in Mississippi by increasing the availability of preventive screening resources must therefore include a strategy to address fundamental causes of health care disparities.

P6.14

CROSS SECTIONAL ANALYSIS OF MATERNAL AND CHILD HEALTH OUTCOMES AMONG PARTICIPANTS OF THE TOUGALOO COLLEGE DELTA HEALTH PARTNERS (TC/DHP) HEALTHY START PROJECT

Sandra Hayes and Arletha Howard

Tougaloo College, Tougaloo, MS USA

Background: The purpose of the Tougaloo College/Delta HealthPartners (TC/DHP) Healthy Start project is to improve perinatal health outcomes for the teens, women, their infants and fathers, living in a seven-county region of the Mississippi Delta. The program uses the Life Course Model, to strengthen the perinatal health delivery system and establish a model of integrated perinatal health care services. The area served by Delta HealthPartners represents nearly 203,000 people, and covers more than 3,350 square miles. It includes some of the most profoundly underserved communities in the country; communities that are affected by persistent and significant disparities in perinatal health, including disparities related to race, income, education, disability and rural location. **Methods:** This was a cross sectional study conducted to compare maternal and child health outcomes among 416 interconceptional African American teens, women and infants who participated in the TC/DHP Healthy Start project from June 2011 to May 2012 with those who did not participate in the program. **Results:** Based on the Kotelchuck Adequacy of Care Index, 96.1% of participants received adequate prenatal care compared to 35.7% of non-participants from the same target area. Data also show a low birth weight rate of 8.9% among program participants compared to 16% among women from the same target area who did not participate in the program. The infant mortality rate was 8% among program participants compared to 15% among women from the same target area who did not participate in the program. **Public Health Implications:** A multifaceted, comprehensive case management approach is necessary to improve maternal and child health outcomes.

P6.15

PREDICTORS OF DENTAL CARE SERVICE UTILIZATION AMONG LATINOS IN MISSISSIPPI, LOUISIANA AND ALABAMA

Azad Bhuiyan, Sophia Leggett, Gerri Cannon-Smith, Pamela McCoy, Maria Barvie, Swati Prodduturu, Nicole Betson, and Russell Bennett

Jackson State University, Jackson, MS USA

Background: Utilization of dental healthcare services by Hispanic/Latino populations is linked with insurance status. Approximately 31% of all uninsured persons in the US are of Hispanic/Latino origin. While significant, the impact of additional factors/barriers on access to dental healthcare by Hispanic/Latino populations within the tri-state areas of Alabama, Louisiana, and Mississippi remain unclear. **Objective:** To examine the potential factors of social economic status (SES), healthcare coverage and acculturation as barriers to dental healthcare service utilization in Hispanic/Latino populations. **Methods:** A Hispanic/Latino Community Health Needs Assessment was administered to 411 participants. Acculturation was defined as the process of adapting the US culture (e.g. English language) or having been born/lived in the US > 10 years. Descriptive statistics for univariate analysis and multiple logistic regression analysis for predicting dental care coverage were performed. **Results:** The means age of participants was 38 years. 57% percent were female. Only 25% of participants reported they had health insurance coverage for past 12 months, 55% reported not seeing a dentist in the past 12 months; 56% participants reported they were acculturated, 13% completed a college /university degree, and 17 % had household income of \$40, 000 - \$100,000. Multivariate logistic regression that included demographic, SES, health coverage and acculturation and its component, revealed the odds of having health coverage vs not being insured is 3.2 times higher (95% CI: 1.7-5.9), being Non-Mexican vs. Mexican 0.6 times lower (95% CI 0.3-0.9) and being females vs. male 2.4 times higher (95% CI 1.4-4.0) in seeking dental healthcare service. **Conclusions:** This result underscores the need for health care coverage to facilitate dental care service.

P6.16

SMOKE-FREE ORDINANCE REDUCES HEALTH RISKS FOR EMPLOYEES IN HOSPITALITY VENUES

Brittney Oliver¹, Barry Hunt², Ronald Williams³, Jeremy Barnes⁴, Tim Day⁵

*Mississippi State University MSU, MS USA*¹, *Mississippi State University MSU, MS USA*², *Texas State University San Marcos, TX USA*³, *Southeast Missouri State University Cape Girardeau, MO USA*⁴, *University of North Carolina-Greensboro Greensboro, NC USA*⁵

BACKGROUND: Adoption of smoke-free ordinances are often controversial in local communities despite secondhand smoke being identified as a primary occupational health risk among employees. **PURPOSE:** The purpose of this study was to compare indoor air quality within smoke-free and smoking-allowed hospitality venues (restaurants, pubs, bars) to develop a measure of risk exposure for employees. **METHODS:** A total of 39 venues were sampled in this study including 17 smoking-allowed and 22 smoke-free venues. The city of Starkville, MS implemented a comprehensive smoke-free ordinance in 2006; therefore, venues in Starkville served as control group. Air quality was measured using a Sidepak AM510 Personal Aerosol Monitor which measures PM_{2.5}. Measurement period lasted 45-60 minutes in each venue, with data collection occurring during peak business hours. The Environmental Protection Agency's standard limit for unhealthy daily exposure (56 µg/m³) was used as a benchmark to determine exposure to fine particulate matter pollution (PM_{2.5}).

RESULTS: Results indicated a significant difference ($t=-2.591$; $p=.014$) in $PM_{2.5}$ levels between smoking-allowed (129.31 ± 212.63) and smoke-free (12.18 ± 8.75) venues yielding a risk 10.5 times greater in smoking-allowed venues. Under the observed air quality conditions in smoking-allowed venues, a fulltime employee would be exposed to 230% of the EPA's average annual daily limit for $PM_{2.5}$. All ($n=22$) smoke-free venues were classified in the "Healthy" range of the EPA index, while only 11.8% of smoking-allowed venues were classified as "Healthy". **CONCLUSIONS:** The results of this study indicate that indoor air quality poses significant health risks to hospitality employees who are not protected by smoke-free ordinances.

P6.17

WHAT IS THE RELATIONSHIP BETWEEN OBESITY AND THE PROXIMITY OF FAST FOOD RESTAURANTS?

Ernest Mckenzie^{1,2} and DeMarc Hickson²

Jackson State University, Jackson, MS USA My Brother's Keeper, Inc. Ridgeland, MS USA²

Objective: The purpose of this study is to determine the relationships between obesity and the proximity of fast food restaurants (FFR) among Mississippians. **Methods:** A survey was issued to over 4,000 participants in the Jackson area, measuring energy, fats, carbohydrates, fiber, fruit and vegetable intakes, body mass index (BMI), waist circumference, rates of fast food intake, and the proximity of fast food restaurants. A question in the survey may ask? How often do you eat vegetables in a week? Then that information was studied through the SPSS (Statistical Package for the Social Sciences) system, which is software for statistical analysis. The SPSS system was used to determine the relationship between two or more factors. SPSS provides descriptive statistics, bivariate statistics, prediction for numerical outcomes, and prediction for identifying groups. **Results:** There was no direct relationship between obesity and the proximity of fast food restaurants. **Conclusion:** Despite there being no relationship between obesity and the proximity of fast food restaurants, fast food does contribute to obesity. Obesity rates and rates of fast food use have both significantly increased over the years therefore there is a correlation between obesity and fast food. **Acknowledgements:** This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.18

NATIONWIDE POLICY SCAN OF FEDERALLY QUALIFIED HEALTH CENTERS (FQHC)

Sylvia Jones^{1,3} and Courtney Jordan^{2,3}

Jackson State University Jackson, MS USA¹ Tougaloo College Tougaloo, MS USA² My Brother's Keeper, Inc. Ridgeland, MS USA³

I. Topic: The purpose of this research is to test the accountability of the standard of care methods taken by FQHCs. With this information, we hoped to find underlying causes of the drifts between HIV/STD testing, treatment, and care in federally funded clinics. **II. Issues:** Results varied in our field of research. Some states FQHCs could not be found online, some could not release that information, some wished to not participate, some did not know who handled that information, and some did not know what the standard of care policy was. Messages were left

for some but no email or phone call was ever returned. In some instances, the person(s) who answered the phones were rude, and unprofessional. **III. Learning Objectives:** No matter the turn out of the attitudes of others on the other end of the phone, remain professional at all times and thank them for their time. **IV. Strategies, Methods, Models or Examples:** -Made phone calls - Sent out emails -Used states MS, LA, TN, DE, Washington, DC, IA, WY, MI, and NY. **Acknowledgements:** This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P6.19

THE RELATIONSHIP BETWEEN MEDICAL MISTRUST AND HIV TESTING BEHAVIORS AMONG AFRICAN AMERICAN MSM IN JACKSON, MISSISSIPPI.

Swyah Smith¹ and Nhan Truong²

Tougaloo College, Tougaloo, MS USA¹ My Brother's Keeper, Inc. Ridgeland, MS USA²

I. Topic. Medical mistrust and HIV testing behaviors among African American MSM (men who have sex with men) **II. Issues:** In the USA, approximately 1 out of every 50 African American males is infected with HIV, and 33% of them are MSM. About 93% of those African American MSM do not know they are HIV infected. This may partially be due to African Americans' mistrust toward healthcare professionals. **III. Learning Objectives:** (1) prepare a literature review, (2) analyze secondary data using SPSS and interpret the findings, and (3) prepare a brief report. **IV. Strategies, Methods, Models or Examples:** The study employed secondary survey data to examine the relationship between medical mistrust and HIV testing behaviors among African American MSM in Jackson, MS. The hypothesis stated that the more medical mistrust, the less likely they will get tested for HIV. Pearson's Product Moment correlations between medical mistrust and HIV testing showed that the hypothesis was rejected. No significant relationships were found between medical mistrust and having ever been tested for HIV ($r = 0$, $p > .05$), and having been tested in the past two years ($r = .07$, $p > .05$). The results may be due to sampling bias. Most of the participants were affiliated with a community based organization and highly knowledgeable about HIV. Future studies should obtain a more representative sample. **Acknowledgements:** This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.20

THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND KNOWLEDGE ABOUT CERVICAL CANCER PREVENTION AMONG AFRICAN AMERICAN WOMEN IN JACKSON, MS

Shequida Selmon^{1,2} and Nhan Truong²

Tougaloo College Tougaloo, MS USA¹ and My Brother's Keeper, Inc. Ridgeland, MS USA²

I. Issues: In the USA, Black women are 50 percent more likely to be diagnosed with cervical cancer and twice as likely to die from the disease as white women. Cervical cancer is preventable; however, many Black women have limited knowledge about the prevention of cervical cancer, which may

be related to socioeconomic status (education and income). II. Learning Objectives: (1) prepare a literature review, (2) design a cervical cancer prevention survey questionnaire, (3) collect survey data, (4) analyze the data using SPSS and interpret the findings, and (5) prepare a brief report. III. Strategies, Methods, Models or Examples: The study employed survey method to examine the association between socioeconomic status and cervical cancer prevention knowledge among 25 African American women in Jackson, MS. The hypotheses were that the higher the household income and education, the more likely her knowledge regarding (1) Gardasil, (2) a Pap smear, and (3) whether cervical cancer is preventable. Pearson's Product Moment correlations showed a trend toward significance with one of the three hypotheses for education, whereby the higher her education level, the more likely her knowledge about whether cervical cancer is preventable ($r = .34$; $p = .095$). All the other correlations did not support the hypotheses ($p > .05$). Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.21

HOME AND HEALTH: THE EFFECTS OF NEIGHBORHOOD CHARACTERISTICS ON ACCESS AND UTILIZATION OF HEALTHCARE

Loren Salu^{1,2} and DeMarc Hickson²

Tougaloo College, Tougaloo, MS USA¹ and My Brother's Keeper, Inc. Ridgeland, MS USA²

Topic: The effect neighborhood characteristics has on the access and utilization of healthcare African American, Men who have Sex with Men. II. Issues: LGBPS of color experience great difficulty obtaining high quality health care and health related interventions than heterosexuals and Caucasian LGBPs. Disadvantaged neighborhoods are associated with poorer neighborhood health. Social cohesion within neighborhoods has been suggested as a key factor for understanding how neighborhood influences affect health III. Learning Objectives: (1) To Increase participants awareness about health disparities in underserved communities in Mississippi and (2) To Increase participants' awareness of type's barriers that affect healthcare utilization by LGBPS of color and (3) To Increase participant awareness about neighborhoods and their effect on access and utilization of health care. IV. Strategies, Methods, Models or Examples: The Minority HIV/AIDS Research Initiative (MARI) Protocol is a multi-site study done in Jackson, Mississippi and Atlanta, Georgia. This article reflects the data gathered from the Jackson area. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.22

THE EFFECT OF RELIGIOSITY/SPIRITUALITY ON HIV AND STI INFECTIONS IN AFRICAN AMERICAN MSM

Demetria L. Love^{1,2} and Nhan Truong²

Tougaloo College, Tougaloo, MS USA¹ and My Brother's Keeper, Inc. Ridgeland, MS USA²

Issues: The human immunodeficiency virus is statistically shown to affect more than 33 million people globally since its introduction in 1981. Statistically, 97% of these cases are in third-world countries, mainly in the sub-Saharan region in Africa. An estimated 4.8 million people are living with HIV or AIDS in Asia as of 2008. (CDC, 2012) Globally, the disease is disproportionately affecting poorer nations, but in the USA, a known super power, HIV is also unevenly distributed. While HIV is thriving amongst youth ages 13-24, the subgroup most affected by HIV are homosexual and bisexual men of all races. Sexuality and normalcy are defined by one's culture. In most cultures globally, homosexuality is not accepted or respected. One of the primary ethnic groups that do not support homosexuality would be African Americans. Culturally, the role of the African American male is to be strong, a provider, and heterosexual. Due to cultural norms, (i.e. religion, psychological, and social factors) most African American men have what is known as Internalized Homophobia, which is defined as, socially induced revulsion and hostility towards one's own homosexuality and things homosexual. (Weinberg, 1973) This hostility, often leads to not acknowledging one's own sexuality and can lead to risky behaviors, leading to the mass spread of diseases such as HIV, and other STI infections including, Gonorrhea, Chlamydia, and Syphilis. Higher IH is associated with lower sexual comfort, higher sexual compulsive behavior, lower social support, African American, the inability to identify more as MSM, less college education, lowest openness as MSM, lowest/highest comfort with orientation, lowest openness as HIV-positive, lowest sexual health, and highest importance of religion. (Ross and Rosser 2001) These factors were directly linked to the refusal to be open to secondary partners about sexuality and HIV status, leading to unintentional exposure to HIV and other STDs to both primary and secondary partners. Learning Objectives: The purpose of my research is to identify the importance of religion in African American MSM, and its connection (if any) to the on spread of HIV and other Sexually Transmitted Infections. Strategies, Methods, Models, or Examples: Several questionnaires were given to all participants of the study. The questionnaires were composed of many subgroups such as: demographic questions, questions concerning social stature, education, religious affiliation, and etc. After putting all of the information in SPSS (Statistical Package for the Social Sciences), I, along with the help of Dr. Nhan Truong, was able to calculate margins of error, frequencies, and other comparisons amongst all of the participants and their responses. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.23

OBESITY, BODY IMAGE, AND SELF PERCEPTION: A REVIEW OF SELECT ANTHROPOMETRIC FACTORS & HIV-RISK RELATED BEHAVIORS IN AFRICAN AMERICAN MEN WHO HAVE SEX WITH MEN (AAMSM) IN JACKSON, MS.

Givanta Tribit^{1,2} and Will Johnson²

Mississippi State University, Starkville, MS USA¹ and My Brother's Keeper, Inc. Ridgeland, MS USA²

Since the emergence of the epidemic, African

Americans have experienced abnormally high instances of HIV infection since the onset of the disease over thirty years ago, and this disproportional gap among African Americans and other ethnicities has expanded over time. Recent studies conducted by the Centers for Disease Control and Prevention (CDC) show that as we entered into the third decade of the HIV epidemic, African Americans accounted for 44% of the estimated 47,500 new HIV infections in 2010. These studies also note that African American men represented 31% of all new HIV infections, of which, 72% occurred in African American men who have sex with men (AAMSM), although MSM only represent about 7% of the male population in the USA. Interestingly, there has been investigative research conducted on how anthropometric factors, such as body mass index (BMI), may affect the rate of HIV and STD infections amongst African American MSM. In this preliminary study we hypothesized that individuals with a better health status (BMI) are more likely to use condoms versus individuals with a lower health status or BMI, and as a result, those individuals with a lower health status are more prone to contracting HIV/STD's from unprotected sex. The independent variable for this particular study was BMI and the dependent variable was sexual behavior, gauged by the audio computer-assisted self-interviewing (ACASI) survey. Information about each participants' BMI was anonymously gathered from self-identified AAMSM participants who received health screening services at the Open Arms Healthcare Center, specifically the anthropometric information from the TANITA body composition analyzers. According to the information presented in this study, this review found that there was no correlation between BMI and unprotected anal sex amongst African American MSM in Jackson, MS. The conducted research also showed that most men were using condoms whether they are with a main partner or a casual partner. For future studies, several other variables may also be investigated for their relevance to the matter, including other physical variables and certain psychological factors. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.24

SEX EDUCATION POLICIES IN PUBLIC SCHOOLS: ABSTINENCE-PLUS VS. ABSTINENCE-ONLY

Bria King^{1,2} and Deja Abdul-Haqq²

Jackson State University Jackson, MS USA My Brother's Keeper, Inc. Ridgeland, MS USA²

I. Topic: The research study identified comprehensive sex education policies adopted by public school districts by conducting a nationwide policy scan and comparative analyses. The purpose of this study was to provide recommendations to Mississippi legislators in efforts to increase the adoption of policies that will expand and address current policies regarding teen pregnancy in Mississippi. II. Issues: In March 2011, the enactment of House Bill 999, a dual-option (abstinence-only or abstinence-plus) sex education mandate required Mississippi public school districts to implement either Abstinence-Only or Abstinence-Plus education, beginning in the 2012-13 academic year (Mississippi State Legislature, 2011; Center for Mississippi Health Policy, 2012). Mississippi has one hundred and fifty-six school districts, with more than half selecting the abstinence-only approach to sex education for the 2012-13 academic year (81

Abstinence Only, 71 Abstinence Plus). Ironically, Mississippi has the highest teen birth rate in the nation at 64.1 births for every 1,000 teens between the ages of 15-19 years old, as well as the highest rates of Chlamydia and gonorrhea among teenagers (Mississippi State Department of Health (MSDH), 2009). In addition, according to the 2011 National HIV Surveillance Report, Mississippi had the 7th highest rate of HIV infection in the USA. III. Learning Objectives a) Identify national public school districts that have adopted comprehensive sex education policies by conducting a nationwide policy scan. b) Identify public school districts that have been successful in implementing comprehensive sex education policies. c) Conduct key informant interviews with selected school board members nationwide to gain an in-depth understanding of existing local and national policies, successes and failures, recommendations, and lessons learned. d) Conduct a comparative analysis of selected states with similar demographics to Mississippi to compare teen pregnancy and HIV rates over the past five years. e) Compile results of the policy scan and comparative analysis. f) Analyze compiled data to create a detailed summary report of recommendations for Mississippi school districts. IV. Strategies, Methods, Models or Examples: When identifying the adoption and implementation of state-mandated abstinence-only or abstinence-plus (comprehensive sex education) policies in school districts across the nation, I conducted a policy scan of state and national policy briefs, reports, peer-reviewed and news articles, telephone request, and online resources from a variety of sources. These include sexual health researchers and centers and organizations such as: State Department of Education, State Department of Health; National Campaign to Prevent Teen and Unplanned Pregnancy; Sexuality Information and Education Council of the USA (SIECUS); Social Science Research Center of Mississippi State University; National Association of State Boards of Education; National Conference of State Legislatures; and National Coalition to Support Sexuality Education. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.25

EXAMINING STIGMA AMONG HIV POSITIVE PATIENTS: AN ASSESSMENT OF THE PATIENT-PROVIDER RELATIONSHIP

Keunshea Fleming^{1,3}, Keara Johnson^{2,3}, Jennifer Kimmons^{1,3}, and Nakeitra Burse³

Mississippi State University Starkville, MS USA¹, Jackson State University Jackson, MS USA², and My Brother's Keeper, Inc. Ridgeland, MS USA³

Background HIV has major social and psychological implications that are potentially derived from stigma. According to the CDC, Men who have Sex with Men (MSM) account for more than half of the 1.1 million people living with HIV in the USA. In Mississippi, males accounted for 79% of newly reported HIV infections. Additionally, African Americans accounted for 76% of newly reported HIV infections. In 2013, MSM accounted for 38.9% of Mississippians living with HIV. Methods A self-designed twelve (12) question survey was distributed during My Brother's™ Keeper, Inc™ Men's Empowerment Support Group for HIV positive African American MSM (AAMSM). Nine (9) participants completed

surveys that assessed patients' comfort level speaking with their healthcare provider about their HIV status. Additionally, the survey focused on the patients' experiences with discrimination and stigma within the healthcare setting, as a result of their HIV status. Results Due to the sample size, data were analyzed using Microsoft Excel. The average age of participants was 34.1, with 88.8% being Black and 11.1% being Black and Native American. All participants were males residing in the Jackson, MS MSA. Of the participants, 22.2% had less than high school education, 44.4% were high school graduates GED, and 33.3% had some college, trade school or vocational training. Significantly, only 11.1% stated that they had experienced stigma from their healthcare provider with sex being the most noted reason. The results were inconsistent with the literature; therefore, further research is needed. The extremely small sample size was a major limitation. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.26

EXAMINING THE RELATIONSHIP BETWEEN BODY IMAGE AND HIV SEXUAL RISK FACTORS AMONG AFRICAN AMERICAN MSM IN THE JACKSON, MS MSA

Keith Cobb, Jr.^{1,2} and Angela Johnson²

Tougaloo College, Tougaloo, MS USA¹, and My Brother's Keeper, Inc. Ridgeland, MS USA²

I. Issues: In recent years the number of MSM affected by HIV/AIDS increased by 93% in ages 13-25. In the MSM community, body image is perceived to be a contributing factor in whether an individual is more willing to engage in unprotected sex. My perception is that the more confident a person is with their body image the more likely they are to use a condom with their casual partners. II. Learning Objectives: (1) To increase participants' awareness about the incidence of HIV infections among African American men who have sex with men (AAMSM); and (2) To increase participants' understanding of the relationship between body image and HIV sexual risk factors among African American MSM in the Jackson, MS MSA. III. Strategies, Methods, Models or Examples: Data was analyzed from My Brother's™ Keeper, Inc.™. Ecological Study of Sexual Behavior & HIV/STI Among African American Men Who Have Sex With Men in the Southern U.S. (MARI Study) to assess the relationship between body image, and condom use and HIV status disclosure. The results are as follows: The more comfortable the participant felt about his physical appearance, the more frequently he used condoms with his primary partner. The more comfortable an individual felt knowing that others were evaluating his physical appearance, the more frequently he would use condoms with someone other than his primary sex partner. The more comfortable the participant was with how others evaluated his physical appearance, the more likely he would ask his last main sex partner and casual sex partner about his HIV status before sex. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.27

EXAMINING THE RELATIONSHIP BETWEEN ACCESS TO RECREATIONAL FACILITIES AND PHYSICAL ACTIVITY AMONG MISSISSIPPIS

Blair Burton^{1,2} and Angela Johnson²

Tougaloo College Tougaloo, MS USA¹ and My Brother's Keeper, Inc. Ridgeland, MS USA²

I. Issues: In a recent CDC health report 32.3% of MS adults reported that they had not exercised in the past month, which translates into a sedentary lifestyle. Research has shown that there is a direct correlation between the built environment and the amount of physical activity an individual undergoes. Other findings indicate that access and opportunity do not always result in increased physical activity. Based on the mixed results of recent studies, the following research question was formulated: Does merely having access to recreational activities automatically result in an individual taking part in physical activity. II. Learning Objectives: (1) To increase participant's awareness about health disparities in underserved communities in Mississippi and (2) To increase participant's understanding of the relationship between an individual's built environment (specifically access to recreational facilities) and opportunities for physical activity. III. Strategies, Methods, Models or Examples: Data was analyzed from My Brother's Keeper's statewide health assessment (n=4,731) which was conducted to gauge the health status of Mississippians. Distance of place was not significantly related to actual physical activity or self-perceived physical activity. However, participants who lived within 12 blocks of recreational facilities were more likely to perceive themselves to be physically active. These findings support the hypothesis that the more access an individual has to recreational facilities the more they will perceive themselves to be physically active. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.28

PRE-EXPOSURE PROPHYLAXIS FOR HIV PREVENTION PROGRAM AT MISSISSIPPI'S FIRST LBGTI CLINIC

Alexius Paige^{1,4}, Ashlee Lewis^{2,4}, Tamarcus Lott^{1,4}, Leandro Mena^{3,4}

Jackson State University Jackson, MS USA¹, Mississippi University for Women Columbus, MS USA², Open Arms Healthcare Center, Jackson, MS USA³, and My Brother's Keeper, Inc. Ridgeland, MS USA⁴

I.Topic: Pre-exposure prophylaxis, or PrEP, is a way for people who do not have HIV but who are at substantial risk of getting it to prevent HIV infection by taking a pill every day. The pill (brand name Truvada) contains two medicines (tenofovir and emtricitabine) that are used in combination with other medicines to treat HIV. When someone is exposed to HIV through sex or injection drug use, these medicines can work to keep the virus from establishing a permanent infection. II. Issues: According to the Mississippi State Department of Health (MSDH), Mississippi had at least one individual living with HIV in all 82 counties by the end of 2010, and the number of cases

have continued to grow. To advance the prevention goals of the National HIV/AIDS Strategy and maximize effectiveness of current HIV prevention methods, Biomedical Interventions such as PrEP have been used to prevent HIV infection, reduce susceptibility to HIV and/or decrease HIV infectiousness. With the appropriate training and information, service providers can increase their opportunities to conduct effective HIV prevention programs in their communities. III. Learning Objectives: The objectives are to (1) define PrEP, (2) discuss who should be considered for PrEP, and (3) discuss how to implement a PrEP Clinic. IV. Strategies, Methods, Models or Examples: The strategies that will be used are handouts and group discussions about PrEP. Acknowledgements: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.29

EBOLA VIRUS DISEASE: SOME FACTS AND COMMENTS ON THE NIGERIAN SITUATION

Alexander D.W Acholonu

Alcorn State University, Lorman, MS USA

Ebola virus disease (EVD) epidemic in West Africa is the most prevalent on record. It originated simultaneously in Democratic Republic of Congo and Sudan in 1976. It subsequently occurred in Gabon, Uganda, Congo, South Africa and Cote d'Ivoire. EVD is caused by five different species of filovirus. Zaire ebolavirus (EBOV), Sudan ebolavirus (SUDV) and Bundibugyo ebolavirus (BDBV) are the ones associated with large EVD outbreaks in Africa. It initially occurred in a village situated near the Ebola River in Zaire hence the name. Infection occurs from direct contact through broken skin or mucous membranes with the blood or other bodily fluids and stool of infected people or if broken skin or mucous membranes of a healthy person come in contact with places contaminated with EVD patient's infectious fluids. The incubation period is from 2 to 21 days. Patients become contagious once they show signs and symptoms of the disease which include sudden onset of fever, intense weakness, muscle pain, headache, and sore throat and in some cases internal and external bleeding. Control of the disease spread includes contact tracing and quarantine of contacts. EVD can only be confirmed through laboratory testing. Effective treatment and vaccine as well as avoidance of animal reservoirs will help prevent further epidemics. Ebola virus outbreak in Nigeria was contained by a quick intervention with massive public health education and coordinated effective Federal, State and Local Government actions which included provision of necessary funds. Only 20 Ebola cases were reported in Nigeria with no new cases since early September, 2014.

P6.30

PREVALENCE OF ZONOTIC DISEASES IN DOGS AND CATS BELONGING TO WOMEN ENTERING A REGIONAL DOMESTIC VIOLENCE SHELTER

Sharon Fooshee Grace, Christine Bryan, and Andrew Mackin,

Mississippi State University, Starkville, MS USA

Pets are important companions for victims of domestic violence (DV). Unfortunately, pets may also suffer abuse and may be harmed if left behind as a family seeks safe shelter. Most

women's shelters offer no provision for animal care, causing some women to delay escape in order to protect their pets. In order to assist such families, a partnership was developed between a university-based pet-safe sheltering program and a DV shelter. Five years of observations affirmed the value of pets to DV victims. A total of 37 animals (24 dogs and 13 cats) were placed in the program, staying for an average of 30 days (range 4 to 69 days) before being returned to their owners. Most of the animals enrolled in the program had poor preventive health care at the time of enrollment. Of 37 cats and dogs, vaccinations (including rabies vaccines) were delinquent in 36/37, and at least one zoonotic parasite was identified in 16/37 animals. Zoonotic infections identified and treated included roundworm (2 dogs, 3 cats), hookworm (7 dogs, 4 cats), *Dipylidium caninum* tapeworm (6 dogs), *Spirometra* tapeworm (3 cats), and *Giardia* (3 cats). At present, there is scant information as to the prevalence of zoonotic diseases in animals from families suffering from domestic abuse. Further investigation into the health risks posed by this unique group of pets will allow veterinarians, social workers, and physicians to make informed decisions regarding health of impacted women and children while also maintaining family stability through retention of pets in the home.

P6.31

ENGAGING PEOPLE, PROCESSES AND POLICIES TO COMBAT INEQUITIES IN ACCESS TO DIABETES SELF-MANAGEMENT EDUCATION IN RURAL MISSISSIPPI

DT Taylor; BJ Daniel; ML Jones; A Fox, C Dove; L El-Sadek; and L Lott

Mississippi State Department of Health, Jackson, MS USA

PURPOSE- to describe a collaborative engagement process to improve access to diabetes self-management education in Mississippi. **METHODS-** Collaborated with University of Mississippi Medical Center to recruit and assist safety net providers with applying to become Diabetes Self-Management Education (DSME) accredited providers; collaborated with American Diabetes Association to locally offer Certified Diabetes Educators (CDE) Preparatory exam; collaborated with Mississippi Affiliate of the American Association of Diabetes Educators to implement National Credentialing Board for Diabetes Educators Mentoring Program; revitalized Diabetes Coalition of Mississippi (DCM) to create stakeholder synergy in effort of obtaining third party reimbursement for diabetes self-management education; utilizing partnerships, hosted training on the business side of providing diabetes education; utilized GIS mapping to pinpoint potential "hot spots" to recruit diabetes education providers. **RESULTS:** Two safety net providers were accredited in 2013 bringing total to ten new programs in four years, with potential to reach 15,590 people with diabetes. Total number of CDEs is estimated to have increased from 117 in 2010 to 133 in 2014. CDE Preparatory Exam course enrollment has increased from 25 in 2011 to over 60 in 2014. The DCM coalition has received training on policy planning process. Medicaid reimbursement for pre-diabetes screening and diabetes self-management education are priority items on their policy agenda. **CONCLUSIONS:** Engaging people, processes and policies to improve DSME access is working in Mississippi. It has also increased training and other resources for DSME providers and has resulted in the emergence of a unified voice to advocate for reimbursement policies. **Grant Support:** Funding

support for the activities described in this abstract was derived from the USA Department of Health and Human Services, Centers for Disease Control, Cooperative Agreement # DP09-90105CONT13, "Collaborative Chronic Disease, Health Promotion and Surveillance Program.

P6.32

PUTTING THE PIECES TOGETHER TO IMPROVE HEALTH ACCESS

Ellen Jones¹, Tim Alford², Erin Harvey¹, and Anna Lyn Whitt¹

MSPHI Madison, MS USA¹ and Kosciusko Medical Clinic Kosciusko, MS USA²

Objectives: 1. Describe the Together on Diabetes Program in Mississippi. 2. Discuss the cost savings associated with positive health outcomes for patients with type 2 diabetes. 3. Explain patient centered medical home success in rural areas. **Background:** Together on Diabetes (ToD) is an initiative to improve health outcomes of people living with type 2 diabetes by strengthening patient self-management education, community-based supportive services, and broad-based community mobilization. The Mississippi Public Health Institute aims to implement a patient centered medical home model (PCMH) in a physician owned clinic in rural Mississippi in order to reduce negative health outcomes associated with type 2 diabetes. **Methods:** The MSPHI implemented a ToD grant, funded by the Bristol Myers Squibb Foundation, to monitor and evaluate health outcomes of people with type 2 diabetes. The anticipated outcome is to show continuous quality improvement and demonstrate effectiveness and cost savings of a diabetes focused PCMH within a physician owned practice. MSPHI looks at clinical measures, such as HbA1c, blood pressure, cholesterol, and BMI, on each patient to gauge positive health outcomes, evaluates patient self-knowledge and management, and patterns and costs of health service utilization. MSPHI is working with the clinic, third party payers, and patients to achieve health equity, while coordinating care through the PCMH model. **Results:** ToD staff began seeing patients in February, 2014. Preliminary results will be shared and will include patient knowledge regarding disease process, and clinical measures. **Future Implications:** Sustainability is dependent upon payment reform. Third party payers should reimburse providers for community and educational services if the data demonstrate that those services reduce costs. This is consistent with Affordable Care Act triple aims of improving health care quality; improving health care access; and reducing excess health care costs.

P6.33

TRANSLATING RESEARCH TO PRACTICE IN MISSISSIPPI'S RURAL COMMUNITIES

Ellen Jones, Ricky Boggan, and Anna Lyn Whitt

MSPHI Madison, MS USA

Objectives: 1. Compare healthcare delivery for individual and population level diabetes management. 2. Assess patient centered medical home models in 2 distinct rural communities. 3. Discuss process to effect policy change around reimbursement models. **Authors:** Ellen Jones, PhD; Ricky Boggan, MS, JD; Anna Lyn Whitt, LMSW, MPH **Background:** The patient centered medical home model (PCMH) holds promise for transforming the relationship between public health and clinical health systems. Most physician practices

have not implemented components of the model and limited information exists about their success in low income and rural areas. The Mississippi Public Health Institute (MSPHI) initiated two PCMH programs in rural counties to address the need for evaluation of such models in the southeast. **Methods:** Using clinical outcome measures prescribed by CMS and Bristol Myers Squibb Foundation, MSPHI will look at patients with type 2 diabetes at baseline and various points after enrolling in the PCMH model. Additionally, MSPHI will partner with Mississippi State University Social Science Research Center to conduct a social context assessment to measure the impact of community based interventions on the population in the county. Data sources include the Mississippi State Department of Health (MSDH), electronic health records, and Medicaid data. **Results:** Results from the first round of the social climate of diabetes survey will be shared. Data from clinical and baseline cost estimates at the two sites will be presented. **Implications:** The burden of diabetes in the southeast points to a need for improved understanding of PCMH, acceptance among providers, and community support to address policies and interventions. Mississippi's results will inform national diabetes efforts. More importantly, the MSPHI will create a platform for dissemination/translation of health systems approaches that will improve diabetes care in the state, influence health systems delivery policies, and improve community health.

P6.34

DELTA ALLIANCE FOR CONGREGATIONAL HEALTH: IDENTIFYING AT-RISK AND UNDIAGNOSED INDIVIDUALS THROUGH CONGREGATIONAL HEALTH SCREENINGS

Jackie Hawkins, Brianna Perryman, Cassandra Dove

MS State Department of Health, Jackson, MS USA

Background/Purpose Delta Alliance for Congregational Health (DACH) is based on a social-ecological model for faith-based institutions to consider the health of individual congregants, the congregation as a whole, and the broader community. Participants will gain an understanding of the DACH model; including best practices and lessons learned; how the DACH model can be implemented in their church/community; and understand the role of the church, community, and the healthcare setting in cardiovascular disease (CVD) risk reduction. **Methods** Screenings of the congregants were conducted on a quarterly basis. If screening resulted in abnormal values, participants were referred to their perspective primary care physician or a local medical provider for those without a medical home. Some individuals were followed-up with a community health worker for education and other social services. **Results** A total of 1303 screenings for ABCs (Aspirin, Cholesterol, A1C, Blood Pressure, and Tobacco Cessation) were conducted, with 1067 individuals screened from October 2011-April 2013. 94.1% were African American; 3.6 were white; and 2.3% were of other race. The mean age was 48 with an average BMI (Body Mass Index) of 33; 14.8% had elevated glucose levels; 7.3% had elevated cholesterol, 42.5% had elevated hypertension. The screenings indicated that 58.8% of those individuals were obese. **Conclusion** The DACH model, provides linkage among at-risk congregants and community members, healthcare, and the church. The DACH model is an effective

method for identifying CVD risk in the community setting, reducing risk factors for CVD, and linking to healthcare for clinical diagnosis and follow-up.

P6.35

PHYSICOCHEMICAL, MICROBIOLOGICAL, AND SOURCE-TRACKING PARAMETERS OF WATER QUALITY IN THE GRAND BAY NERR IN MISSISSIPPI

Ibrahim Farah, Stephen Kishinhi, and Paul Tchounwou,

Jackson State University, Jackson, MS USA

Grand Bay National Estuarine Research Reserve (GBNERR) is an important ecosystem in the Mississippi Gulf Coast. The GBNERR may be a source for contamination with anthropogenic bacterial pathogens that may play a significant role in the causation of human diseases. The objective of this study was to evaluate the physicochemical and microbiological quality of water in the Grand Bay NERR and to determine quantitative levels and potential source(s) of human fecal pollution. Water samples were collected aseptically from Bayous Heron and Cumbest, Point Aux Chenes Bay and Bangs Lake. Physicochemical parameters were determined using standard protocols. Bacteria including Enterococci were concentrated from water samples by membrane filtration. Water samples were tested for the presence of traditional indicator microorganisms including: heterotrophic (HPC), total coliforms (TC), fecal coliforms (FC) and enterococcus (ENT) bacterial counts. For source-tracking, DNA was extracted from enterococcal colonies on membrane filters by using QIAamp DNA extraction kit including primers specific for the ESP gene in Enterococcus faecium. Mean values of temperature, specific conductivity, dissolved oxygen and pH were within acceptable levels in comparison to MDEQ, USEPA and the USGS standards during the time of investigation. However, the values of turbidity in Grand Bay water exceeded USEPA recommended levels in several occasions during the investigation. Data from this study indicates significant variability ($p < 0.0001$) in mean bacteria concentrations between sites. The data also indicates significant numbers of indicator bacteria in Bayou Heron and Bayou Cumbest when compared with federal/State guidelines. The marker ESP gene was detected in one site of bayou Cumbest; an area where human populations reside. However, in all other sites of the GBNERR, this gene was undetectable. Presence of the ESP marker and high numbers of indicator bacteria suggest public health concerns for oyster and shellfish consumers as well as other water contact activities. Hence, control strategies should be developed and implemented to prevent further contamination of the Grand Bay NERR waters.

P6.36

DYNAMICS OF PROGESTERONE, TNF- α AND A METABOLITE OF PGF_{2 α} IN BLOOD PLASMA OF BEEF COWS FOLLOWING EMBRYO TRANSFER

M.C. Mason¹, J. Copeland¹, E.J. Cuadra^{1*}, T.H. Elsasser², Y. Jung³, and J. Larson⁴

*Alcorn State University*¹; *USDA ARS, Bovine Functional Genomics Laboratory Beltsville Agricultural Center, Beltsville, MD 20705*²; *Prairie View A&M University, Prairie View, TX*³; *Mississippi State University, Mississippi State, MS 39762*⁴

Lactating beef cows received an embryo along with no treatment (control), controlled internal drug releasing device (CIDR), human chorionic gonadotropin (hCG), or gonadotropin

releasing hormone (GnRH) to assess the effectiveness of these treatments in increasing blood progesterone (P4) and its effects on tumor necrosis factor- α (TNF- α) and prostaglandin F_{2 α} (PGF_{2 α}) after the transfer of embryos. All cows were previously synchronized for estrus and on d 7 after exhibiting estrus (d 0) they received embryos. Blood samples were taken on d 0 (d of embryo transfer), d 7, and d 14 for analysis of P4 and TNF- α and on half the animals in each experimental group on d 7 (collected every 15 min for 2 h) and the remaining half on d 14 for PGF_{2 α} . Percent retention rates on d 60 were 56.2, 62.5, 46.7 and 13.3 for cows in the control, CIDR, hCG and GnRH groups; respectively. Progesterone was greater ($P \leq 0.05$) in cows receiving hCG compared to other groups on d 7. Mean concentrations of P4 in all treatment groups increased from d 0 to d 7 and declined ($P \leq 0.05$) from d 7 to d 14. Contrary to pregnant cows, non-pregnant cows had an overall decline in P4 and TNF- α from d 0 to d 14 ($P \leq 0.05$). Whereas, increased ($P \leq 0.05$) concentrations of PGF_{2 α} metabolite (PGFM) were seen in pregnant and non-pregnant animals on d 14; however, no difference ($P \geq 0.05$) was observed overall between the two groups.

P6.37

HYPERTENSION AND ENDOTHELIN-1 IN AN ANIMAL MODEL OF HELLP SYNDROME

Shauna-Kay Spencer, Rachael Morris, Patrick Kyle, and Kedra Wallace

University of Mississippi Medical Center, Jackson, MS USA

We have shown that infusion of sFlt-1 and sEndoglin into normal pregnant rats causes Hemolysis, Elevated Liver enzymes and Low Platelets (HELLP). Resulting in hypertension, elevated TNF α , IL-6 and increased CD4⁺ T cells, which have been shown to activate the endothelin-1 system (ET-1) and are elevated in women with HELLP. sFlt-1 and sEndoglin were infused via osmotic pumps into normal pregnant rats (NP) on gestational day (GD) 12 to create HELLP. On GD 18 arterial catheters were inserted and on GD 19 mean arterial pressure (MAP) was analyzed in rats and samples collected for molecular analysis. Rats with HELLP had significantly increased lactate dehydrogenase (463 ± 48 vs. 630 ± 47.4 IU/L; $P < 0.05$), aspartate aminotransferase (76.8 ± 5.8 vs. 155.8 ± 21.9 IU/L; $P < 0.005$) and decreased platelets ($6 \times 10^6 \pm 3.2 \times 10^5$ vs. $3 \times 10^6 \pm 4.8 \times 10^5$ uL; $P < 0.0005$). MAP increased in HELLP rats (88.2 ± 2.9 vs. 110.3 ± 3.5 mmHg; $P < 0.005$). Circulating ET-1 increased from 103.5 ± 17.2 vs. 179.6 ± 24 pg/mL in HELLP ($P < 0.05$). Endothelial cells were exposed to serum, ET-1 in response to NP serum was 14.05 ± 4.7 pg/mg vs. 69.43 ± 9.3 pg/mg with HELLP ($P < 0.0005$). To determine a role for ET-1 to mediate hypertension in response to HELLP, pregnant rats were treated with an ET_A receptor antagonist (ABT-627, 5mg/kg) via drinking water. This prevented hypertension in HELLP (91.8 ± 4.3 vs. 91.5 ± 3.6 mmHg) rats. There was also an increase in platelet levels in treated HELLP rats ($528,714$ uL vs. $299,500$ uL; $P < 0.005$). Results purports that hypertension in HELLP proceeds via activation of the ET-1 system.

P6.38

ANTI-MYCOBACTERIAL PROPERTIES OF PSEUDOGNAPHALIIUM OBTUSIFOLIUM PLANT EXTRACTS

Erin W. Norcross

Mississippi College, Clinton MS USA

The worldwide tuberculosis crisis and the emergence of drug resistant *Mycobacterium tuberculosis* strains have caused renewed interest in anti-tuberculosis (anti-TB) drug discovery. Any new therapies that could reduce treatment time, reduce cost, and minimize side effects could have a significant impact on the global TB crisis. Because of this need for new anti-mycobacterial therapies, plants used traditionally for their medicinal properties are an active area for drug discovery. *Pseudognaphalium obtusifolium* has been used by Native Americans to treat a variety of conditions including lung diseases. Other members of the plant family Asteraceae, to which *P. obtusifolium* belongs, have been shown to exhibit antibacterial activity against numerous pathogens including drug resistant *Staphylococcus aureus* and *Mycobacterium smegmatis*. The goal of this project is to evaluate the anti-mycobacterial activity of plant extracts from *P. obtusifolium*. Broth microdilution and flow cytometry will be used to complete the MICs and HepG2 and macrophage cell lines will be used to evaluate the extracts for toxicity. *P. obtusifolium* plant extracts that show MICs less than or equal to 125 ng/mL will be further tested intracellularly using macrophage cell line J774. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P6.39

MANIPULATION OF THE MACROPHAGE RESPONSE USING AMINO ACID COATED UHMW-PE IMPLANTED SUBCUTANEOUSLY

Kenneth R. Butler, Jr., Hamed Benghuzzi, Michelle Tucci and Aaron Puckett,

University of Mississippi Medical Center Jackson, MS USA

Polyethylene materials used in orthopedic applications are biocompatible and non-immunogenic with host tissues. Recent studies in our laboratory have demonstrated the need for further study of these devices *in vivo* to further elucidate methods to modulate the tissue-implant response. The purpose of this investigation was to determine macrophage behavior after implantation of ultra-high molecular weight polyethylene (UHMW-PE) rinsed with saline (control) or coated with poly-L-lysine (PLL), arginine-glycine-aspartic acid (RGD), or arginine-glycine-glutamic acid (RGE) into 16 adult male rats subcutaneously (S/C). Implants and surrounding tissue were harvested at 90 days post-implantation. The animals were euthanized, and the UHMW-PE implants and the fibrous tissue capsules surrounding them were harvested. Microscopic examination of routinely stained sections (5 microns, Hematoxylin & Eosin) of the fibrous tissue capsules revealed macrophage counts were highest in the PLL coated group (3.1 ± 0.80 cells/high power field). There was a decrease in mean macrophage counts per high power field for RGD (1.58 ± 1.02), saline (1.32 ± 0.46), and RGE (1 ± 0.76) compared to PLL. There were statistically significant differences (ANOVA, $p < 0.05$) present. These findings indicate macrophage behavior at the tissue-implant interface and in surrounding fibrous tissue can be influenced using various amino acid combination coatings in subcutaneous applications. In addition, these results provide further evidence that the intensity of the chronic inflammatory

reaction to UHMW-PE can be manipulated to some extent.

P6.40

MORPHOMETRIC EVALUATION OF THE TISSUE IMPLANT RESPONSE SURROUNDING SUBCUTANEOUS TCP, HA, AND ALCAP BIOCERAMIC IMPLANTS

Kenneth R. Butler, Jr., Hamed Benghuzzi, Michelle Tucci and Aaron Puckett

University of Mississippi Medical Center, Jackson, MS USA

The objective of this investigation was to quantify and further elucidate the tissue-implant response in the fibrous tissue surrounding tricalcium phosphate (TCP), hydroxyapatite (HA), and aluminum calcium phosphate (ALCAP) implants when implanted subcutaneously. Sixteen animals in four experimental groups ($n = 4/\text{group}$) were implanted with one implant each: Group I (control, TCP), Group II (HA), and Group III (ALCAP). At 90 days post-implantation, the fibrous tissue surrounding the implants was harvested and submitted for routine histologic processing and staining. Sections of stained fibrous tissue (5 micron sections) cut every 20 microns throughout the depth of the tissues were evaluated for the presence of macrophages, fibrocytes, neutrophils, vascularity and thickness for all three groups using semi-automated quantitative methods. Data were reported as means $\pm$ SD and were analyzed using ANOVA followed by Bonferroni multiple comparisons test ($\alpha=0.05$). Group III demonstrated a significantly higher number of neutrophils but fewer macrophages and blood vessels per high power field and had a substantially thinner fibrous tissue capsule thickness compared to Groups I and II. Group II elicited a greater response of fibroblasts compared to Groups I and III suggesting HA may provide a slightly higher degree of stability to the implant. In total, these findings suggest both TCP and HA behave similarly *in vivo* when compared to ALCAP and may be better choices for subcutaneous soft-tissue application compared to ALCAP.

P6.41

REGULATION OF GONADOTROPINS BY MEANS OF SUSTAINED DELIVERY OF PROGESTINS USING EWES AS A MODEL

Hamed Benghuzzi¹, Michelle Tucci¹ and Barry England²

University of Mississippi Medical Center, Jackson¹ and University of Michigan Medical Center, Ann Arbor, MI²

Manipulation of gonadotropin hormones (luteinizing (LH) and follicle stimulating hormones (FSH)) in ewes in non-breeding season is a major challenge to the scientific community. We hypothesized that sustained delivery of progesterone and estrogens by means of Tricalcium-Phosphate-Lysine delivery systems (TCPL) can suppress the rise in LH and FSH levels and ultimately induce cycling activities. The specific objective of this study was to design an implantable TCPL system capable of delivering progesterone (P) for about two weeks and Estradiol (E) in a short burst that mimics the ovulatory surge in adult ewes. TCPL implants were fabricated in four different sizes (1.5, 2.3, 3.5, or 5.6 cm) using four different ceramic compositions and impregnated with P (20-45%) and E (4-16%). Surgical aseptic techniques were employed following standard approved lab protocols. Blood samples were collected daily and analyzed for

P, E, LH and FSH levels. X-ray procedure was performed twice a week to assure the intactness of the devices. The results of this student revealed: (1) TCPL were cable of delivering P and E at levels that mimic the estrus cycle, (2) remarkable reduction of LH and FSH levels in all experimental animals compared to sham operated group. Overall conclusion, results of this study demonstrated that the anterior pituitary gonadotropin hormones can be regulated through sustained delivery of reproductive hormones.

P6.42

USING PHOTOTHERMAL THERAPY FOR SELECTIVE DETECTION AND DESTRUCTION OF CANCER CELLS

Santanu Banerjee

Tougaloo College Tougaloo, Mississippi USA

Cancer is the second leading cause of fatalities in the US, accounting for nearly 1 in 4 deaths. Prostate Cancer is the most common malignancy among US men and Breast Cancer is the most common cancer among US women. Currently available treatments are less effective at early diagnosis and for treatment at advanced stages. The traditional treatments often cause drastic side effects. Hence, new approaches to treating cancer are urgently needed for improving public health. Recently, gold nanorods of different shapes and sizes with tunable optical properties in the near- infrared (NIR) range have been utilized for targeted detection and hyperthermal destruction of cancer cells. We use this photothermal approach using multifunctional gold nanoparticles (GNP) for therapy of breast and prostate cancer cells, using NIR light to selectively detect and destroy low concentration cancer cells. We discuss our results and expand on the student training and lab development for this research. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.43

EVALUATION OF ADENOCARCINOMA HUMAN ALVEOLAR BASAL EPITHELIAL CELL LINE UPON THE EXPOSURE TO OMEGA FATTY ACIDS IN CULTURE

Jana Bagwell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

The A549 human adenocarcinoma cell line has previously shown good suitability as a model for respiratory studies due to the presence of type II alveolar epithelial functionality. The objective of this study was to evaluate the A549 cells biochemically for cell proliferation, viability, and membrane integrity upon the exposure to omega fatty acids. Sterile aseptic techniques were followed throughout the experimentations by following standard lab protocols to develop confluent cell culture. To establish an environment of an inflammatory response, A549 cells were stimulated with interleukin 1- β at the time of cell confluency. The cells were then treated with a low and high concentration of flaxseed oil, providing omega 3-6-9 fatty acids and allowed to incubate for 24, 48 and 72 hours. The following biochemical assays were utilized: (i) cellular metabolic activity was measured by alamarBlue®, which uses the natural reducing power of living cells to convert resazurin to resorufin (ii) the measurement of glutathione reductase to oxidized glutathione within cells was

used as a measure of oxidative stress (iii) cell damage was assessed by the measurement of lactate dehydrogenase (LDH), which is released from the cell membrane during cytotoxic events (iv) the measurement of poly (ADP-ribose) polymerase (PARP) is an important marker of caspase3-mediated apoptosis and cleavage of PARP correlates with DNA fragmentation. The focus of this study is to explore the materials and methods that best evaluate the overall viability and integrity of the A549 cell line when treatment such as omega fatty acid is introduced during an inflammatory response. These techniques of evaluating the overall cell health will be utilized in future investigations.

P6.44

THE EFFECTS OF EXPOSING COMBINATIONS OF DENTAL ADHESIVES, PORPHYROMONAS GINGIVALIS LIPOPOLYSACCHARIDES, AND CORTISOL OR NIFEDIPINE TO HUMAN GINGIVAL FIBROBLASTS

Angelia D. Garner, Michelle A. Tucci, and Hamed A. Benghuzzi

University of Mississippi Medical Center, Jackson, MS 39216

The needs of dental patients are becoming ever complex. This is largely due to the increasing number of systemic conditions that patients present with during routine or emergency dental visits, such as hypertension and angina pectoris. Medications that patients are prescribed have potential to cause effects on the oral tissues. There is a need to understand the interactions between the oral tissues and materials used to restore teeth. The objective of this study was to assess the physiological function of Human Gingival fibroblasts upon exposure to dental adhesives; Polymethyl methacrylate, OptiBond®, and Prime & Bond®; *Porphyromonas gingivalis* lipopolysaccharide and Cortisol or Nifedipine. An increase in metabolic activity was noted with the experimental group exposed to the combination of Prime & Bond®, LPS-PG, and Nifedipine ($P < 0.001$). Oxidative stress was observed in experimental groups exposed to the combinations of PMMA, LPS-PG, and Cortisol ($P < 0.001$); also, noted in all three dental adhesives in combinations with LPS-PG and Nifedipine ($P < 0.001$). Cellular membrane damage was evident in experimental groups exposed to the combinations of PMMA, LPS-PG, and Cortisol; PMMA, LPS-PG, and Nifedipine; and Prime & Bond®, LPS-PG, and Nifedipine. In conclusion, it appears that the addition of Nifedipine in combination with LPS-PG alters cellular function.

P6.45

PARACRINE SIGNALING IS KEY FOR MELANOMA CELL MIGRATION

Omama Ahmad, Yassmin Hegazy, Mawusi Kamassa, Courtney Ross, Ran Wang, Zachariah Burns, and Elizabeth Brandon

Mississippi College, Clinton, MS USA

Background and Objective Obesity worsens the prognosis of many cancers by altering the levels of circulating hormones, inflammatory cytokines, and adipokines. Paracrine signaling between tumor and stromal cells is key to tumor growth and metastasis. Melanoma is an obesity-associated cancer that is also highly metastatic. Our hypothesis is that inflammatory cytokines and adipokines promote melanoma growth and metastasis. **Methods** B16F10 mouse melanoma cells were synchronized and cultured with the inflammatory cytokines interleukins 4 and 6, resistin, TNF- α , (all at 10 ng/mL) and

conditioned medium from macrophages and adipocytes. Growth curves were generated by counting cells at 24, 48, and 72 hours. The same treatments were used to examine melanoma cell migration and proliferation in Boyden chambers. **Results** IL-6, resistin, and macrophage-conditioned medium significantly enhanced proliferation (Student's T-test $p = 0.05$), while TNF- α inhibited it. Co-culture with adipocytes significantly increased cell proliferation ($p = 0.03$). The data indicate that resistin also increased the expression of Bcl-X_L, a prosurvival factor. Co-culture with macrophages and adipocytes significantly enhanced melanoma cell migration (Student's T-test $p = 0.03$ and 0.05 respectively). **Discussion and Conclusions** Inflammatory signals from macrophages and adipocytes are sufficient for melanoma cell proliferation and migration. The observation that adipocytes stimulated melanoma cell migration whereas adipocyte-conditioned medium did not indicates the importance of paracrine signaling to tumor cell behavior. Supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health, grant number P20GM103476.

P6.46

CHRONIC CARBON MONOXIDE TREATMENT ATTENUATES DEVELOPMENT OF OBESITY AND REMODELS ADIPOCYTES IN MICE FED A HIGH-FAT DIET.

Hosick PA, AlAmodi AA, Storm MV, Gousset MU, Pruett BE, Gray W, III, Stout J, and Stec DE

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

OBJECTIVE: Induction of heme oxygenase-1 (HO-1) has been demonstrated to result in chronic weight loss in several rodent models of obesity. However, the specific contribution of the HO metabolite, carbon monoxide (CO) to this response remains unknown. In this study, we determined the effect of chronic low level administration of a specific CO donor on the progression of obesity and its effects on metabolism and adipocyte biology in mice fed a high-fat diet. **DESIGN:** Experiments were performed on C57BL/6J mice fed a high-fat diet (60%) from 4 weeks until 30 weeks of age. Mice were administered either the CO donor, carbon monoxide releasing molecules (CORM)-A1 (5 mg kg⁻¹), intraperitoneally every other day) or the inactive form of the drug (iCORM-A1). Body weights were measured weekly and fasted blood glucose, insulin as well as body composition were measured every 6 weeks. Food intake, O₂ consumption, CO₂ production, activity and body heat production were measured at 28 weeks after start of the experimental protocol. **RESULTS:** Chronic CORM-A1 attenuated the development of high fat induced obesity from 18 weeks until the end of the study. Chronic CORM-A1 treatment in mice fed a high-fat diet resulted in significant decreases in fasted blood glucose, insulin and body fat and increased O₂ consumption and heat production as compared with mice treated with iCORM-A1. Chronic CORM-A1 treatment also resulted in a significant decrease in adipocyte size and an increase in adipocyte number and in NRF-1, PGC-1 α and UCP1 protein levels in epididymal fat. **CONCLUSION:** Our results demonstrate that chronic CO treatment prevents the development of high-fat diet induced obesity via stimulation of metabolism and remodeling of adipocytes.

P6.47

AN AQUATIC FULBRIGHT EXPERIENCE IN THAILAND

Elizabeth Bergey

University of Oklahoma, Norman, OK USA

This presentation describes my experiences as a Fulbright scholar in Thailand, where my research centered on aquatic biology. Included is an introduction to the Fulbright program, why I applied, what I did (with an emphasis on research) and the continuing influence of my Fulbright experience. My collaborative research project investigated downstream effects of an intermittently flowing dam release on algae and macroinvertebrates. I will also answer questions about the general application process. The Fulbright Scholar Program sends more than 1,200 U.S. scholars and professionals each year to teach or conduct research in more than 125 countries. Scholars return to their campuses with new perspectives on their fields and fresh ideas for further international participation. This presentation will be of particular interest to scholars wishing to expand their research and professional linkages. I am a member of the Fulbright Ambassador Program, which identifies, trains, and engages a select group of Fulbright Scholar alumni to serve as representatives for the Fulbright Program at campus workshops and academic conferences across the USA.

P6.48

NUCLEAR RADIATIONS AND HUMAN EXPOSURE

Amin Haque

Alcorn State University, Alcorn State, MS USA

Nuclear radiations exist in nature due to cosmological activities and due to nuclear reactions on the Earth's surface and inside the Earth's crust. The main nuclear radiations are: alpha and beta particles, and gamma rays. Alpha particles are emitted due to decay of naturally-occurring heavy nuclei such as uranium, radium, and man-made transuranic elements. Alpha particles cannot penetrate the skin due to heaviness, so are dangerous only if they are inside the body. Beta particles are emitted by many radioactive nuclides. Being lighter, they can penetrate a little way into human flesh. Gamma rays are similar in nature to atomic X-rays, but they are much more energetic and penetrating. The average dose received by all of us from background radiation is about 2.4 millisievert/year, which can vary depending on the geology and altitude where people live – ranging usually from 1.0 to 10.0 mSv/year but can be more than 50 mSv/year. The highest known level of background gamma radiation is 15 mSv/year affecting people in Kerala and Madras states in India, in addition to about 40 mSv/year from radon. People in Brazil and Sudan are exposed up to 40 mSv/yr. Several places in Iran, India and Europe have an annual dose of 100 mSv and up to 260 mSv/year at Ramsar in Iran. However, the population of higher dose radiation has no higher cancer mortality than the general population. Low doses of nuclear radiations have been found beneficial to human health.

P6.49

SODIUM INTAKE AND ARTERIAL PRESSURE IN NORMOTENSIVE AND DOCA-SALT HYPERTENSIVE RATS DURING CHRONIC MINOXIDIL TREATMENT

Min Huang¹, Hamed Benghuzzi², Michelle Tucci³, and Robert L.

Hester⁴

Departments of Physical Therapy¹, Diagnostics and Clinical Health Sciences², Orthopedics³, and Physiology⁴ University of Mississippi Medical Center, Jackson, Mississippi 39216-4505

It has been well documented that sodium overload is often an important factor in the pathogenesis of various forms of experimental and clinical hypertension. In this investigation we hypothesized that chronic-salt loading pressure-natriuresis curve determines the level of arterial blood pressure in both normotensive and DOCA-salt hypertensive rats during chronic minoxidil exposure. The specific aim of this study was to determine if minoxidil treatment resulted in a decrease in arterial blood pressure in DOCA-salt hypertensive rats, without affecting the renal function curve. A total of 64 adult SD-rats were randomly divided into 8 equal groups (control, minoxidil (3 mg/day; Route: Oral), salt, salt-minoxidil, DOCA, DOCA-minoxidil, DOCA-salt (75 mg; Route: pellets), and DOCA-salt minoxidil). The rats in the salt groups drank saline while the rats in the non-salt groups drank tap water. Sodium intake was measured every 24 hours. Mean arterial blood pressure was measured at the end of 6 weeks post treatment. The results revealed that there were no significant differences in salt intake among any of the non-salt groups. Minoxidil treatment did not significantly change salt intake in any of the tap water or saline animals ($p < 0.05$). Arterial pressures measured were 119 ± 4 mmHg (control), 117 ± 4 mmHg (minoxidil), 111 ± 3 mmHg (salt), 111 ± 3 mmHg (salt minoxidil), 139 ± 8 (DOCA), 133 ± 4 (DOCA minoxidil), 160 ± 5 (DOCA-salt), and 146 ± 9 (DOCA-salt minoxidil). There was a significant effect of DOCA and an interaction was observed between DOCA and salt treatment. Furthermore, this resulted in a significant increase in MAP. However, neither saline nor minoxidil treatment alone had a significant effect on MAP. Chronic minoxidil treatment did not shift the chronic salt-loading pressure-natriuresis curve in either normotensive or hypertensive rats. These results indicate that chronic salt-loading pressure natriuresis curve plays a central role in long term control of arterial blood pressure and the development of DOCA-salt hypertension.

P6.50

STRUCTURE ELUCIDATION OF G-QUADRUPLEX WITHIN THE MID-REGION OF THE KRAS PROMOTER AND IDENTIFICATION OF STABILIZING SMALL MOLECULES AS PROMISING TRANSCRIPTIONAL SILENCERS

Rhianna Morgan, Tracy Brooks, and Khondaker Miraz Rahman²

University of Mississippi, Oxford, MS USA¹ and King's College London, England UK²

Over 60% of pancreatic cancers harbor mutations in the kRAS oncogene, whose promoter has three distinct guanine-rich regions (near, mid, and far) capable of forming higher order G-quadruplexes (G4s). These important structures have transcriptional silencing potential and stabilizing compounds cause selective apoptosis in kRAS-addicted cells. Previous works in our laboratory have identified the mid-G4 region as having the highest silencing capacity, with little apparent roles for the near- or far-G4 regions. The structure of this mid-region G4 is being elucidated by electromobility shift assay, DNA polymerase stop assay, DMS footprinting, and circular dichroism (CD). In

addition, small molecules are being screened by the Förster Resonance Energy Transfer (FRET) melt assay and confirmed by CD for their stabilization potential. We have identified multiple, equilibrating, intramolecular G4s forming within the mid-region of the kRAS promoter. Varying buffer conditions (cations, dehydration, and molecular crowding) affect these formations; the predominating isoform is a tetra-stacked mixed parallel and antiparallel structure with an 8:15:7 loop configuration. Over 1,600 compounds have been screened and several are being pursued as leads. Several compounds selectively stabilized the mid-G4 and suppress kRAS transcription. Our work highlights the mid-G4-forming region of the kRAS promoter a therapeutic target with the utmost promise for pancreatic cancer, and further features the stabilizing potential of targeted compounds. Studies are ongoing to vet the potential of other π -compounds from the FRET screen, as well as to elucidate the structure of the kRAS mid-G4 in chromosomal DNA.

P6.51

THE EFFECTIVENESS OF ANTI-OXIDANTS AGENTS TO POTENTIATE THE PHYSIOLOGICAL RESPONSE OF INSULIN HORMONE USING PANC-1 PANCREATIC LIKE CELL LINE AS A MODEL

Victoria Hodges, Michelle Tucci, Gerri Wilson, Elgenaid Hamadain, and Ham Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

The need for improved anti diabetic medications is suggested in the lack of proper adherence to treatment regimes. This is further illustrated in the number of individuals that experience devastating co-morbidities because of poor maintenance of the disease. The process of drug development is difficult and lengthy and begins by understanding how drugs work at a molecular level on cells in the body. The objective of this study was to investigate the effectiveness of anti-oxidants agents to potentiate the physiological response of insulin hormone using PANC-1 pancreatic like cell line as a model. PANC-1 cells were plated onto three 24 well plates at a density of (100×10^6) per well. The experimental design consisted of six equal groups: Group 1 served as control and groups 2-4 were treated with insulin, thymoquinone (TQ), epigallocatechin (EGEG). Groups 5 and 6 were pretreated with insulin and exposed to TQ and EGCG, respectively. Biochemical and morphological evaluations were conducted following standard lab protocols. Results of this study revealed that the use of either TQ or EGCG have maximized the efficacy of insulin as evidenced by the assessment of the metabolic activity (total protein) and morphological assessment. Furthermore, the role of EGCG was shown to be more effective than TQ at inducing cellular injury.

P6.52

PROLIFERATION OF ENDOGENOUS T-REG CELLS IMPROVES THE PATHO-PHYSIOLOGY ASSOCIATED WITH PLACENTAL ISCHEMIA OF PREGNANCY

Tarek Ibrahim, Lukasz Przybyl, Ashlyn Harmon, Lorena Amaral, Denise Cornelius, Janae Moseley, Jessica Faulkner, Babbette LaMarca, and Ralf Dechend

University of Mississippi Medical Center, Jackson, MS USA

Preeclampsia (PE), new onset of hypertension during pregnancy, is associated with pro-inflammatory cytokines and

decreased regulatory immune responses including Tregs and decreased IL-10. We believe this decrease in immune regulatory mechanisms leads to much of the pathophysiology associated with PE such as elevated blood pressure and decrease in fetal weight. The RUPP rat model of induced placental ischemia exhibits similar characteristics as women with PE regarding high blood pressure, cytokine levels and immune cell activation and decreased Tregs and pup weight. Therefore, we hypothesized that administration of a CD28 superantagonist (SA) would increase the Treg profile in the RUPP rats which could reduce pro-inflammatory cytokines and blood pressure. Chronic Reduced Uterine Perfusion Pressure, the RUPP procedure, was performed at gestation day 14 (GD14); SA was administered intraperitoneally at GD15, GD18 carotid catheters inserted, and GD19 MAP and pup weight, serum and tissues were collected. MAP in NP rats was 99.5 +/- 2.1, 116.6 +/- 2.04 in RUPPs which significantly decreased to 108.5 +/- 1.9 mmHg in RUPP+SA. Circulating FoxP3+ Treg cells were 7.3% in NP, 0.48% in RUPP rats but significantly increased to 10.96% in RUPP+SA; IL-2 was 6.8 +/- 6 in NP, 89.4 +/- 24 in RUPP, and 126.3 +/- 23.7 pg/mL in RUPP+SA. IL-10 was 24.6 +/- 13 in NP, 35.6 +/- 17 in RUPP and 158.7 +/- 120 pg/mL in RUPP+SA. IL-6 was 26.96 +/- 1.77 in NP, 42.6 +/- 7.14 in RUPP, and decreased to 24.76 +/- 0.943 in RUPP+SA. Pup weight was 2.135 +/- 0.23 in NP, 1.964 +/- 0.13 in RUPP, but increased to 2.2 +/- 0.1 mg in RUPP+SA. These data suggest an important role for up-regulating Treg cells to enhance the immune regulatory interactions and inhibit the hypertension while safely improving pup weight in response to placental ischemia during pregnancy.

P6.53

SUPRA-ADDITIVE EFFECTS OF BENZODIAZEPINE AND NEUROACTIVE STEROID COMBINATIONS ON SCHEDULE-CONTROLLED BEHAVIOR IN RATS

Barak Gunter, Donna Platt, and James Rowlett

University of Mississippi Medical Center, Jackson, MS USA

Benzodiazepines are positive allosteric modulators of the GABA_A receptor and are prescribed as anxiolytics, hypnotics, and anticonvulsants. These drugs are effective, however there are unwanted side effects associated with their use such as sedation and motor impairment. Neuroactive steroids are endogenous modulators of GABA_A receptors and recent evidence has shown that combinations of the short-acting benzodiazepine triazolam and the short-acting neuroactive steroid pregnanolone can produce supra-additive anxiolytic effects and infra-additive reinforcing effects. Thus combinations of these two drugs appear to increase the therapeutic index of triazolam. Here, we investigated these same combinations in rats trained to press a lever under a 10-response, fixed-ratio (FR) schedule of food pellet delivery. Dose-response functions for triazolam and pregnanolone were generated and individual drug ED₅₀'s determined (i.e., the dose that engendered 50% of the maximum rate-decreasing effect). Dose-response functions for combinations of the two drugs were then determined by co-administering the drugs in fixed proportions based on the relative potency of triazolam and pregnanolone (1:30, 1:100, 1:300). Isobolographic analysis of the rate-decreasing effects of triazolam-pregnanolone combinations revealed that the potencies of the combinations were supra-additive in relation to predicted values based on dose-additive effects. These results suggest that

supra-additive anxiolytic effects might be accompanied by similarly supra-additive impairments of rates of responding, which would likely reduce the therapeutic index of triazolam as an anxiolytic.

P6.54

ANTINOCICEPTIVE EFFICACY OF CHRONIC FLUOXETINE TREATMENT

Gerri A. Wilson, Jonathan M. Mitchell, J. Scott. Bittle, Yatrik J. Patel, Jennifer E. Naylor, Kevin B. Freeman, Michelle A. Tucci, and Hamed A. Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Fluoxetine, a selective serotonin reuptake inhibitor, is one of the oldest second-generation antidepressants on the market. Recent studies have shown that fluoxetine has antinociceptive effects, but the results were based on acute doses of the drug. The objective of our pilot study was to compare the antinociceptive efficacy of two chronic doses of fluoxetine treatment to a naïve control using adult male Sprague-Dawley rats and a model of acute thermal pain involving a hotplate analgesimeter (Omnitech Electronics, Inc.; Columbus, OH) set at 52.5°C. The treatment groups received 10 mg/kg or 20mg/kg of fluoxetine that was delivered daily for four months via Pillsbury sugar cookie dough. The naïve control group received nothing. Each animal was habituated to the hotplate enclosure for one minute on the day prior to testing. For the study, each rat was placed on the hotplate apparatus, and a built-in timer was started as soon as all four of the animal's paws touched the surface. The timer was stopped as soon as the animal displayed one of the following responses: paw lift, paw lick, or jump. Our results show that both fluoxetine treatment groups had longer latencies than the naïve control group, and that the latencies between the two doses were not significantly different. These data confirm that chronic fluoxetine treatment does have an antinociceptive effect.

P6.55

CHARACTERISTICS OF PHYSICIANS PRACTICING IN URBAN, RURAL, AND ISOLATED AREAS IN MISSISSIPPI

Ashley N. King¹ and Denise D. Krause²
*Tougaloo College, Tougaloo, MS USA*¹ *University of Mississippi Medical Center, Jackson, MS USA*²

Purpose: To provide information about the demographics and distribution of the physician workforce in Mississippi.

Objective/Hypotheses: To identify characteristics of the physician workforce in urban, rural, and isolated areas of Mississippi. We hypothesized that: The majority of physicians are located in urban areas. Physicians located in rural and isolated areas are older than those in urban areas. There are no gender differences in geographic distribution. The ratio of non-White physicians is more evenly geographically distributed than White physicians.

Methodology: Medical licensure data were obtained from the Mississippi State Board of Medical Licensure and cleaned. All physicians licensed in Mississippi were geocoded and mapped. A dataset of physicians practicing only in Mississippi was extracted. We downloaded and mapped a 4-- category

classification scheme of urban, large rural, small rural, and isolated areas by zip code. These data were merged with physician licensure data to classify each provider as practicing in one of these four areas in Mississippi. Combined data were mapped in ArcGIS 10.2, population statistics were calculated, and descriptive statistics were created in Tableau 8.1 to display results. **Results:** 60% of physicians practice in urban areas. A larger percentage of older physicians serve rural populations. Females are more likely to practice in urban areas than males. Races are similarly distributed throughout geographic areas. **Future Directions:** Next steps are to run chi squared tests and perform logistic regression analysis. Further studies may include comparing the distribution of physicians to dentists practicing in urban, large rural, small rural, and isolated areas of Mississippi.

Friday, February 27, 2016

MORNING

Room

PARALLEL SESSIONS

PLENARY SESSION III

8:15 OPENING REMARKS

O6.13

8:30 ACUPUNCTURE AND PRURITUS

Lan Zhou and Gailen Marshall

Univ. of Mississippi Medical Center, Jackson, MS

USA Introduction: Pruritus is a common chief complaint at many dermatology and allergy office visits. It accompanies many inflammatory skin diseases but may occur as the only clinical manifestation in otherwise normal skin. Pruritus often requires combined treatments but, in many cases there is still a poor therapeutic response. Complementary and alternative medicine (CAM) is becoming increasingly popular among patients with pruritus. Acupuncture is the oldest and most well-studied alternative option with most documented evidence-based effects related to pain relief. Recently acupuncture has also been successfully used to treat the pruritus of various dermatological diseases. Studies to define underlying mechanisms study are currently ongoing. Methods: English literature papers using acupuncture to treat pruritus are searched from PUBMED and reviewed. Results: Acupuncture has been used to treat pruritus from atopic dermatitis, urticaria, herpes zoster, uremic pruritus and neurogenic pruritus in various clinical studies. Proposed underlying mechanisms are related to inhibition of histamine-induced itch transmission, decreased allergen-induced basophil activation, changes in neurotransmitter levels, inhibitory effects on peripheral nerve activity and diminished activity in specific areas of the brain stimulated by itch including the anterior insula, the anterior middle cingulate cortex and striatum. Conclusions: Acupuncture was used to treat pruritus in some clinical studies. Novel therapies for patients with refractory pruritus are needed. Increased understanding will significantly impact the development and applicability of acupuncture in treating pruritus.

O6.14

8:45 INFLAMMATORY BIOMARKERS AND BLOOD PRESSURE VARIABILITY: THE GENETIC EPIDEMIOLOGY NETWORK OF ARTERIOPATHY

Harrison F To; Wanmei Wang, B Gwen Windham, Michael E Griswold, Thomas H. Mosley, Jr., and Kenneth R. Butler

University of Mississippi Medical Center, Jackson, Mississippi

The purpose of this study was to examine associations between inflammation and two common definitions of BP dipping status using 24-hour ambulatory blood pressure (ABMP) readings. ABMP monitoring and inflammatory biomarker assays of C-reactive protein (CRP), interleukin-6 (IL-6), and 15 other markers were performed in 722 phase 2 participants (mean age 64 (6.7) years, 36% men, 39% black, 83% hypertensive) in the Genetic Epidemiology Network of Arteriopathy (GENOA) Study (2001-2004). Non-dippers were categorized in two ways: (1) nocturnal systolic and diastolic BP both dipped by <10% compared to daytime values (n=161), and (2) only nocturnal SBP dipped by <10% irrespective of DBP (n=380). Inflammatory markers were log-transformed to account for skewness. Logistic regressions using generalized estimating equations, adjusted for age, race, and sex and accounting for sibship clustering, yielded odds ratios (OR) of dual non-dipper or systolic non-dipper status for inflammatory biomarkers. IL-6 (log-transformed) was associated with dual non-dipping status (OR=1.55 [95%CI:1.03,2.32] p=.035), translating into a 55% increase in the likelihood of being a dual non-dipper for every doubling of IL-6. Systolic non-dipping status was associated with both IL-6 (OR=1.63 [1.13, 2.35] p=.009) and CRP (OR=1.35 [1.08,1.68] p=.008). These results suggest that non-dipping classification should be approached with prudence, as the two different criteria may significantly influence conclusions about predictive marker associations. Our findings support the link between inflammation and non-dipping circadian BP patterns and provide novel biomarkers, which may be useful for early detection and subsequent prevention of CVD.

O6.15

9:00 HIPPOCAMPAL VOLUME IS ASSOCIATED WITH VERBAL MEMORY PERFORMANCE IN OLDER, BUT NOT YOUNGER ADULTS

Mike Schmidt, Michael Griswold, Kevin Freeman, and Thomas Mosley

University of Mississippi Medical Center, Jackson, MS USA

The hippocampus plays a key role in memory storage and retrieval. Over the adult lifespan, both hippocampal volume (HV) and memory ability decline, accelerating in dementia. Relationships between HV and memory have been widely reported in the elderly and in neuropsychiatric disorders, eg. dementia, major depressive disorder, and schizophrenia. This relationship remains poorly understood in normal populations. We utilized the Genetic Epidemiology Network of Arteriopathy study, whose participants are members of sibships in which at least one sibling had essential hypertension diagnosed prior to age 60 to examine associations between HV, measured by Freesurfer 5.3 segmentation of 1.5T T1 SPGR images, and verbal memory (VM), measured by the Rey Auditory Verbal Learning Test. Our participants underwent MRI and VM testing between 2001-06, and we excluded those with likely dementia (MMSE<=24;n=91), resulting in a sample of 546 African Americans (AA) (68% Female, age 63±8) and 650 non-Hispanic Whites (NHW) (62% Female, age 61±9). We used linear regression with Generalized Estimating Equations (GEE) to estimate slopes (β) while adjusting for expected covariates. The mean HV (left + right) was 7.9cm³ (SD=0.9) and the mean

RAVLT was 8.3 words recalled (SD=3.4). Overall, a 1cm³ decrease in HV was associated with $\beta=0.29$ fewer words recalled ($p=0.034$, $n=1189$). Stratifying over age revealed a significant positive association in older participants (≥ 70 years: $\beta=0.87$, $p<0.001$, $n=220$) but no association in younger participants (<70 years: $\beta=0.10$, $p=0.517$, $n=969$). These data support the hypothesis that hippocampal atrophy contributes to memory loss in advanced age, but not in younger adults. **Funding:** NIH U01 HL54434 NIH R01 NS41558

O6.16

9:15 COMPARISON OF CEA, NSE, AND CYFRA 21-1 FOR THE SERODIAGNOSIS OF LUNG CANCER

Alexandra Knopp, Mary Guo, James T. Johnson, and Margot Hall

University of Southern Mississippi, Hattiesburg, MS USA

There were 226,160 new cases of lung cancer in the US during 2012. There were 160,340 patients that died from lung cancer during 2012 *. Since early diagnosis and treatment leads to a better prognosis, the medical community is actively looking for new noninvasive tests for the disease. This includes the search for new effective tumor markers. Tumor markers are used in combination with other tests to diagnose cancer. After the diagnosis, they are used to follow a patient's case. The three tumor markers studied were neuron specific enolase (NSE), carcinoembryonic antigen (CEA), and CYFRA 21-1. In this study, the normal reference intervals were developed using sera from healthy donors. The analytical properties of the tumor marker assays were tested for and found to be satisfactory. The study was designed to compare the diagnostic and predictive values for the three tumor markers. Preliminary results on 638 patients (76 lung cancer patients, 562 healthy patients) included: (1) diagnostic % sensitivity (CEA 22.37%, NSE 0%, Cyfra 21-1 18.92%), (2) diagnostic % specificity (CEA 80.43%, NSE 99.39%, Cyfra 21-1 93.16%), (3) %PV+ (CEA 13.39%, NSE 4.17%, Cyfra 21-1 28.00%), (4) %PV- (CEA 88.45%, NSE 87.12%, Cyfra 21-1 89.09%), (5) %efficiency (CEA 73.51, NSE 86.65%, Cyfra 21-1 84.00%). It was hypothesized that CYFRA 21-1 would be superior to CEA and NSE for the sero- diagnosis of lung cancer in a cohort of patients, and the hypothesis was rejected. Cyfra 21-1 was not superior to CEA and NSE in the sero-diagnosis of lung cancer. References: *American Cancer Society. Cancer Facts and Figures 2012, Atlanta: American Cancer Society, 2012.

O6.17

9:30 EFFECTS OF ENDOTHELIN-A RECEPTOR AND ANGIOTENSIN CONVERTING ENZYME INHIBITION ON THE DEVELOPMENT OF PROGRESSIVE PROTEINURIA IN DIABETIC DAHL SS RATS WITH PRE-EXISTING RENAL DISEASE

Denisha Spires¹, Lateia Taylor², Kasi McPherson², and Jan Williams²

Tougaloo College MS USA¹ and University of Mississippi Medical Center MS USA²

The endothelin (ET) system has recently emerged as an interesting therapeutic target for the treatment of diabetic nephropathy (DN). Recently, we observed that ETA receptor blockade prevented the progression of renal disease in diabetic

Dahl salt-sensitive (STZ-SS) rats with pre-existing renal disease. Since angiotensin converting enzyme inhibitors (ACEi) are the first-line of therapy for patients with DN, the present study examined whether treatment with an ACEi (lisinopril) in combination with an ETA receptor blocker (ABT-627) would have a more beneficial effect on the progression of renal disease in STZ-SS than ETA receptor blockade alone. Nine week-old SS rats were treated with streptozotocin (STZ, 50 mg/kg, i.p.) to induce diabetes. After 3 weeks of diabetes, proteinuria increased to 353 ± 34 mg/day. The rats were then separated into three groups: (1) vehicle (drinking water) and (2) ABT-627 (5mg/kg/day) and (3) ABT-627+lisinopril (10mg/kg/day). After 6 weeks of treatment, MAP (via telemetry) and proteinuria decreased by 15% and 40%, respectively, in STZ-SS rats treated with ABT-627 alone. However, we observed a greater effect with combination therapy which produced a 20% and 70% reduction in MAP and proteinuria, respectively, in STZ-SS rats. These results indicate that chronic ETA receptor blockade alone or in combination with an ACEi delays the development of progressive proteinuria during diabetes-induced renal injury by primarily reducing arterial pressure. This research was supported by NIGMS NIH P20GM104357 and AHA 12SDG9440034.

O6.18

9:45 POST RENAL TRANSPLANTATION DIABETES MELLITUS IN RELATION TO CORTICOSTEROID DOSING

Victoria Purvis, Ashley Seawright, Truman Earl, and Chris Anderson

University of Mississippi Medical Center, Jackson, MS USA

The incidence of one-year post renal transplantation diabetes mellitus (PRTDM) approaches 30%. Corticosteroids are widely used for immunosuppression following kidney transplantation. However, they are known to induce hyperglycemia. Steroid minimizing protocols have been championed to prevent the development of PRTDM. We hypothesized that a change in our institution's steroid protocol would improve PRTDM. Methods: Sixty non-diabetic patients receiving renal transplants between 2010 and 2012 were retrospectively studied to determine the 1-year incidence of PRTDM. Prior to September 2011, patients received 500mg methylprednisolone as immunosuppression induction, 250mg methylprednisolone on post-operative day (POD) 1, 125mg methylprednisolone on POD 2, and prednisone 50mg weaned to 5mg/day over 3 months (regimen A). After, patients received 500mg methylprednisolone as immunosuppression induction, 1mg/kg (max 80 mg) of prednisone on POD 1 and 2, and prednisone 20mg weaned to 5 mg/day over 6 weeks (regimen B). The use of calcineurin inhibitors (tacrolimus) and anti-metabolites (mycophenolate) did not change. The incidence of development of PRTDM and length of hospital stay (LOS) were compared. Results: Thirty patients received regimen A and thirty patients received regimen B. The most common transplant indications were hypertensive nephrosclerosis, focal segmental glomerular sclerosis, and polycystic kidney disease. 9/60 (15%) patients developed PRTDM at one year; 4/30 from regimen A (13%) and 5/30 from regimen B (17%), $p=0.71884$. There was a trend toward decreased LOS in regimen B, but no significant difference (regimen A median 3.067 days and regimen B median

2.800 days, $p=0.30134$). Conclusion: We observed no decrease in the incidence of PRTDM at 1 year despite a more aggressive steroid weaning strategy. This suggests that other factors, such as calcineurin inhibitors, play a more important role in PRTDM. Further investigation is needed to optimize patient outcomes.

Friday, February 27, 2015

MORNING PARALLEL

SESSIONS PLENARY

SESSION IV

Room TC 229

8:15 OPENING REMARKS

06.19

8:30 DICHLOROMETHANE-DERIVED PSEUDOGNAPHALIMUM OBTUSIFOLIUM EXTRACT DECREASES PROLIFERATION OF BREAST DUCTAL EPITHELIAL ADENOCARCINOMA CELL LINE

Mary McDonnell, Kaylan Carter, Ohud Algahtani, and Angela Whittom Reiken

Mississippi College, Clinton, MS USA

Pseudognaphalium obtusifolium is an annual herb member of the Asteraceae family. Its population ranges across North America from Texas to Quebec. It has been extensively used in various forms within Native American medicine, which was later adopted by settlers. The therapeutic benefits of the herb are yet to be scientifically determined. This series of experimentation is for determining whether extracts derived from this herb are capable of being used as alternative therapies for treatment of various forms of cancer. Plant extracts were derived via a serial solvent extract method and suspended in dimethyl sulfoxide (DMSO). Of the derived extracts available, dichloromethane (DCM)-derived extract was chosen to determine whether the bioactive components affect the proliferation of MCF7 (breast ductal epithelial adenocarcinoma) cells by culturing in media reflecting serial dilutions of the extract. The method of determining changes in proliferation and ratios of live/dead cells were evaluated by flow cytometry analysis. The DCM-derived extract was found to decrease proliferation of the MCF7 cells in both a time and dilution-dependent manner. MTT cell viability and LDH toxicity assays along with microscopy were subsequently performed on MCF7 cells cultured in media containing specific extract dilutions for times indicated to significantly reduce proliferation.

06.20

8:45 EFFECTS WHOLE LEAF PSEUDOGNAPHALIMUM OBTUSIFOLIUM CHEMICAL EXTRACTS ON PROLIFERATION OF MCF7 ADENOCARCINOMA CELLS

Kaylan Carter, Mary McDonnell, and Angela Whittom Reiken

Mississippi College, Clinton, MS, USA

P. obtusifolium was well documented as a plant among the scientific community by the nineteenth century, and different benefits of this plant and the recipes for its use have been passed down through the word-of-mouth. This plant, once used to treat ailments not only among the native populations, but also early North American settlers, was popular until the early twentieth

century, as modern medicine became popular. Our aim in these experiments is to investigate the effects of *P. obtusifolium* whole leaf extracts on carcinoma cells and determine if the extracts decrease cellular proliferation, indicating possible anticancer properties. We have chosen to perform our studies utilizing the adenocarcinoma MCF7 cell line. The study presented focuses on the effects of whole leaf extracts, and results will be compared to additional studies involving hexane-, ethanol-, and dichloromethane-derived extracts obtained from *P. obtusifolium*.

06.21

9:00 TRICHOMONAS VAGINALIS VIRUS IN 8 ATCC CELL LINES

Karen Ezelle¹, Giancarlo Fernandez¹, John Meade², and Cory Toyota¹

*Millsaps College, Jackson, MS USA*¹ and *University of MS Medical Center, Jackson, MS USA*²

Trichomoniasis is the most prevalent non-viral sexually transmitted disease in the world is caused by infection with *Trichomonas vaginalis*. *T. vaginalis* is infected with up to four viruses known as TVV 1 – 4. We have analyzed eight cell lines from the ATCC for the presence of *Trichomonas vaginalis* virus. Total RNA was isolated from *T. vaginalis* trophozoites using guanidine thiocyanate/phenol based TRI Reagent RT (Molecular Research Center, Cincinnati, Ohio). Viruses were identified by RT-PCR using primers specific for individual TVV strains and the method was validated by DNA sequencing analysis. We report that all eight cell lines are infected with at least one TVV, three have TVV1-3, three have TVV 1 and 3. These stock isolates of *T. vaginalis* have been the focus of many published research projects (46 for ATCC30001 alone). Presence of these viruses has the potential to impact the results of literature studies. This work was supported by the Howard Hughes Medical Institute and the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

06.22

9:15 REGRESSION OF FUNCTIONAL CAPACITY OF SK-OV-3 OVARIAN CANCER LIKE CELL LINE BY SUSTAINED DELIVERY OF TQ AND EGCG

Jennifer Harpole, Michelle Tucci, and Hamed Benghuzzi

University of MS Medical Center Jackson, MS USA

Recent studies in our laboratory have indicated that the exposure of Thymoquinone (TQ) and Epigallocatechin-3-gallate (EGCG) to SK-OV-3 cells resulted in major pathophysiological responses. This study was executed to investigate whether continuous delivery by means of ceramic delivery system when compared to a conventional dose of TQ and EGCG can alter the invasive behavior of SK-OV-3 ovarian cancer like cell line. A total of 72 wells were plated with (10^5) SK-OV-3 ovarian cancer cells according to standard lab protocols. Each group was subdivided into 4 groups of 6 wells each. Group 1 served as control and groups 2, 3, and 4 were treated with TQ (16 μ M), EGCG (3 μ g/ml), and TQ + EGCG, respectively. Biomarkers and morphological evaluations were performed following standard lab techniques. The results are as follows: (1) TQ was more effective using a conventional dosing, (2) EGCG was more effective than TQ when given in a sustained manner; (3) the combination of TQ+EGCG yielded the same results regardless of

the route of administration; (4) TQ exposure induced high level of nitric oxide at 72 hour phase; (3) sustained dosing was found to be more effective in minimizing the functional activities of SK-OV-3 cells throughout the experiment; and (4) morphologically, no significant damage was observed at the cellular membrane in either the routes of administrations.

O6.23

9:30 KILLING CANCER NATURALLY

Bilal Qizilbash, Elizabeth Brandon, Alexandria Niswonger, Matthew Bear, Matthew Taitano, Jacob Morgan, and Maxwell Schwam

Mississippi College, Clinton, MS USA

Design and methodology: The natural context in which bioactive compounds are found in curly kale creates a concert of both agonist and antagonistic factors that could have significant anticancer effects. To test this hypothesis, we prepared kale juice in various forms: raw, sonicated juice (that was subsequently filter sterilized), filter sterilized juice, organic baby kale, and organic kale. Juiced lettuce was also tested. Serial dilutions were tested on melanoma cells to determine the optimum dosage for a four day treatment. Western blots were performed to assess cell death. Normal epithelial cells were used as controls. Original data and results: We found a dose-dependent decrease in cell growth and chose 0.7% juice for our experiments. Melanoma cells treated with unfiltered juice were killed by day four. Cells treated with the sonicated filtered juice had significantly reduced growth (8.63×10^5 cells/day $\pm$ 52,700 cells for control v. 1.05×10^5 cells/day $\pm$ 8,660 for sonicated kale juice, $p=0.01$). Western blots with a poly-ADP ribose polymerase (PARP) antibody showed two PARP fragments in the lysates from cells treated with kale juice. This suggests that the kale juices induced apoptosis. The raw juice was repeatedly the most effective and was non-toxic to normal mouse epithelial cells during a four day period. Juiced lettuce had no effect on the melanoma cells. Conclusion: Juiced curly kale induced apoptosis in melanoma cells. This research is the first to test the effects of the whole juice and may be effective on other cancer types.

O6.24

9:45 BIOLOGICAL EFFECTS OF NUCLEAR RADIATIONS

Amin Haque

Alcorn State University, Alcorn State, MS USA

Nuclear Radiations' alpha and beta particles, and gamma rays - cause ionizations of atoms, which may affect molecules, cells, tissues, organs, and the whole human body. All biological effects begin with the consequence of radiation interactions with the atoms. Each cell is mostly H₂O. The interactions break the bonds of H₂O molecule, producing H and OH free radicals. OH can combine with another OH to form H₂O₂, which is highly toxic. In addition, one of the H atoms of H₂O₂ can be knocked out readily to form a peroxide radical which then attacks other bio-organic molecules forming relatively stable organic peroxides. This process might prove fatal to the cell. If radiation interacts with the atoms of the DNA molecule, or some other cellular component critical to the survival of the cell, it may affect the ability of the cell to reproduce or the cell may be destroyed. Tissues which are young and rapidly growing are the most likely radiosensitive. Different

radiations have different effects because they distribute their energy differently. The balance between production and loss of cells can be upset by ionizing radiation. The typical response of cells to a continuous, low level radiation is an adaptation in which the output of new cells increases to compensate for higher losses due to radiation damage. The severity is generally dependent on the type of radiation, dose, dose rate, age at the time of irradiation and state of health.

10:00 BREAK

10:00-12:00 POSTER SESSION II

Undergraduates Display on Thursday (following Dodgen Lecture) and Present Friday (10:00-11:45), Base Pair display and present Friday (10:00-11:45)

P6.56

RATS WITH HYPERTENSION, HEMOLYSIS ELEVATED LIVER ENZYMES AND LOW PLATELETS (HELLP) HAVE INCREASED PLACENTAL AND FASL

Taylor Bowles, Kedra Wallace, Rachael Morris, and Keisa Mathis

University of Mississippi Medical Center, Jackson, MS USA

The CD95L or FASL system of apoptosis is part of the tumor necrosis factor family that contributes to cell death. Placental CD95L is up-regulated in women with HELLP syndrome and has been proposed to contribute to liver damage. The objective of the current study was to determine if animals with HELLP have increased CD95L similar to women with HELLP. Additionally, as the anti-inflammatory drug dexamethasone has been found to decrease inflammation in women with HELLP, we examined its' effects on circulating CD95L in women with HELLP. Whole blood was collected from women with HELLP before and after dexamethasone administration. On gestational day (GD) 12, sEndoglin and sFlt-1 infusion began via osmotic pump into normal pregnant (NP) rats. On GD18 carotid catheters were inserted, GD19 plasma and tissue were collected and CD95L was measured via western blot or enzyme linked immunosorbent assay. Women with HELLP had significantly higher levels of circulating CD95L compared to NP women. HELLP rats had significantly more circulating CD95L compared to NP rats (179.6 ± 24 vs. 117.1 ± 13 pg; $n=5$; $P=0.05$). HELLP rats also had increased production of placental CD95L. These data suggest that similar to women with HELLP, rats with HELLP have increased circulating CD95L. Future studies will examine the effects of dexamethasone on decreasing CD95L production.

P6.57

EVALUATION OF THE ANTI-MYCOBACTERIAL PROPERTIES OF P. OBTUSIFOLIUM PLANT EXTRACTS

Josh Irby, Aaron Blocker, Hallie Hodge, Chelsea Twiner, Taylor Shepherd, Joseph Kotnour, Dale Rosado, and Erin Norcross

Mississippi College, Clinton, MS USA

The emergence of multi-drug resistant and extensively drug resistant tuberculosis has led to a global effort to bring new

anti-TB therapies to market. *Pseudognaphalium obtusifolium*, an herbaceous plant that is a member of the family Asteraceae, was used in traditional medicine among many Native Americans. Other members of this plant family have been evaluated for antibacterial activity showing promise against Gram positive and mycobacterial pathogens. The primary goal of this project is to evaluate the anti-mycobacterial activity of *P. obtusifolium* whole leaf dichloromethane extract both alone and in the presence of established anti-mycobacterial drugs. Bacterial cultures were incubated with increasing concentrations of *P. obtusifolium* extracts for up to three days and minimum inhibitory concentration (MIC) was determined using broth microdilution method and flow cytometry. Eukaryotic cell viability was also determined using an MTS assay. Preliminary evidence shows that *P. obtusifolium* extracted using dichloromethane may inhibit the growth of *M. smegmatis* strains. This work shows the ability to test novel anti-mycobacterial agents. However, further testing including the use of simultaneous treatments with first-line TB medications is necessary. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.58

ADMINISTRATION OF ANTI-INFLAMMATORY CYTOKINE AMELIORATES BRAIN INFLAMMATION AND IMPROVES NEUROBEHAVIORAL PERFORMANCE IN JUVENILE RATS FOLLOWING NEONATAL EXPOSURE TO LIPOPOLYSACCHARIDE

Camilla Wright, Ruiqi Feng, Tembra Jones, Juying Shen, Yi Pang, Abhay Bhatt, and Lir-Wan Fan

University of Mississippi Medical Center, Jackson, MS USA

Our previous studies show that administration of IL-1 receptor antagonist (IL-1ra) can protect against systemic lipopolysaccharide (LPS)-induced inflammatory responses in the developing rat brain. The object of this current study is to further examine whether IL-1ra protects against LPS-induced chronic brain inflammation and ameliorates LPS-induced neurobehavioral dysfunction in juvenile rats. Intraperitoneal (i.p.) injection of LPS (2 mg/kg) or saline was performed on postnatal day 5 (P5) Sprague-Dawley rat pups, and IL-1ra (20 mg/kg) or vehicle was administered (i.p.) 5 min after LPS injection. Neurobehavioral tests were carried out from P14 to P21, and brain inflammation was examined at 16 days after LPS injection (P21). Our results showed that systemic LPS exposure resulted in neurobehavioral disturbances in juvenile rats and chronic inflammation, as evidenced by elevated levels of IL-1 β concentration of P21 rat brain. IL-1ra treatment significantly attenuated systemic LPS-induced disturbances in neurobehaviors, such as vibrissa-elicited forelimb-placing, movement initiation and responses in the elevated plus-maze and passive avoidance task. IL-1ra treatment also decreased systemic LPS-induced increases in IL-1 β concentration of P21 rat brain. Treatment with IL-1ra may provide protective effects against neonatal systemic LPS-induced chronic inflammation and neurobehavioral disturbances in juvenile rats, suggesting that the blockade of IL-1 β might be an effective treatment for chronic brain injury induced by infection/inflammation. (Supported by a NIH grant NIH/NINDS R01NS080844, Summer Undergraduate Research Experience (SURE) Program, and Newborn Medicine

Funds from the Department of Pediatrics, University of Mississippi Medical Center)

P6.59

NANOTECHNOLOGY-BASED APPROACH TO IMPROVE FERTILITY OUTCOMES IN SWINE

Hannah R. Nelson¹, Isabella C. Morales¹, Darby S. Dillard¹, Christy S. Steadman¹, Henry Clemente², Mark A. Crenshaw¹, Shengfa F. Liao¹, Scott T. Willard¹, Peter L. Ryan¹, and Jean M. Feugang¹

Mississippi State University, Mississippi, MS¹ and Clemente Associates, Inc., Madison, CT²

Pork is the most widely consumed meat in the world. The sustainable supply of these markets relies on the maintenance of highly fertile pigs on farms. Currently, numerous factors are known to influence swine fertility, and the use of selected breeds and improved-farming systems contributes to minimizing production losses. Still, many other factors that impact boar fertility remain uncharacterized. Here, we took advantage of the recent advances in nanotechnology to test a novel approach to selecting high quality spermatozoa for breeding programs. In this preliminary study, magnetic nano-devices designed to specifically interact with defective or poor performing spermatozoa were mixed with freshly collected boar semen and incubated in appropriate conditions. Mixtures were submitted to a magnetic field for a serial elimination of free and sperm-bound nano-devices. A total of seven sister gilts were inseminated with normal (n=3 gilts) and nanopurified (nano-device free; n=4 gilts) semen. Thirty days following inseminations, two gilts in the control group were diagnosed non-pregnant and remaining gilts maintained pregnancies until farrowing. Totals of 17 piglets were born alive in the control group, versus 55 in the nanopurified ($\approx 14 \pm 1$ /gilt). Equal percentages of piglets were weaned alive ($\approx 77\%$) and comparable growth performance, in terms of weekly weight gain, crown-rump length, and heart girth was observed between groups. Interestingly, nanopurified semen generated a higher proportion of males that averaged 55%, versus 38% in the control. Findings indicate that male fertility may benefit from nanopurification technology that improves semen quality. Further studies with larger groups of gilts are needed. Work supported by the USDA-ARS Special Initiative no. 58-6402-3-0120

P6.60

TRICHOMONAS VAGINALIS VIRUS TREATMENT WITH RIBAVIRIN

Allison, K. Judge¹, Karen E. Ezelle¹, J. Chris Meade², and Cory G. Toyota¹

¹Millsaps College, Jackson, MS 39210 and ²University of Mississippi Medical Center, Jackson, MS USA

Trichomoniasis is the most prevalent non-viral sexually transmitted disease in the world is caused by infection with *Trichomonas vaginalis*. *T. vaginalis* is infected with up to four viruses known as TVV 1 – 4. *Trichomonas vaginalis* virus was treated with ribavirin (RBV), a nucleoside analogue inhibitor of RNA-dependent RNA polymerases. *T. vaginalis* was treated with varying concentrations of RBV and the presence of TVV was determined by a reverse-transcriptase PCR assay of total RNA isolated at varying times. Viruses were identified by RT-PCR using primers specific for individual TVV strains. Preliminary results suggest that TVV1-4 are knocked down by RBV treatment and all TVVs are affected similarly. In addition

to understanding the effect of RBV on TVV, which has clinical implications, the creation of both TVV-positive and negative strains of *T. vaginalis* will allow investigation into the effects of TVV in its *T. vaginalis* host. This work was supported by the Howard Hughes Medical Institute and the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.61

EVALUATION OF ANTI-MYCOBACTERIAL AGENTS USING MYCOBACTERIUM SMEGMATIS

Hallie Hodge, Chelsea Twiner, Josh Irby, Aaron Blocker, Taylor Shepherd, Joseph Kotnour, Dale Rosado, and Erin Norcross

Mississippi College, Clinton, MS USA

Background and Objective: Mycobacterium tuberculosis, the causative agent of tuberculosis, has rapidly gained resistance to many first-line treatments. Ethambutol (EMB) inhibits the arabinosyl transferase enzymes responsible for synthesizing components of the bacterial cell wall. This experiment's purpose is to evaluate the anti-mycobacterial activity of novel structural analogues of EMB using multiple *M. smegmatis* strains as the model organisms. **Methods:** Bacterial cultures were incubated with increasing concentrations of the drug for up to three days and minimum inhibitory concentration (MIC) was determined using broth microdilution method and flow cytometry. Eukaryotic cell viability was also determined using an MTS assay. **Results:** The MIC was defined as the lowest concentration of drug that inhibited bacterial growth. The values obtained for EMB were within the previously published range (1.5-5 g/mL) while the values for the analogues showed considerable variation. **Discussion and Conclusions:** This work shows the ability to test novel anti-mycobacterial agents. However, treatment of TB involves multiple medications given simultaneously, so additional testing of the drugs in combination with other first-line medications is an important future experiment. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.62

THE EFFECT OF SELENOMETHIONE ON COX-2 EXPRESSING CELL LINES

Tanita Parshotam, Jasmine Jones, Justin McDaniel, Ciara Frizzell, Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Currently, selenium is being evaluated for its anticancer effects against COX-2 expressing cells such as colon and human prostate cancer, respectively. Panc-1 and FADU cells are similar to prostate and colon cancer cells in that they express higher levels of the Cox 2 enzyme. We tested the hypothesis that selenomethione (SelMet) can inhibit proliferation of laryngeal and pancreatic cancer cell lines. Cells were challenged for periods of 24, 48, and 72 hour with a dose of SelMet that was proven to be effective in prostate and colon cancer cells. Cellular protein levels were not affected by SelMet after 24 hours, but display changes in cellular morphology. After 48 hours of treatment

reductions in cellular protein and glutathione levels were observed. Overall, the results show a modest reduction in Panc-1 and FADU cells. Selenomethione may be more effective if used in combination with known anti-chemotherapeutic drugs.

P6.63

THE EFFECT OF SELENOMETHIONE IN COMBINATION WITH DOXORUBICIN ON COX-2 EXPRESSING CANCER CELL LINES

Justin McDaniel, Ciara Frizzell, Jasmine Jones, Tanita Parshotam, Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Pancreatic carcinoma and laryngeal cancers have poor prognosis, thus any therapeutic improvement is imperative. Doxorubicin (DOX), is now in clinical trials for targeted therapy of several sex hormone-dependent tumors. PANC-1 and FADU are cell lines that have limited treatment options, and both cell lines are capable of developing resistance. We tested the hypothesis that combining doxorubicin with selenomethione would improve the effectiveness of the doxorubicin. Cells were treated with doxorubicin, selenomethione, or combination of doxorubicin and selenomethione for periods of 24, 48, and 72 hours, and evaluated for cell growth, apoptosis, and cellular stress. Our results show that a combination of selenomethione and doxorubicin was more effective in reducing cancer cell load after 48 hours in culture. By 72 hours, evidence of apoptosis was seen in the combination treatment group when compared with control and agents used independently. The data suggests that selenomethione is capable of sensitizing the cells to the effects of the chemotherapeutic agent.

P6.64

FOOTBALL MOUTHPIECE MICROBIOTA

Mary Catherine Reynolds, Meghan Johnson, Niki Patel, Theodore E. Snazelle

Mississippi College, Clinton, MS USA

The purpose of the football mouthpiece investigation was to determine the microbiota diversity of football mouthpieces using the Biolog Gen III Microstation. *Staphylococcus hominis* was the predominant organism isolated (18% of all isolates). The isolated microbiota species of our research came from samples obtained with Transystem Liquid Stuart Plastic Rayon Tipped Applicators from the trough area of football mouthpieces and subsequently grown on Biolog BUG-B plates, a type of blood agar plate. The bacterial isolates were identified using 96 well, GEN III microplates, incubated at 35°C for 24 hours, and subsequently read on the Biolog GEN III Microstation. 37% (14) of all the isolates were *Staphylococcus* sp., 18% (7) *Streptococcus* sp., 8% (3) *Bacillus* sp., 5% (2) *Acinetobacter* sp., 5% (2) *Mycobacterium* sp., 5% (2) *Neisseria* sp., and 8 single isolates: *Actinomyces bovis*, *Capnocytophaga gingivalis*, *Carnobacterium maltaromaticum*, *Cellulomonas biazotea*, *Curtobacterium flaccumfaciens*, *Lactobacillus coryniformis* ss *torquens*, *Pseudomonas fulva*, and *Rothia mucilaginosa*. Furthermore, 84% (32) of the isolates were Gram-positive and 16% (6) Gram-negative. Significantly, 28 isolates identified are part of the normal skin and oral cavity flora of humans. Ten other isolates identified are found in other natural environments such as soil or the skin and mucosa of livestock.

P6.65

THE EFFECTS OF INCREASED EXPOSURE TO UVC LIGHT ON HUMAN SKIN MICROBIOTA

T'Kylia Moss and Mary Lux

University of Southern Mississippi, Hattiesburg, MS USA

Many methods have been employed to prevent infections from opportunistic pathogens in immunocompromised individuals. Among these are the use of ultraviolet light (UV). In this study, UVC light, was found to have a deleterious effect on specific skin flora. Organisms tested included *Acinetobacter baumannii*, *Candida albicans*, *Candida kefyr*, *Corynebacterium renale*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Streptococcus pyogenes*. Nutrient agar was used to cultivate most organisms. Blood agar was used for the cultivation of *Streptococcus pyogenes* and *Enterococcus faecalis*. Bacterial suspensions were made and utilized to plate each organism onto a set of 5 nutrient agar or blood agar plates. A portion of each of the 5 plates was then exposed to UVC light for 15, 30, 45, 60, 75, and 90 seconds respectively. For each organism, increased exposure to UVC light resulted in a decrease of the number of colony forming units observed in the portion of the plate that was exposed to the UVC light. These data suggest that UVC light acts as an efficient bactericidal agent. Results obtained in this study may lead to innovative uses for UVC light in the prevention of disease.

P6.66

OUTBREAK TRACKING: PSEUDOMONAS AERGINOSA IN A NEWBORN INTENSIVE CARE UNIT

Xan Haven, Elham Ghonim, and Donna C. Sullivan

University of Mississippi Medical Center, Jackson, MS USA

Background: *Pseudomonas aeruginosa* is gram negative bacilli well adapted to survive in nutrient poor conditions such as water systems where it forms biofilms. It is an important opportunistic pathogen in the immunocompromised, including patients in intensive care. **Objective:** A cluster of five cases associated with *P. aeruginosa* were observed over 4 weeks in the newborn intensive care unit (NICU). Patient and NICU environmental isolates were evaluated to determine genetic relatedness. **Methods:** Patient isolates were grown on agar plates. Bacterial DNA was isolated and concentrations were determined. For analysis of genotype, multilocus sequence typing (MLST) database was used (<http://pubmlst.org/paeruginosa/>) for protocol conditions as well as analysis. Strain types (ST) were determined based on allele assignment for 7 housekeeping genes, with each allele designated by a number corresponding to known sequences. DNA from 11 *P. aeruginosa* isolates were amplified by polymerase chain reaction (PCR) for the 7 genes. Amplicons were purified and sequenced. **Results:** Of the 11 isolates, 6 were ST 471 (3 patient, 3 environmental). The 3 identical environmental samples were obtained from a water vent associated with the NICU bed of one patient who also had ST 471. **Conclusions:** The population structure of *P. aeruginosa* in considered to be non-clonal with rare epidemic or clonal complexes. MLST analysis linking 3patients and an environmental source is indicative of common transmission. Tap water could have acted as the vehicle of transmission, contaminating staff and patients as a result of personal care activities and may have played a role in

this outbreak. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.67

GROWTH AND CELL VIABILITY OF SKOV-3 CELLS FOLLOWING TREATMENT WITH INOSITOL 6 PHOSPHATE.

Giorgio Grant, Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Inositol 6-phosphate (IP-6) has demonstrated novel anti-cancer activity using several different tumor models. IP-6, a phytoestrogen, has estrogen receptor (ER) binding capabilities that are not known to cause cellular proliferation in hormone sensitive cells. It is hypothesized that IP6 can induce competitive inhibition with estrogen for estrogenic binding sites on cancer cells resulting in decreased proliferation. SKOV-3 are ovarian estrogen receptor positive cell line. The cells were seeded onto a 24 well plates at a density of 1×10^6 cells per well. Cells were grouped into control and IP-6 treatment (1 mM) (n=18 per time). The cells were harvested after 24, 48 and 72 hours of treatment. Cellular protein, cellular glutathione, and cellular morphology were evaluated. All data are expressed as mean $\pm$ SEM and each data set were analyzed by student t-test and significance was determined at $p < 0.05$. Cells treated with 1 mM IP-6 did not show a change in cellular protein or intracellular glutathione levels for the duration of the study. However, by 72 hours in culture, cytological analysis of the cells showed changes in the morphology of the nucleus in cells treated with IP-6. Our findings are consistent with other researchers showing anti-estrogenic treatments such as tamoxifene does not affect SKOV-3 cells. A recent report suggest that SKOV-3 cells have functional estrogen receptors that are capable of binding estrogen receptors and they concluded that the SKOV-3 cells exhibit estrogen resistance which may be a result of constitutive expression and loss of E_2 regulation of selected growth regulatory gene products rather than a defect in estrogen activation of ER as a transcriptional regulator. Additional work with these cells are needed to characterize the estrogen resistant mechanism. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.68

THE EFFECTS OF OMEGA 3 FATTY ACIDS ON SKOV-3 CELLS

John M. Lee, Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

A recent report suggest that men who have higher levels of omega-3 fatty acids have higher a 43 percent chance of developing prostate cancer and a 71 percent chance of developing the high grade form of the disease. The effect of Omega 3 fatty acids on ovarian cancer cells has not been performed. The objective of our study was to determine the effects of Omega 3 fatty acids on estrogen positive high grade cancer cell line to evaluate changes in cellular protein, glutathione, and morphology over time. SKOV-3 cells were

challenged with 200 mg/ml of a blend of omega 3 fatty acids (alpha linolenic acid, linoleic acid, and oleic acid) for periods of 24, 48, and 72 hours. Our results show a statistically significant increase in cellular protein levels after 24 hours. The cellular glutathione levels were increased for the duration of the study. Changes in intracellular glutathione levels were most notable at 24 hours where there was a two fold increase compared with untreated cells. Evaluation of the cellular morphology confirms increased cell numbers with hyperchromatic nuclei. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.69

CAN NONSTEROIDAL ANTI-INFLAMMATORY DRUGS IN COMBINATION WITH 5-FU ENHANCE APOPTOSIS IN FADU?

Erica Chen, Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Many studies have shown that aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) have the ability to inhibit the propagation of a number of cancer cells. A high concentration of the cyclooxygenase enzymes, specifically cyclooxygenase II (COX-II), has been found in many tumors. The COX-II enzyme has become a main target for NSAIDs, due to its overexpression in a majority of tumors, along with a common chemotherapy drug, 5-Fluorouracil (5-FU). This study evaluated 5-FU as a single treatment, varying doses of Advil (NSAID) as a single treatment, and Advil (NSAID) in combination with 5-FU. This study serves to explain the mechanism of action of 5-FU, Advil, and Advil in combination with 5-FU, in a hypopharyngeal carcinoma as evidenced by its effect on the FaDu cell line. Additionally, the purpose was to also understand the mechanisms by which Advil (NSAIDs) could enhance the cytotoxic effect of 5-FU and increase the percentage of apoptosis in the cancer. Our results show NSAIDs in combination with 5FU are capable of reducing FADU tumor cells more effectively than when either are used independently. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.70

THE EFFECT OF CAPTOPRIL AND ANGIOTENSIN ON THE HUMAN CARCINOMA A549 CELL LINE

Olicia Spears², Gerri Wilson, Matt Mitchell, Michelle Tucci, and Hamed Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA and Mississippi College, Clinton, MS USA²

Angiotensin II and angiotensin receptors are required for the pathogenesis of lung fibrosis. Angiotensin has a number of profibrotic effects on lung parenchymal cells that include the induction of growth factors for mesenchymal cells, extracellular matrix molecules, cytokines and increased motility of lung fibroblasts. Angiotensin is also proapoptotic for lung epithelial cells, and is synthesized by a local system after lung injury by a variety of agents. Recent evidence shows that the

counter regulatory molecule angiotensin 1-7, the product of the enzyme angiotensin converting enzyme 2 (ACE-2), inhibits epithelial cell apoptosis and thus acts as an anti-fibrotic epithelial survival factor. A549 cells are known to over-express angiotensin II and produce ACE-2. The goal of this study was to determine angiotensin is capable of inducing apoptosis in A549 cells and if the addition of captopril, an ACE inhibitor, can further increase apoptosis. Our results show a decline in the cell viability and increased apoptosis following both angiotensin and captopril treatment as early as 24 hours following treatment with increasing doses. Cell swelling and disruption of both cytoplasm and nucleus was evident in combination treatment. The combination treatment may increase epithelial cell destruction and play a role in lung cancer treatment. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P6.71

IS THE CUP HALF EMPTY OR HALF FULL: FALSE NEGATIVE IMMUNOASSAY SCREENING FOR METHAMPHETAMINE

Jewel Robertson and Stacy Hull Vance

University of Mississippi Medical Center, Jackson, Mississippi USA

A urine drug screening can detect cases of illegal drug, prescription medications, workplace safety, and monitor drug therapy compliance. Immunoassay screening test are used to rule out specimens that do not contain drugs of abuse above an established threshold. Once a specimen screen is positive the sample must be confirmed using Gas chromatography with mass spectrometry (GC-MS). **HYPOTHESIS:** Our hypothesis is the screening test was negative due to the metabolism of methamphetamine by the CYP2D6 enzymes. **OBJECTIVE:** The objective of our study was to investigate the negative immunoassay screen for Amphetamine and positive confirmation test using GC/MS. **CASE DESCRIPTION:** A 1 year old white male presented to the PER with lethargy and possible ingestion of a foreign substance. The patient's father and uncle had a history of Methamphetamine use. **DISCUSSION:** Most amphetamine immunoassays are not specific and can result in a positive drug screen due to the presence of amphetamine, methamphetamine, over the counter cold products and prescription drugs. Confirmatory testing is required when a screening test is positive or a suspected false negative result is suspected. GC-MS is considered the gold standard technique for comprehensive drug screening due to its high specificity and high reproducibility. **CONCLUSION:** The immunoassay screening test for amphetamine was below cut off levels and resulted in a false negative screen for methamphetamine when the specimen was confirmed positive using GC-MS. Factors that can affect immunoassay results include: the time since drug usage, amount and frequency of the use, fluid intake, body fat, and metabolic factors.

P6.72

SPECIFIC ANTIOXIDANT, PTEROSTILBENE, FAILS TO REDUCE BLOOD PRESSURE IN FEMALE SPONTANEOUSLY HYPERTENSIVE RATS.

Cameron Sanders, Carolina Dalmasso, Andrew Harris, and

Jane Reckelhoff

Base Pair Program Murrah High School, Jackson, MS USA
and University of Mississippi Medical Center, Jackson, MS USA

Many studies have shown that oxidative stress plays a role in mediating hypertension in male animal models. In female animals, however, most generic antioxidants fail to reduce their blood pressure. In the present study we determined whether a specific antioxidant, pterostilbene, a metabolite of resveratrol, would reduce the blood pressure in aging female spontaneously hypertensive rats (SHR). Rats, aged 20 months (n=2-3/grp), were implanted with radiotelemetry transmitters in the abdominal aorta, and two weeks later, baseline blood pressure was measured continuously 24 hrs per day for 7 days. Then rats were treated with pterostilbene (20 mg/kg/day i.p. in 0.5% ethanol in 0.9% NaCl) or vehicle for 7 days while blood pressure was measured. Baseline mean arterial pressure averaged 162 $\pm$ 10 mm Hg. Placebo treated rats had mean arterial pressure of 153 mm Hg (n=2); pterostilbene failed to reduce the mean arterial blood pressure in treated females (158 $\pm$ 12 mmHg; n=3). These data support our previous studies that antioxidants fail reduce the blood pressure in female SHR, suggesting that perhaps one of the reasons why in clinical trials antioxidants have not been able to reduce blood pressure in hypertensive individuals is that the drugs do not work in women. The data also suggest that the mechanisms responsible for hypertension in females may be different than in males. Supported by NIH HL66072.

P6.73

T CELL-DEPENDENT B CELL ACTIVATION PLAYS A ROLE IN MEDIATING HYPERTENSION AND PATHOPHYSIOLOGY IN RESPONSE TO CD4+ T CELLS FROM REDUCED UTERINE PERFUSION PREGNANT RATS

Nathan Campbell, Javier Castillo, Denise Cornelius, Justin Porter, Alexia Thomas, Lorena Amaral, Kedra Wallace, Janae Moseley, and Babbette LaMarca

Base Pair Program Murrah High School, Jackson, MS USA
and University of Mississippi Medical Center, Jackson, MS USA

Preeclampsia, (PE) newly developed hypertension during pregnancy, is associated with altered immune activation. We have previously shown that adoptive transfer of CD4+T cells from a rat model of PE, the RUPP Rat, increases blood pressure, endothelin (ET) expression, oxidative stress (ROS), inflammation, and agonist autoantibodies to the AT1 receptor in NP recipients, all of which have been shown to play a role in hypertension during pregnancy. The objective of this study was to determine if blockade of lymphocyte crosstalk via the CD40-CD40 ligand interaction between RUPP CD4+ T cells with endogenous B cells in NP recipient rats would improve pathophysiology observed previously with RUPP CD4+ T cells. To do so splenic CD4+ T lymphocytes were magnetically separated, incubated with 2.5 μ g/mL anti-CD40 ligand (α CD40L) overnight and transferred into Normal Pregnant (NP) rats on day 12 of gestation (NP+ α CD40L RUPP T cells). On day 19 of gestation, blood pressure (MAP), blood, and tissues were collected from all groups of rats. MAP was 99 $\pm$ 1.2 in NP (n=18), 120 $\pm$ 2.3 mmHg in control RUPP rats (n=19;P<0.001); 121 $\pm$ 1.2 in NP+RUPP T cells(n=5;P<0.001); but only increased to 103 $\pm$ 1.7 in NP + α CD40L RUPP T cells (n=21) (P<0.001 vs NP+RUPP T cells). Placental ROS increased from 160.4 $\pm$ 31 in NP to 380.5 $\pm$ 60.7 in RUPP (p<0.05) and 318.6 $\pm$ 89 in

NP+RUPP T cells. CD40 ligand binding reduced placental ROS to 118.7 $\pm$ 24 in NP + α CD40L RUPP T cells (p<0.05). Plasma IL-6 increased from 38.71 $\pm$ 8 in NP to 92.94 $\pm$ 15 in RUPP (p<0.05) and 107.4 $\pm$ 26 in NP+RUPP T cells and only increased to 50.1 $\pm$ 3.6 pg/ml in NP + α CD40L RUPP T cells. TNF-alpha increased from 10.9 $\pm$ 5 in NP to 79 $\pm$ 15 in RUPP (p<0.05) and 23 $\pm$ 17 in NP+RUPP T cells and was only 8 $\pm$ 3 pg/ml in NP + α CD40L RUPP T cells. Plasma sFLT-1 increased from 79 $\pm$ 14 in NP to 172 $\pm$ 34 in RUPP (p<0.05) and 107 $\pm$ 9 in NP+RUPP T cells and was only 74 $\pm$ 21 pg/ml in NP + α CD40L RUPP T cells. These studies indicate that placental ischemic induced T cell communication with B cells is one important mechanism of PE that leads to much of the pathophysiology of the disease. *This work was supported by NIH grants RO1HD067541 and T32HL105324*

P6.74

NOISE EXPOSURE RESULTS IN VESTIBULAR DEFICITS IN RATS

Emily Gomez¹, Courtney Jernigan², Yue Yu⁴, Jun Huang⁵, Xuehui Tang⁴, Jerome Allison⁵, Adel Maklad⁵, William Mustain⁴, David Sandlin², Justin Hyde³, Eden Yelverton³, Wu Zhou⁵, Hong Zhu⁴,

Base Pair Program Murrah High School, Jackson, MS USA¹
and University of Mississippi Medical Center, Jackson, MS USA²

The vestibular system responds naturally to head acceleration and sound. It is known that extensive noise exposure leads to sensorineural hearing loss. A large proportion of subjects experiencing noise-induced hearing loss show signs of vestibular deficiency, but little is known about the underlying mechanisms. The goal of the current study was to explore the effect of noise on the peripheral vestibular system by studying morphological changes in vestibular hair cells and by recording vestibular afferents sensitivity to rotation and sound stimulation following noise exposure. To test the hypothesis that exposure to high intensity noise (116 dB pSPL) causes peripheral vestibular damage, rats were exposed to continuous broadband white noise (0-24 kHz) at an intensity of 116 dB sound pressure level (SPL) via an insert ear phone for three hours under isoflurane anesthesia. Seven days after noise exposure a 45 decibel (dB) hearing threshold shift was documented with auditory brainstem response (ABR) testing, indicating hearing loss. Single unit extracellular recording was carried out from the vestibular nerve during a series of rotations and then during 80 dB broadband click stimulation. After recording, rats were perfused and the vestibular end organs were collected for morphological analysis. Preliminary analysis indicates a decrease in sound-sensitivity of vestibular afferents as well as a decrease in stereocilia bundle count with no decrease in afferent sensitivity to rotation. These findings indicate noise exposure damages sensory cilia of vestibular hair cells and causes decreased peripheral vestibular function.

P6.75

ANTI-INFLAMMATORY CYTOKINE INTERLEUKIN-1 RECEPTOR ANTAGONIST ATTENUATES LIPOPOLYSACCHARIDE-INDUCED NEUROBEHAVIORAL DEFICITS AND BRAIN INFLAMMATION IN NEONATAL RATS

Tembra Jones¹, Samir Mamoon¹, Camilla Wright², Juying Shen², Yi Pang², Abhay Bhatt², Lir- Wan Fan²

Base Pair Program Murrah High School Jackson, MS USA¹ and University of Mississippi Medical Center Jackson, MS USA²

Our previous study indicated that neonatal Lipopolysaccharide (LPS) exposure resulted in brain inflammation, as indicated by sustained activation of microglia and elevation of interleukin-1beta levels in the brain. The objective of our current study was to examine whether the IL-1 receptor antagonist (IL-1ra) reduces systemic LPS-induced brain inflammation and neurobehavioral dysfunction. Sprague-Dawley rat pups received intraperitoneal (i.p.) injection of LPS (2 mg/kg) on postnatal day 5 (P5). IL-1ra (100 mg/kg) or vehicle was administered (i.p.) 5 min after LPS injection. The control rats were injected (i.p.) with sterile saline. Neurobehavioral tests and brain inflammation examinations were carried out on P6. Our results show that neonatal systemic LPS exposure resulted in neurobehavioral deficits which were associated with neuroinflammation, as evidenced by increase of IL-1beta concentrations. IL-1ra treatment significantly ameliorated LPS-induced neurobehavioral impairments, including impaired righting reflex, negative geotaxis, wire hanging maneuver, and hind limb suspension test. IL-1ra treatment also attenuated LPS-induced increase of brain IL-1beta levels. In summary, our data suggests that due to its potent anti-inflammatory property, IL-1ra may protect developing brain against systemic infection/inflammation.

P6.76

INFLAMMATION HYPEROXIA AND WHITE MATTER INJURY

Joseph Araujo^{1,2}, Lir-Wan Fan¹, Xuemai Dai¹ and Yi Pang¹

University of Mississippi Medical Center Jackson, MS USA¹ and Base Pair Program Murrah High School Jackson, MS USA²

As microglia have been shown to play critical roles in early neural development, the activation of microglia may lead to dysregulation of early neurodevelopment programs. To further understand the neurodevelopmental consequence of microglia activation, we investigated the effect of endotoxin (LPS) exposure on key aspects of neural development in rat pups. Rat pups received LPS injections or sterile saline as a control. Both male and female rat pups were included in this study. Inspection of microglia (IBA1 immunostaining) activation tissue samples from the pups revealed that LPS injections caused an increase in microglia activation, and we also found that the proliferation of neural progenitor cells is increased. However, apoptosis, which is a critical step to control neuronal numbers during development, was significantly reduced by LPS treatment as compared to the control. Our data suggests that early life neuroinflammation may result in excess number of neural cells, which is in line with clinical findings that brain volume is increased in autism spectrum disorder patients.

P6.77

EFFECTS OF BENZODIAZEPINE ON SLEEP AND HOMEOSTASIS IN ADULT RATS

Tyrone McDonald¹, Katherine Hall², James Rowlett², Daniela Rueedi-Bettschen², James Shaffery²

Base Pair Program Murrah High School Jackson, MS USA¹ and University of Mississippi Medical Center Jackson, MS USA²

Insomnia is a very common disorder and the main

treatment are benzodiazepines (BDZ). The aim of this project is to study the effects of several different BDZ-receptor agonists on sleep patterns in adult rats. Sprague-Dawley rats were implanted with standard sleep recording electrodes. After a recovery of 6-7 days, the rats were put into individual cages and recorded for a 48hr period of undisturbed (baseline) sleep and wake. The rats then received a dosage of one of the four drugs: Triazolam, Zolpidem, TPA (TP003; a GABA-A receptor agonist, functionally selective for the alpha3 subunit), or vehicle, as a control. We recorded sleep and wake for 48hr. The rats received a 1 day rest period, and then injected with either a different drug, the same drug at a different dosage, or vehicle. The computer digitized EEG and EMG polygraphic activity were visually scored into Slow Wave Sleep, Rapid Eye-Movement Sleep or Wake in sequential 15 seconds epochs. From this time in state, bout length and frequency were derived. Spectral analysis of standard sleep frequency bands was determined within each of the scored stages. Using this data we hope to discover how specific BDZ-receptor subunits affect adult sleeping patterns.

P6.78

IN SILICO ANALYSIS OF EBOLAVIRUS EVOLUTION

Douglas Campbell², Stephen Stray¹

Base Pair Program Murrah High School, Jackson, MS USA¹ and University of Mississippi Medical Center Jackson, MS USA²

Ebolavirus comes from Africa and is a member of the family Filoviridae. As of 2014 a new outbreak of the Ebolavirus has started in Africa. There is currently no vaccine or treatment for Ebola. The purpose of this study is to track mutations in the Ebolavirus surface glycoprotein. Sequences of the Ebola surface antigen were found on a database that is publically available: <http://www.ncbi.nlm.nih.gov/pubmed>. Amino acid sequences were converted into numerical values based on the total surface area, nonpolar surface area, polar surface area, and charge of individual amino acids. Sequence changes were classed as either spontaneous or fixed changes, depending upon whether a particular change was perpetuated across multiple sequences. We have mapped the changes onto a structural model of the Ebola surface glycoprotein bound to antibodies from a survivor of Ebolavirus. Tracking these changes allows us to pinpoint areas of mutation that may lead to immunity from this antibody. We found that there were no changes at the binding sites of the antibodies. The high magnitude changes were located near what are believed to be receptor binding sites. It should be noted that only a small number of Ebolavirus isolates have been sequenced to date; future research using a larger sequence database could improve the reliability of results. These studies may aid design of potential vaccines to prevent future Ebolavirus outbreaks.

P6.79

TREATMENT DEPTH EFFECTS OF THE ZAVATION LUMBAR BONE GROWTH STIMULATOR

Gerri A. Wilson, Jonathan M. Mitchell, Michelle A. Tucci, and Hamed A. Benghuzzi

University of Mississippi Medical Center, Jackson, MS USA

Lumbar spinal fusion is one of the more common spinal surgeries, and its use is on the rise. If the bone fails to fuse properly, then a pseudarthrosis or "false joint" develops and results in pain, instability, and disability (Reid 2011). Since 1974, three types of electrical stimulation technologies have been

approved for clinical use to enhance spinal fusions. One such technology is inductive coupling, which includes combined magnetic fields (CMFs). The purpose of this study was to evaluate the effects of a CMF device known as the Zavation Lumbar Bone Growth Stimulator (Zavation, Brandon, MS) on MG-63 (ATCC® CRL1427™) human osteosarcoma cells at treatment depths ranging from 0.5" to 6.0". The cells were grown to confluence on 4-well chamber slides that were kept in a nickel-alloy chamber within an incubator to shield the cells from unwanted environmental electromagnetic fields. During treatment, a specially designed apparatus held both the treatment device and the chamber slide. Briefly, the chamber slide was placed inside an acrylic tube at a specific distance from the transducer housing, and the device was turned on for 30 minutes. The chamber slides were then returned to the incubator to be assayed and stained at later dates. The alamarBlue™ cell viability assay and hematoxylin and eosin staining were used to demonstrate cell viability and morphology, respectively, at various time points including 3 days post-treatment (PT), 7 days PT, 14 days PT, and 21 days PT. Our results showed that compared to control cells, the cells located at 3" had the greatest increase in viability whereas those located from 0.5" to 1.5" had decreased viability and those from 4.5" to 6" showed no change. These data suggest that 3" is the ideal treatment depth for the Zavation device. This treatment depth is consistent with that of a device already approved by the FDA.

P6.80

HYPERTENSION DURING PREGNANCY IS ASSOCIATED WITH NEUROINFLAMMATION

Lauren Erby, Shauna-Kay Spencer, Cynthia Bean, Kedra Wallace

University of Mississippi Medical Center, Jackson, MS USA

HELLP syndrome (hemolysis, elevated liver enzymes, low platelets) and preeclampsia (PE) (reduction in uterine perfusion pressure -RUPP), which are hypertensive disorders that can occur during pregnancy with severe symptoms and consequences. The development of hypertension (HTN) may increase ischemia and inflammation in the maternal brain. We hypothesize that HTN in response to placental ischemia or HELLP increases CD4+ T cells expression in the maternal brain. On gestational day (GD) 12, sEndoglin (7ug/kg) and sFlt-1 (4.7ug/kg) infusion began via miniosmotic pump into normal pregnant (NP) rats to induce HELLP. On GD14 RUPP rats had the lower abdominal aorta and ovarian arteries physically constricted. On GD18 carotid catheters were inserted (n=5/group), GD19 mean arterial pressure (MAP), plasma, tissue and maternal brains were collected. MAP increased from 96.2 ± 3.6 in NP rats to 127.8 ± 3.8 (p=.05) in RUPP rats; to 113.4±3.2mmHg in HELLP rats (p=.05). RUPP and HELLP rats had increased circulating CD4+ T cells compared to NP rats (p=.01, p=.05). CD4+ T cells along the corpus callosum in RUPP (136.1 OD) and HELLP rats (151.9 OD) were increased compared to NP (114.5 OD, p=.05, p=.05). CD4+ T cells are increased in both the circulation and the brain and therefore be one potential link in the neuropathophysiology of HTN associated with PE and HELLP syndrome. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

10:00 - 12:00 GRADUATE SYMPOSIUM

1:30 - 3:00 UNDERGRADUATE SYMPOSIUM

HISTORY AND PHILOSOPHY OF SCIENCE

Chair: William Suttle

Independent Scholar

Vice-Co-Chair: Kenneth Curry

University of Southern Mississippi

Vice-Co-Chair: Paula Smithka

University of Southern Mississippi

Thursday, February 26, 2015

MORNING

Room TC 228

O7.01

09:30 IS THE SCIENCE OF PSYCHOLOGY REDUCIBLE TO NEUROSCIENCE?

Christopher Samuel Cruz

University of Southern Mississippi, Hattiesburg, MS, USA

Is inter-theoretical reduction possible from psychology to neuroscience? It seems possible, at least in theory, that if we could perfectly map the brain and the nervous system, and account for all the happenings in the two, then we could ascribe causes and effects to human behavior that otherwise might have only been explainable by psychology. Some might argue that an advanced neuroscientific theory could make the same predictions that a psychological theory could produce, if not better ones. Despite these challenges, inter-theoretical reduction from psychology to neuroscience is not as straightforward and simple as it might seem. Indeed, there are some things that psychology can learn and has learned from neuroscience, but my main point is that psychology offers a study of human nature that cannot fully be captured by neuroscientific study alone.

O7.02

10:00 A NETWORK THEORY OF WILL-POWER

Nick Byrd

Florida State University, Tallahassee, FL, USA

Extant theories of will-power are lacking in a variety of ways. In this paper, I propose that will-power is a network, the various nodes of which include the correlates and mechanisms of will-power that are revealed in a variety of empirical domains. For example, the will-power is linked to physical exercise (Oaten and Cheng 2010), circadian rhythm (Blake 1967; Blatter and Kahochen 2007; Colquhoun 1981; Schmidt et al 2007), positive affect (Aspinwall 1998; Isen and Reeve 2006; Tice et al. 2007), glucose levels (Gailliot et al. 2007), sleep (Durmer and Dinges 2005; Nilson et al 2005), genomic variables (Launay et al 2009), environmental factors (Soubry et al. 2013), and the interaction(s) between these variables (Algeria-Torres, Baccarelli, and Bollati 2011; Rhee, Phelan, and McCaffery 2012; Vandewalle et al. 2009). Existing theories have tried to account for the growing list of correlates by appealing to multiple models, e.g. resource

models (Baumeister et al. 1998), strength models (Baumeister and Vohs 2007), and dual-process models (Sripada 2014) None of these models are robust on their own. The network theory, however, appeals to only one model and it offers principled and robust predictions of the many correlates and mechanisms involved in will-power. So, in the interest of simplicity, robustness, and empirical clarity, we should prefer the network theory.

10:30 BREAK

07.03

10:45 A CRITIQUE OF DAVID LEWIS' "MAD PAIN AND MARTIAN PAIN"

Dylan Lee Kittrell

University of Southern Mississippi, Hattiesburg, MS, USA

In "Mad Pain and Martian Pain," David Lewis ([1978]/1980) argues for a view of the mind that "joins claims of type-type psychophysical identity with a behaviorist or functionalist way of characterizing mental states such as pain." Lewis goes about arguing for this thesis by, first, pointing out the shortcomings of functionalism and mind-brain identity (MBI) in regards to two thought experiments, Martian pain and mad pain. Functionalism fails to account for madman pain, whereas MBI fails to account for Martian pain. Lewis claims that his theory makes up where these two fail. I will argue that Lewis' proposed solution actually proves too much; he is mistaken from the very beginning when he assumes that any "credible theory of mind needs to make a place" for both Martian pain and madman pain. It is really only the former that needs to have a place made for it, not the latter. There is simply no compelling reason (neither "from the outside" nor "from the inside") to believe that the madman is in pain, and any theory that counts the madman as being in pain will inevitably render the concept of pain so broad that it would become basically useless. I shall further argue, that since we do have compelling reasons (both from the inside and outside) to suppose that the Martian is in pain, we ought to be suspicious of any account that tries to make types of brain states necessary conditions for types of mental states.

07.04

11:15 DO ENVIRONMENTAL SCIENCE ADVISERS REPRESENT THE THREAT OF A TECHNOCRACY?

Sara Kolmes

Florida State University, Tallahassee, FL, USA

In many arenas, our modern lives are mediated by science and technology. This has immense benefits, but the technological and scientific realities of our world shape the ways we interact with the world and the possibilities open to us. Technological "Lock-In" in which infrastructure is shaped by aspects of a technology not inherent to its purpose, often directs what further development is possible. For example, Robert Moses' overpasses on the way to Jones beach were built shorter than buses or trains. Only cars could pass, so only those rich enough to own cars in the 1930s could visit. The area developed as a haven for the rich where the poor were not welcome even as cars became common, as only expensive attractions were built there. The concern that technical experts make normative

decisions without realizing it is an old one. The status of technical decisions as unquestionable by a layperson and the possibility for this to lead to de-facto rule by experts inspired concerns about a technocracy. Recently, worries that government science advisers pose this risk have resurfaced surrounding environmental scientists. I argue that science advisers do not represent this threat, because scientific results are reported as probabilities rather than binary responses or specific advice. Scientists will report results within statistical standards for the profession (such as 0.05 probability for confidence), and then conscious interpretation of this result into practical advice will occur. Because of the way in which scientific knowledge is expressed, science advisers do not pose a technocratic threat.

11:45 BREAK

Thursday, February 26, 2015

AFTERNOON

07.05

1:00 BLOCKING THE PESSIMISTIC META-INDUCTION: A REFUGE FOR REALISM

Lauren Bower

Loyola Marymount University, Los Angeles, CA USA

A central issue in the scientific realism debate over the last three decades involves the pessimistic induction and the reactions made to it. An ongoing conversation that examines this issue in an exemplary way is the debate between Stathis Psillos (1996) and P. Kyle Stanford (2003). I will contribute to this conversation by first arguing that Psillos attempt to block the pessimistic induction (as put forth by Larry Laudan, 1981) is successful albeit undeveloped. Truthlikeness of a theory need not depend on the genuine reference of a theory's central explanatory terms; it is enough to identify the success-contributing constituents of a theory which include a theory's laws and mechanisms. I will argue that what leaves Psillos divide et impera strategy open to criticism is precisely a lack of a priori, prospectively applicable criteria for selective confirmation within the parameters of the divide et impera strategy. In this vein, I will argue that a development of such criteria will successfully block the pessimistic meta-induction and any ad hoc criticisms thereof. Second, I will argue that Stanford's criticism of Psillos' divide et impera strategy is unconvincing. In doing so, I will make clear how each of Stanford's three criticisms fail by raising a counter-objection to each. If I am successful, a refuge for scientific realism against one of its most serious attacks will be preserved.

1:30 DIVISIONAL BUSINESS MEETING

07.06

2:00 NO HIDDEN VARIABLES: FROM NEUMANN'S TO KOCHEN AND SPECKER'S THEOREM IN QUANTUM MECHANICS

Vasil Dinev Penchev

Bulgarian Academy of Sciences, Sofia, Bulgaria

The talk addresses a philosophical comparison and thus interpretation of both theorems having one and the same subject: the absence of the other half of variables, called “hidden” for that, to the analogical set of variables in classical mechanics. This implies the existence of quantum correlations, which can exceed any classical correlations (e.g., violating Bell’s inequalities), thus quantum information and is essential for the interpretation of quantum mechanics. The theorem and proof of John von Neumann (1932) are formulated in the context of his fundamental treatise devoted to quantum mechanics (*Mathematische Grundlagen der Quantenmechanik*, pp. 167–173). He deduced the absence of hidden variables from the availability of non-commuting operators in Hilbert space corresponding to conjugate physical variables in quantum mechanics. The unification of wave mechanics (1926) and matrix mechanics (1925) as well as of the representation by Ψ -functions (1930) implies the introduction of Hilbert space. The theorem of Simon Kochen and Ernst Specker (*The problem of Hidden Variables in Quantum Mechanics*, 1968) generalizes von Neumann’s result: Once Hilbert space has introduced, this implies immediately the absence of hidden variables even if the quantities are non-conjugate and thus their corresponding self-adjoint operators in Hilbert space commute. The proof of Kochen and Specker is founded on the interpretation of the commensurable quantities in quantum mechanics as mathematically commensurable sets sharing a common measure. It introduces implicitly quantum measure unifying quantum leaps and smooth changes thus deducing entanglement and the absence of hidden variables from the core principle of quantum mechanics: wave-particle duality.

07.07

2:30 SEEING IS BELIEVING; IT’S INTUITIVELY OBVIOUS!

Nedah Nemati and Mike Schmidt

University Mississippi Medical Center, Jackson, MS, USA

Despite the utility of our perceptual systems, base sensory experiences are still a step removed from reality. Optical illusions have been used to demonstrate these interpretive errors. Many examples demonstrate “filling-in” of missing stimuli. Evolutionarily, these mechanisms make sense as they generate a reasonable approximation of the world, based upon incomplete sensory information. While evolutionary pressure addresses “why,” scientists have explored the “how” of perceptual errors, demonstrating that these illusions occur early in the visual processing stream. These are recognized as low-level errors, and suggest potential analogous mechanisms in other sensory modalities and at higher perceptual levels. As philosophers and scientists, the burden is upon us to corroborate our experience rather than trusting it implicitly. The rational intuitive dichotomy is often used to describe information processing in cognitive neuroscience. It is possible, however, that using this abstraction as a method for understanding causal mechanisms is ironically assuming that the logic behind it is rational rather than intuitive. In this talk, I show how certain narratives constructed in neuroscience when describing causal, mental processes are themselves products of dichotomization. Individuals often step beyond the sparse data of perceptual experience in order to make inferences and establish cause-effect relations, a process similar to “filling-in.” Through specific experiments, I show how

traditional “filling-in” works not only for visual perception, but also for inferring causal mechanisms at large. Finally, I show how this prevents a dual-process alternative, or one that allows both sides of the dichotomies to simultaneously be involved in information processing.

Friday, February 27, 2015

MORNING

Room TC 228

07.08

9:00 BIOLOGICAL ENTITIES AND PERSISTENCE OVER TIME: BIOLOGICAL INDIVIDUALITY AND THE ORGANISM PROBLEM

August W.M. Martin

Leiden University, Leiden, the Netherlands

The “problem of biological individuality” (Clarke 2010, R. Wilson 2014, ‘Biological Notion of Individual’) relates in part to the notion of “organism” (J. Wilson 2000), a basic and arguably integral concept in biological science (Pepper and Herron 2008). Unfortunately, philosophical investigations of this problem have, with few exceptions (Rieppel 2009), been conducted largely in the absence of input from the metaphysics of persistence and philosophy of time. This is a hindrance to a resolution to the problem of biological individuality, because of its integral and vital preoccupation with determining the temporal and not just the spatial boundaries of biological entities. Furthermore, the differences between prominent pluralistic (J. Wilson 1999) and monistic (R. Wilson 2005) accounts of biological individuality can in part be clarified by forging an intersection between metaphysics of persistence, philosophy of time, and the problem of biological individuality. Finally, I present Ernst Haeckel’s (1866) largely neglected ontology of biological individuals as a clear example of how a response to the general problem of the biological individual can benefit greatly by intersecting it explicitly with metaphysical concerns about the status and nature of time and how objects persist over time.

07.09

9:30 THE AESTHETICS OF SCIENTIFIC REPRESENTATION OF THE HISTORY AND DIVERSITY OF LIFE ON EARTH

August W.M. Martin

Leiden University, Leiden, the Netherlands

In *Beauty and Revolution in Science*, McAllister (1999: 90) holds that many scientists are impelled by the conviction that “their aesthetic sense can lead them to truth.” What is the role of this “aesthetic sense” in our use of images to represent the history and diversity of life on Earth? The web of our biological knowledge is woven partly from images intending to represent past and present organisms in biology textbooks and other utilities: paintings, drawings, pictures, as well as micrographs. Extinct organisms can only be represented in paintings and drawings. There are indisputable qualitative distinctions between actual images of organisms on the one hand, and merely possible representations of organisms on the other

hand. Depictions of scenes from prehistoric periods, such as the primordial forests of the Silurian and Devonian, are powerful images and aesthetically evocative. We also often choose to represent even extant organisms with illustrations; and not infrequently, we give prominence to organismic parts, such as fungal and plant reproductive structures. Our choice of scientific representation, in sequence, display, and prominence, not only reflects human interests, but also arises from a scientific instinct rooted in our “aesthetic sense” that beauty is a guide and index to objective truth, including the realities of historical and persisting biological diversity, organismic profundity, and geologic time.

07.10

10:00 THE PERSISTENCE OF THE “STORM IN A TEACUP”

Paula J. Smithka and Kenneth J. Curry

University of Southern Mississippi, Hattiesburg, MS, USA

Two theories regarding the nature and persistence of objects are endurantism, associated with a 3-D model, and perdurantism, commonly associated with a 4-D model. Whereas endurantists claim that objects are whole and complete at each time they exist, so time is not a physical part of the object, perdurantists claim that objects are 4-dimensional space-time worms extending from their origins to their demise. On this view, time is part of an object and what are commonly taken to be 3-D “objects” are merely temporal slices of the whole and complete 4-D object. Recently, some philosophers have argued that these two views are metaphysically compatible and the alleged controversy is merely a “storm in a teacup” (McCall & Lowe 2006). Their claim is that an endurantist/3-D model can be translated into a perdurantist/4-D model “without remainder.” However, it would seem that for the inter-translatability to be successful, the persistence claims of endurantism must be recast in a language that is adverbial, thus covertly incorporating time into the inter-translation. This amounts to a question-begging move in favor of the perdurantist/4-D model. Furthermore, what the ontological structure of an object is differs according to which a priori metaphysical system one adopts, so they are not compatible models. When a natural science, such as biology, seeks to employ a model-theoretic framework to account for their empirical data, the framework should cohere with the data. While 4-D models may be better suited to accommodate theoretical physics, 3-D models fare better for biological species.

10:30 BREAK

AFTERNOON

Room TC 228

07.11

12:30 JOHN HERSHEL, WILLIAM WHEWELL, AND NINETEENTH CENTURY ROOTS OF SCIENTIFIC METHOD

Kenneth J. Curry, Georgia Rae Rainer

University of Southern Mississippi, Hattiesburg, MS, USA, and Florida State University, Tallahassee, FL, USA

John Herschel (1792–1871) and William Whewell (1794–1866) were nineteenth century polymaths who

matriculated at Cambridge together and, inspired by Francis Bacon, were determined to change the science of their day. Those changes influence the science of our day. Herschel was a philosopher of science, astrophysicist, and pioneer photographer. He is remembered for his popular book, *A Preliminary Discourse on the Study of Natural Philosophy*, published in 1831. Whewell went on to become Master of Trinity College (Cambridge). He wrote authoritatively on a broad range of subjects including philosophy of science and is remembered for his two volume work, *Philosophy of the Inductive Sciences, founded upon their History*. Herschel, influenced by Isaac Newton, was an empiricist. He espoused an approach to science that we would call today hypothetico-deductive. Scientific theories were to be based on law-like axioms. Laws might be empirical pointing to regularities without showing why things occur as they do. Higher laws would explain regularities in terms of causes, *verae causae* or true causes in Herschel’s terminology. Whewell, influenced by Immanuel Kant, expressed rationalist leanings. He was skeptical about deductions that Herschel might be willing to make from experimentally known phenomena to unknown phenomena. Whewell’s inductive approach was to bring together empirical facts with concepts that could be expressed as a general law, a mental process Whewell called “colligation.” The hypothesis so derived could then be extended to a general class of phenomena including unknown members. Confirmation of a theory was manifested in the consilience of inductions.

07.12

1:00 VICTORIAN SCIENCE: THE MILIEU IN WHICH IT WAS BORN, THE MODERNITY INTO WHICH IT EVOLVED

Georgia Rae Rainer, Kenneth J. Curry

Florida State University, Tallahassee, FL, USA, University of Southern Mississippi, Hattiesburg, MS, USA

The British Association for the Advancement of Science (BAAS) was founded in 1831 by several prominent scholars of the day including Cambridge thinkers William Whewell, Charles Babbage, and indirectly, John Herschel. This Association changed the practice of science and established the professional discipline that we know today. One way in which the BAAS made a significant impact to the scientific community was by encouraging women to attend the research presentations, which not only increased the role society played in promoting these annual meetings, but more importantly, it opened the door for women to actively participate in the scientific community. Also the BAAS restored the practice of a question and answer period following each presentation (having been previously discontinued by the Royal Society). These changes increased diversity in the scientific community where the benefit of this practice promoted the objectivity of science given the different perspectives that critically examine the work. The BAAS had the advantage of incorporating various commentators with different background assumptions to criticize the observations of the researcher and potential methodological flaws. This is crucial to modern scientific practice and is demonstrated in the values ascribed to peer reviewing and repeatability of experiments. While these changes may seem mild to the modern reader, they set a trend in the practice of science that has become ingrained. The modern scientific community widely uses the presentation format established by the British Association, and in large part, is

better for it.

O7.13

1:30 PHILOSOPHY OF HENNIG'S PHYLOGENETIC SYSTEMATICS

Kenneth J. Curry, Paula J. Smithka

University of Southern Mississippi, Hattiesburg, MS USA

Willi Hennig (1913–1976) is remembered for his work in phylogenetic systematics. His seminal work in German (1950), *Grundzüge einer Theorie der Phylogenetischen Systematik* (*Foundations of a Theory of Phylogenetic Systematics*), and his subsequent work published in English (1966), *Phylogenetic Systematics*, introduced a novel methodology subsequently called cladistics that has become central for phylogenetic studies and also contained a rich philosophical account that has been largely ignored. Hennig's phylogenetic systematics is grounded in logical positivism of the early twentieth century and a German tradition extending from the early nineteenth century that is congenial with a holistic approach to species and higher taxa, viewed as historically continuous individuals. Species and higher taxa at all levels were taken to be four-dimensional (temporally extended) individuals understood ontologically as processes rather than as material entities. Hennig created the notion of the semaphoront as the pragmatic segment of an individual that represented the point in space-time when an investigator observed and measured the individual. Semaphoronts could be segments of organisms, species, or higher taxa each of which was then interpreted as a semaphoront complex with a relationship of members to a set, thus creating tension between the set-theoretic concept of a species in which semaphoront complexes instantiate membership criteria for species and the historical concept of a species as an individual. Ultimately Hennig's philosophy led to a dual ontology of species as individuals vs. species as sets of organisms which still plagues concepts of species.

2:00 BREAK

PANEL DISCUSSION (Joint presentation with Ecology and Evolutionary Biology)

2:30 PRACTICAL AND THEORETICAL CONSIDERATIONS FOR METHODS IN BIOLOGY

This panel discussion addresses some methods in science, especially pertaining to biological evolution and phylogenetic systematics. The three presentations preceding this panel discuss some nineteenth century roots of scientific method, the influence of those roots on present practice, and early to mid-twentieth century development of phylogenetic systematics as espoused by Willi Hennig. These presentations will serve as a basis for the panel's discussion of current practices in evolutionary and phylogenetic systematics research with respect to interpretation of evidence, nature and collection method for data available, use of inference in historical reconstruction, and use of induction and deduction in creating and evaluating hypotheses. Panel members include Dr. Mac Alford (biologist), Dr. Brian Kreiser (biologist), and Dr. Paula Smithka (philosopher of biology).

MARINE AND ATMOSPHERIC

Chair: Remata Reddy

Jackson State University

Vice-Chair: Francis Tuluri

Jackson State University

Thursday, February 26, 2015

MORNING

Room 227

O8.01 (Invited Talk)

9:00 GIS TOOL FOR ASSESSMENT OF QUARTERLY AIR POLLUTION EXPOSURE AND ITS ASSOCIATION WITH ASTHMA IN EASTERN TEXAS STATE

Francis Tuluri¹ and Amit Gorai²

Jackson State University Jackson, Mississippi USA¹ and Birla Institute of Technology Mesra, Ranchi India²

Several investigations reveal the impact of air pollution on increased asthma prevalence. But, there is no strict finding on direct association between air pollution and asthma rate. In the present study, GIS tool is used to examine the association of short-term seasonal and quarterly exposure to ambient air pollution levels (PM2.5 and ozone) and asthma rate in eastern part of Texas, USA. For the period 2009 to 2011, quarterly asthma rate data were obtained from Texas State Department of Health, National Asthma Survey surveillance of Texas State, USA. For the same period, quarterly mean concentration were determined from daily air pollution data of PM2.5 and ozone concentrations of various air quality monitoring stations distributed in different counties in the study area. Using Kriging inverse distance weighted interpolation, GIS based mappings are obtained. Quarterly mean concentrations of air pollution data were compared to quarterly variations in asthma discharge rate using Pearson correlation coefficient analysis. The correlation coefficients between Asthma Discharge Rate (ADR) and ozone concentration are -0.082, -0.086, -0.056 and -0.047 respectively in four quarters of 2009. In 2010, the correlation coefficients between ADR and ozone concentration are 0.096, 0.047, 0.004 and 0.083 respectively in four quarters. Similarly, the correlation coefficients between ADR and ozone concentration are -0.034, -0.066, -0.007 and -0.020 respectively in four quarters of 2011. Thus, it can be inferred that ozone is negatively correlated with asthma discharge rate in every quarters of 2009 and 2011. In 2010, the results showed ozone is correlated with asthma rate. The results revealed that there are no statistically significant associations between short-term air pollution exposure and asthma discharge rate in the study area. A negative correlation coefficient was observed between the quarterly mean concentration of ozone and the quarterly asthma discharge rate from 2009 to 2011. However, in most of the cases a positive correlation coefficient was observed between the quarterly mean concentration of PM2.5 and the quarterly asthma discharge rate indicative of association of ambient air pollution exposure with asthma.

O8.02**9:30 A SPATIAL ANALYSIS OF TORNADO SIRENS IN MISSISSIPPI**Hope-Anne L. Longwith, Duanjun Lu, and Stone Abdullah*Jackson State University Jackson, MS USA*

Determination of effective ways to reduce fatality from tornadoes is one of the fundamental drivers for tornado research. This research focuses on analyzing spatial distribution in the context of past tornado events with aims to enhance the understanding of tornado. Using a spatial statistical analysis of tornado sirens combined with the development of a tract-base tornado day density, tornado related fatalities for the state of Mississippi were investigated. Tornado days are days that a tornado has affected a given area. Using tornado days rather than number of tornadoes can make different spatial patterns. Rather than just analyzing the location of the events, analysis of tornado days addresses the risk of a tornado occurring within an area on any given day of the year. The location of an emergency siren in proximity to a given area most likely to suffer a tornado day will give us the likelihood of a serious injury or fatality occurring in that area.

O8.03**9:45 SURFACE THERMODYNAMIC CONDITIONS OF MISSISSIPPI SEA BREEZE ENVIRONMENTS**Loren White, Jaylond Harvey*Jackson State University, Jackson, MS, USA*

A vehicular observing platform is used to make the first known mobile transects through Gulf of Mexico sea breeze fronts. The author has previously used similar techniques for investigation of cold fronts and urban heat islands. Measurements were made of temperature and humidity at 10-second intervals along a transect of about 200 km inland from Gulfport, Mississippi in summer of 2014. The transects intersected the sea breeze front approximately an hour before the influence of developing thunderstorms locally. The temperature and humidity measurements are interpreted in relation to cloud photography and visible satellite imagery. Comparisons are made with previous sea breeze descriptions from field campaigns, idealized three-dimensional structures, and modeling studies. Although focus is particularly on the thermodynamic transitions and spatial scales at the sea breeze front, multi-parameter variations within the air masses, surface footprints of developing deep moist convection, and along-coast (i.e. parallel) variations are also interpreted in light of prevailing synoptic conditions.

O8.04**10:00 ENVIRONMENTAL WATER QUALITY OF THE PEARL RIVER AND HEALTH EFFECTS**Vijaya Shankar¹, Remata Reddy¹ and Huey-Min Hwang¹, Pradip Bhowl²¹*Jackson State University, Jackson, MS*²*Mississippi Department of Environmental Quality, Jackson, MS*

Water is a vital resource for the survival of all living beings and for maintaining the sustainability of the natural environment. Approximately 80% of all human illnesses in the world are caused by poor water quality. Water borne diseases are caused by a water source that contains pathogenic microorganisms. In this study we investigated the correlation between water quality and human health effects of the Pearl River Basin in Central and

Southern parts of the State of Mississippi. The experimental approach starts with retrieving the water quality data of the study sites in the previous 10-12 years from the MS Department of Environmental Quality. The total maximum daily loads (TMDLs) covers a portion of the Pearl River from the Ross Barnett Reservoir to the confluence with the Strong River. Afterwards for verification and comparison purposes, selected water samples were collected from the Pearl River Basin Central Part of the Mississippi, to monitor the water quality in terms of selected parameters such as BOD, COD, and TSS by using a SECOMAN Spectrophotometer. Correlations among the water borne diseases (eg., viral gastroenteritis,)and the water quality of the studied sites will be discussed. Suggestions for water remediation will be provided.

10:15 BREAK**O8.05****10:30 MODELING OVERFILTRATION OF MARINE PATHOGENS**Gorka Bidegain¹, Tal Ben-Horin², Eric N. Powell¹, John M. Klinck³, David Bushe², and Eileen E. Hofmann³¹*Gulf Coast Research Laboratory, University of Southern Mississippi, MS, USA*²*Haskin Shellfish Research Laboratory, Institute of Marine and Coastal Sciences, Rutgers University, Port Norris, NJ, USA*³*Center for Coastal Physical Oceanography, Old Dominion University, Norfolk, VA, USA*

Benthic filter feeders are able to filter a substantial amount of waterborne pathogens such as bacteria, fungi, protozoans, and viruses from a dilute solution. Arguably, this life style is highly vulnerable to disease transmission. Some mechanisms such as dense assemblages of filter feeders reduce infective particles in the water column sufficiently to permit the internal inactivation mechanisms to limit body burden below the infective dose level and thus, limit epizootic development. We combine modeling and experimental work to demonstrate this hypothesis. We formulated a disease dynamic compartmental model and informed it using Dermo disease, caused by *Perkinsus marinus*, in Eastern oysters (*Crassostrea virginica*), as an experimental system. The model yields the basic reproduction number R_0 to explore the potential of epizootic development. Preliminary 3-D simulations using the Regional Ocean Modeling System (ROMS) hydrodynamic model coupled to a benthic model, reproduces a continuous water flow, particle flux along an estuary channel, and pathogen sink due to filtration by oysters. Model results suggest that high-density oyster reefs effectively remove pathogens by refiltering water many times (overfiltration) and thus decrease the downstream pathogen flux, limiting transmission locally and in neighboring reefs. Mesocosm experiments explored *Perkinsus marinus* dilution (inactivation) dynamics in seawater and the effect of resource competition in oysters lowering per capita exposure to pathogens and reducing disease prevalence. Experimental results demonstrate that resource competition lowers the per capita rate of exposure of oysters to pathogens, decreasing the incidence of disease and confirms for non-flow conditions the overfiltration effect shown by the model.

O8.06

10:45 GIS ANALYSIS OF TORNADO EVENTS IN MISSISSIPPI

Duanjun Lu, Hope-Anne Weldon, and Stone Abdullah

Jackson State University, Jackson, MS USA

Tornadoes are nature's most violent windstorms and are a significant hazard to life and property throughout the USA. A key component of analyzing tornado involves understanding the constituents of vulnerability (e.g., the socio-economic factors). Vulnerability can be defined as the potential for loss. It is relevant to geographical locations, time, and among different social groups. Social vulnerability is the product of social inequalities where there are social factors that influence or shape the susceptibility of various groups to harm and that also govern their ability to respond. It results from place inequalities (i.e., the level of urbanization, growth rates, and economic vitality). In this study, we applied Social Vulnerability Index (SoVI) for tornadoes occurring in the year of 1950 and 2013 through Principal Components Analysis in ArcGIS, and exam the combination of tornado hazards and SoVI to identify the vulnerability of place in Mississippi. We also analyzed tornado days to address the risk of a tornado occurring within Mississippi on any given day of a year.

O8.07

11:00 ENVIRONMENTAL MODELING AND PREDICTION FOR CLIMATE AND SEASONAL FLUCTUATIONS OVER GRANDBAY OF GULF OF MEXICO

R. Suseela Reddy¹, D. Lu¹, Meheri Fadavi¹, Paul Tchounwou¹, and Paulinus Chigbu²

¹*Jackson State University, Jackson, MS, USA*

²*University of Maryland Eastern Shore, USA*

Our goal is to investigate the seasonal patterns of meteorological parameters in order to predict their impacts on ecosystem and fish populations over the Grand Bay National Estuarine Research Reserve (GBNER) area using NOAA BUOY meteorological data and the Penn State/NCAR Mesoscale Model (MM5). In the present study, the MM5 version 3 Weather/Environmental model was run using data assimilation techniques where non-conventional data from various sources are fed into the model as initial and lateral boundary conditions to simulate seasonal variations of surface features and precipitation. The climatic and seasonal fluctuations of these parameters have important implications for the GBNER ecosystem. Seasonal prediction for meteorological variables using environmental modeling MM5 have been studied for winter and summer seasons. The sea level pressure is low during winter with an average of 1005 mb and high during the summer with an average of 1009 mb. The heat fluxes are high during January with an average of 80 W/m² compared to July with an average of 30 W/m². The precipitation is maximum over the Grand Bay during January with a maximum of 1.85 cm compared to July with a maximum of 0.5 cm. Sea surface temperatures during the winter is low compared to summer over the Grand Bay region. The environmental model captured the seasonal variations and model output is in good agreement with observations.

11:15 Business Meeting

EVENING

Poster Session

Immediately Following Dodgen Lecture

P8.01

IMPACTS OF SAHARAN DUST TRANSPORT OVER ATLANTIC ON PARTICULATE MATTER, OZONE AND HEALTH EFFECTS

Lenetta Mallory¹, Remata Reddy¹, Duanjun Lu¹, Loren White¹, Mehri Fadavi¹, Qilong Min², Roy Armstrong³, and Vernon Morris⁴

Jackson State University Jackson, MS USA¹, State University of New York at Albany Albany, NY USA², University of Puerto Rico at Mayaguez Mayaguez, PR Puerto Rico³, and Howard University Washington, DC USA⁴

We investigated dust-ozone interactions and health effects. The study compares PM 2.5 μm and ozone over coastal stations of Puerto Rico, Gulf of Mexico and Caribbean Sea using EPA's Air Quality System (AQS). Due to the effects of ozone and PM2.5 on health and climate, regularly monitoring aerosol levels is needed to ensure the health effects. The Saharan Air Layer (SAL) outbreak that occurred on 24 June 2009 from Senegal, Africa reached San Juan, Puerto Rico and Miami, Florida, the same day. Ozone and PM2.5 data for San Juan and Miami are daily averages for the months of June and July 2009. The Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model calculated the forward and backward trajectories, during the outbreak, averaged between 10 and 20 meters above the ground level. San Juan showed an increase in PM2.5 from 6.27 to 10.24 $\mu\text{m}/\text{m}^3$ while in Miami there was an increase from 7.2 to 10 $\mu\text{m}/\text{m}^3$. Ozone in San Juan decreased from 0.015 to 0.0115 ppm and from 0.0273 to 0.0185 ppm in Miami. The reduction of ozone concentration may be partially due to the decrease of solar radiation under the dusty conditions. The reduced solar radiation suppresses the photochemical reactions and results in low ozone concentration.

P8.02

ASSESSMENT AND SPATIAL VARIATION ANALYSIS OF WATER QUALITY IN GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

Jacqueline McComb, Fengxiang Han, and Christian Rogers

Jackson State University, Jackson, MS USA

Estuarine systems are both chemically and physically dynamic systems, they act as buffers between land and ocean. In such environments, trace elements and particles are influenced by the estuarine biogeochemical cycles. The occurrence of trace elements in estuaries relates to regional geochemistry and anthropogenic sources. Trace metals can accumulate to toxic levels in aquatic environments and cause severe effects to organisms and on human health. Numerous factors, such as the water chemistry and hydrology can control trace metal deposition and fixation in the sediments. The estuary may act as both sinks and sources of secondary aquatic pollution. The study of both water and sediment geochemistry is, therefore, essential for the prevention of environmental risk and protection strategies. Sampling was conducted during low tide, along a salinity gradient within the Grand Bay National Estuarine Research Reserve Estuary February 2014. Water column physiochemical properties were determined using a YSI HI

9828/10 Multiparameter Water Quality Meter that allowed obtaining data from temperature, salinity, dissolved oxygen, and pH at each sampling site. All samples were collected in the vicinity of the 4 major bayous (Cumbest, Heron, Crooked, and Bangs Lake). Forty samples were analyzed for dissolved trace elements (Sr, Ca, Mg, Fe, Mn, Cu, Zn, Ni, Pb, Cr, P, and Cd). This study examines the spatial variability, sources, and the quality of brackish water. The results showed that the measured trace elements in the brackish water could be divided into three categories: High concentrations (2000- 4000 g/L Sr), moderate concentrations (20- 100 µg/L; Fe, Cd, Pb, Zn), and low concentrations (0.1 -10 µg/L; P, Ni, Cu, Cd, Mn, Cu, and Cr). Cadmium and Mg were highly soluble in all 40 samples collected from all bayous sampling locations.

P8.03 EPIZOOTIOLOGICAL MODELING OF MARINE INFECTIOUS DISEASE

Gorka Bidegain¹, Eric N. Powell¹, John M. Klinck², Tal Ben-Horin³, Eileen E. Hofmann²

¹*Gulf Coast Research Laboratory, University of Southern Mississippi, Ocean Springs, MS, USA.*

²*Center for Coastal Physical Oceanography, Old Dominion University, Norfolk, VA, USA*

³*Haskin Shellfish Research Laboratory, Institute of Marine and Coastal Sciences, Rutgers University, Port Norris, NJ, USA*

The dynamics that underlie the generation of epizootics in marine ecosystems still lack the equivalent level of description, conceptual understanding, and epizootiological modeling framework routinely present in the terrestrial environment. Here, we propose a theoretical basis for the transmission dynamics of marine infectious diseases (MIDs) by means of a series of compartmental models, expressed in a comprehensive formulation adapted from Kermack and McKendrick's mathematical theory of epidemics. The models represent the dynamics of a variety of host-pathogen systems including transmission by direct contact not only between live animals, but also between dead animals and living susceptible hosts. We also include cases where transmission occurs by indirect contact; that is, via particle transport through the water column and uptake by contact or filtration of waterborne infective pathogens released to the water column by live or dead infected animals. From these models, we formulate the basic reproduction number R_0 using the next generation matrix procedure. The sensitivity of the series of R_0 models to their parameters was analyzed to explore their relative importance and interaction in determining the potential for epizootic development. A priori, systems where the transmission involves a variety of processes, such as the death of infected animals, dead animals releasing pathogens in the water, and filter feeders accumulating them, an epizootic should be less probable than for contact-based diseases for the same population density. This contribution covers the mathematical basis for the dynamics and epizootiology of a diverse array of MIDs, focusing on the initiation and termination of epizootics.

P8.04

ADVANCE WATER QUALITY MODELING ON OYSTER RESTORATION AT THE NORTHERN GULF OF MEXICO

Anna Linhos, Julius Adenihun,

Mississippi State University, Starkville, MS, USA

Oyster formations in the Northern Gulf of Mexico are declining rapidly due to over-harvesting, contaminants, and oil spills. Oyster habitat can be re-stabilized if adequate nutrients and shell formations are available, such as calcium carbonate, dissolve oxygen, sedimentation, PH level, minimum flows, and moderate temperature for survival. Most of the streams and rivers in USA are polluted from toxic materials. Polychlorinated By-phenyls (PCB), Dichlorodiphenyltrichloroethane (DDT), and Pharmaceuticals Personal Care Products (PPCP) are organic pollutant compounds that are interrupting the physical, biological, and chemical composition of the ecosystem integrity today. The site location of this project is an estuary area, includes upstream revering flows, and flows from downstream sea level. Management of oyster restorations require hydro-ecological models such as Hydrological Engineering Centers River Analysis System (HEC-RAS), Sea Level Affecting Marshes Model (SLAMM), and Trophic Simulation Model (TroSim). The data implored for this project is obtained directly from National Oceanic and Atmospheric Administration (NOAA). HEC-RAS evaluates steady flows river analysis, water surface profiles, unsteady flow simulation, sediment transport computations and revering water quality analysis. SLAMM simulates wetland/shoreline modifications of sea level rise, which includes the integration of wetland elevation analysis, 3D landscape, salinity modeling, and channelization. TroSim analyzed the stream flow and physical characteristics of oysters and their habitations. Other advance software are also utilized for the creation of 3-dimensional longitudinal, vertical, and lateral flows of the ecosystem, such as ArcGIS, AutoCad, and CFD. A fourth-generation computing programming language, MATLAB coded to compare the analyses of the computer software.

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Chair: Jamil Ibrahim

University of Mississippi Medical Center

ViceCo-Chair: Erol Sarigul

Alcorn State Univeristy

ViceCo-Chair: Xiaoqin Wu

Mississippi State Univeristy

Thursday, February 26, 2015

MORNING

Room TC 229

09.01 (Symposium)

9:00 STEM, PROJECT-BASED LEARNING: STRATEGIES AND EXPERIENCES IN THE CLASSROOM

Carl DeWitt¹ and Gail Dickinson²

¹Hinds Community College

²STEM Instructor, Germantown Middle School

Currently, an initiative exists globally to create a learning environment in which students can become sustainably proficient in Science, Technology, Engineering, and Mathematics (STEM). STEM education and how it relates to project-based learning must be understood. Project-based learning is an engaging classroom approach in which students explore and solve real-world problems with concepts and ideas from STEM subjects. By using project-based learning, teachers bring excitement and creativity back into the classroom. The appropriate hands-on experiences give students the opportunity to successfully learn and take on the role of a scientist or engineer and begin to view themselves as a person who can understand and express science. In understanding what and how the STEM classroom looks, strategies will be discussed on transforming traditional lesson plans into problem-based STEM experiences emphasizing engineering as the center for solving real-world problems. All of the activities presented in this session have been field tested with 8th graders in Mississippi public schools. Examples of innovative projects include: designing a parachute project, snack packaging project, designing an iPod dock (sound) project and how to design an app for a cell phone. Now is the time to integrate and embrace STEM education and innovation in Mississippi classrooms. Through a project-based learning perspective and foundation, students will be prepared to enter the workforce solidly positioned to successfully fill the marketplace positions open for STEM based careers.

10:00 Break

09.02

10:30 FLOOD EXTENT SIMULATION: A GEOGRAPHIC INFORMATION SYSTEM (GIS) RIVER FLOODING EXTENT APPROACH

Derrick Jones

Mississippi Valley State University Itta Bena, MS USA and
National Weather Service, Jackson, MS USA

Situational awareness of river flood and evolution through the use of flood extent mapping is critical for emergency management resource allocation, decision making, and overall public alertness. However, current National Weather Service (NWS) mapping guideline rigors for flood extents per gauge site can equate to \$10,000-\$50,000 and six months to two years of effort expenditures before finalization. This high expenditure burden is placed on limited budgets of local city, county, and state emergency management and is a restricting factor for NWS flood extent mapping implementation. NWS, Jackson, MS, with the support of the U.S. Army Corps of Engineers (USACE), Lower Mississippi River Forecast Center (LMRFC), and the Hydrologic Service Branch (HSB), has developed a river flood extent protocol using ArcGIS and a Flood Extent Simulation Model (FESM) that saves economic and temporal investment while being spatially accurate. Results on unedited model output on the Leaf River at Hattiesburg, MS and Susquehanna River at Binghamton, NY indicate spatial kappa coefficient accuracy of 62% to 86% for minor to record flooding stages compared to respective Advanced Hydrologic Prediction Service (AHPS) approved HEC-RAS flood extents. However, further quality control measures were implemented and improvement statistics for kappa coefficient and pixel classification were tracked for each updated flood extent version for corresponding AHPS HEC-RAS mapped sites. As a result, the spatial kappa coefficient accuracy was improved significantly (88% to 97%) for the minor to record flood stages for the two sites. The average processing time for the NWS Jackson flood extent protocol is 1 to 2 hours, including additional quality controlling measures. This technique will save resources and further facilitate river flood awareness to NWS core partners and the public.

09.03

10:50 PROJECT MANAGEMENT FRAMEWORK FOR CLOUD AND HPC RESOURCE PROVIDERS

Ifeanyi Onyenweaku¹, Jefferson Ridgeway², and Gregor von Laszewski³

Mississippi Valley State University, Itta Bena, MS USA¹,
Elizabeth City State University Elizabeth City, NC USA², and
Indiana University Bloomington, IN USA³

Cloudmesh is a project that allows the management of virtual machines in a federated fashion. It can be run in two modes. One is a standalone mode where the users run Cloudmesh on the local machines. The second mode is a hosted mode where multiple users share a web server through which the virtual machines are managed. One of the important functions for Cloudmesh is to provide a sophisticated user management. This user management is currently conducted in drupal through the FutureGrid portal via an integration to the FutureGrid LDAP server. However, as the rest of Cloudmesh is developed in Python, the user management in FutureGrid has had some limitations. It is important to identify a Python based solution with more advanced features in order to re-implement the user management functionality in Cloudmesh to address long term sustainability of the user management component. This research will explore how to design a data model in Python via mongoengine to represent users and user created projects to identify how we can leverage either Django or Flask to manage such created projects. To address the later, we will first evaluate

if we can get a Django web application started and identify how to use it. If this turns out to be too difficult, we will fall back to Flask. As part of the management, we need to implement a queue in which users are queued for approval, and a project queue whereby projects are queued and approved by a committee. A simple backend system written in Python will support this task and provide an abstraction that is outside the web interface.

09.04

11:10 DEVELOPING A WEB-BASED INTERFACE TO EVALUATE DOWNSCALED GFS PRODUCTS

Joshua Bailey¹ and DaNa Carlis²

Mississippi Valley State University, Itta Bena, MS USA¹
National Weather Service/National Center for Environmental Prediction College Park, MD USA²

The weather is a very important aspect in our everyday lives. It dictates whether we will drive or walk to a destination or when to plan a social gathering. Because society is so dependent on the weather, it is important that forecasters make accurate predictions. In order to make accurate predictions, a forecaster must have data from a variety of sources. The National Digital Forecast Database (NDFD) provides a plethora of sensible weather elements such as temperature, precipitation, and surface pressure. The various line offices of the National Weather Service work to contribute to the NDFD and is one of the most commonly used tools to create grids is the Global Forecasting System (GFS). Currently the GFS produces weather products such as temperature, winds and precipitation over Guam. However, my mentor, DaNa Carlis, recently added the ability to produce weather products over Hawaii, Puerto Rico, Alaska, and the Continental USA (CONUS). Before becoming fully operational, the output must be verified to ensure the data produced is accurate. It is the purpose of this research to develop a web-based interface that will serve as a gateway to verify the data produced by the GFS. To ensure that it is a fair comparison, a Python script will be developed to create visual interpretations of the data for both the GFS and the North American Mesoscale, which already produces data over Alaska, Hawaii, Puerto Rico, and CONUS. If the downscaled grids produced by the GFS are accurate, then they can be used as input into the NDFD which would provide more data that forecasters can use to make predictions.

09.05

11:30 DESIGN OF AN ALGORITHMS FOR BIOINFORMATICS COURSE FOR COMPUTER SCIENCE MAJORS

Natarajan Meghanathan

Jackson State University, Jackson, MS USA

In Fall 2014, we developed a new course titled: Algorithms for Bioinformatics for Computer Science majors at Jackson State University. The pre-requisite for the course is Data Structures and Algorithms. The topics covered in the course are in the form of both algorithm design strategies as well as application-oriented. The course was divided into several modules self-prepared by the instructor by referring to various sources. An introduction module on Molecular Biology, focusing on the nucleotide bases, DNA sequences, mutations (transition and transversion), stages of protein synthesis (transcription and translation) as well as genetic code mapping was covered in the

first two weeks of classes. The main course modules focused on: String processing algorithms; Dynamic programming algorithms for the longest common subsequence (LCS) problem, global and local pair-wise sequence alignment problems and their variants; Heuristics for multiple sequence alignment; Branch and bound strategy (Partial digest problem and Motif finding problems); Suffix trees and applications; Clustering algorithms and Phylogeny (Large and Small Parsimony problems). The course also had three hands-on projects requiring students to work with bioinformatics databases for sequence search, alignment and analysis (involving both genes and proteins). Students were assigned take home quizzes and exams to facilitate comprehensive testing of the subject matter as well as necessitate an in-depth understanding for students on the subject matter. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

11:50 Break

AFTERNOON

Room TC 229

1:20 Opening Remarks.

09.06

1:30 MONTE CARLO SIMULATION USING DETERMINISTIC BEHAVIOR: AREA PROBLEM

Tapan Kumar Tiwari

Alcorn State University, Lorman, MS USA

Monte Carlo Simulation or method is a numerical technique that is often used to simulate complex physical and mathematical systems, particularly when it is unfeasible to derive results in closed-form expression. Since this method uses random numbers or pseudo-random numbers repeatedly, the Monte Carlo technique has become more attractive and relevant with the emergence of several powerful computer algebra systems. As a result, some variation of a Monte Carlo simulation model is now often used in various fields, including finance, energy, manufacturing, engineering, research and the environment. In Mathematics, an interesting use of this technique is the evaluation of multidimensional definite integrals with difficult boundary conditions. The method is equally useful in solving certain types of complex optimization problems. In this presentation, we will show how to approximate the area under a nonnegative curve using Monte Carlo simulation. The problem and the algorithm for computing the area is taken from William P. Fox's book entitled: *Mathematical Modeling with Maple*. A simple program in Mathematica to execute the algorithm and graphically present the process will be developed. Monte Carlo Simulation or method is a numerical technique that is often used to simulate complex physical and mathematical systems, particularly when it is unfeasible to derive results in closed-form expression. Since this method uses random numbers or pseudo-random numbers repeatedly, the Monte Carlo technique has become more attractive and relevant with the emergence of several powerful computer algebra systems. As a result, some variation of a Monte Carlo simulation model is now often used in

various fields, including finance, energy, manufacturing, engineering, research and the environment. In Mathematics, an interesting use of this technique is the evaluation of multidimensional definite integrals with difficult boundary conditions. The method is equally useful in solving certain types of complex optimization problems. In this presentation, we will show how to approximate the area under a nonnegative curve using Monte Carlo simulation. The problem and the algorithm for computing the area is taken from William P. Fox's book entitled: *Mathematical Modeling with Maple*. A simple program in Mathematica to execute the algorithm and graphically present the process will be developed.

O9.07

2:50 TRANSFORMING DATA INTO INFORMATION TO SUPPORT EVIDENCE-BASED DECISION MAKING

Jamil Ibrahim

University of Mississippi Medical Center, Jackson, MS USA

Most database management applications require researchers to master the four data-driven tasks common to virtually any computing application: data access, management, analysis and presentation. EXCEL has developed a reputation for being a powerful and a full featured software that allows researchers and other users to manipulate and analyze data in many different ways. As research questions become more and more complex, the presenter will introduce techniques for simplifying analytic results without losing data and without the need for a full written report. The attendees will receive data analysis examples using Pivot Tables, PowerPivots, Power Views, and Power Maps.

O9.08

2:10 D WAVELET FEATURE EXTRACTION AND APPLIED TO FRUIT BRUISE DETECTION

Ping Zhang and Nishant Suresh

Alcorn State University, Lorman, MS USA

Bruise detection plays a critical role in determining the grade of fruits. The presence of bruises affects the appearance of fruits. Thus, how to detect bruises and remove the damaged products can help maintaining the quality of the entire lot and is therefore essential to the fruit economy. Currently, the broadly used bruise detection is 2-D imaging systems. However, the 2-D imaging technology has many disadvantages, such as low-accuracy, high sensitivity to the viewpoint of the camera and lighting conditions, incapability to provide depth measurement of the bruises, low-accuracy in detecting the stem/calyx, etc. In this paper, we propose a low-cost, real-time 3-D imaging technology for bruise detection method. The proposed system consists of 3-D image acquisition, 3-D imaging processing, 3-D image feature extraction and 3-D object classification. It is expected to solve the intrinsic problems of high labor cost, fatigue, and non-availability of trained workers in the fruit harvest and storage process. It will also solve the problems in the 2-D imaging technology. This paper will focus on 3-D object feature extraction. 3-D wavelet translation will be used in this project to extract the detail features on the surface of the testing objects. The extracted features are sent to an Artificial Neural Networks classifier for object recognition and the bruise on the fruits will be detected. Keywords: Wavelet Transformation, Feature Extraction, 3-D Imaging Processing

2:30 Business Meeting

EVENING

POSTER SESSION

Immediately following Dodgen Lecture

P9.01

ENHANCING PARENT INVOLVEMENT IN NC-CCSS FOR K-2 MATHEMATICS

Tayla Frizell, Deanna Mallard, Nyjah Grant, Darnell Johnson, Ervin Howard, Linda Hayden

Elizabeth City State University, Elizabeth City, NC USA, Mississippi Valley State University, Itta Bena, MS USA, and Longwood University Farmville, VA USA

In this study, the 2014 REU math team developed and provided a workshop that assisted parents in understanding the North Carolina Common Core State Standards for K-2 Mathematics to assist with student homework assignments. Parent involvement is defined as parent participating in the educational processes and experiences of their children. A chi-square analysis was used to analyze data collected from the pre survey and the post survey administered to participants in the workshop. The study revealed all of the individual components of parent involvement were positively and significantly related to educational goals. The study identified various aspects of parent involvement that yielded statistically significant results in affirming that parent involvement attributed to urban student achievement. These findings were particularly helpful for indicating which kinds of parent involvement influenced academic success. Most notably, parent expectations and styles demonstrated a strong relationship with scholastic outcomes. Parent expectations and styles created an educationally oriented ambience that established an understanding of the certain level of support the child needed to succeed academically. The REU mathematics team focused on three essential questions in this study: (1) What practices will increase parent awareness of K-2 NC-CCSS for mathematics at P. W. Moore Elementary School? (2) What methods can be used to strengthen parent skills in assisting with mathematics homework assignments at P. W. Moore Elementary School? (3) What actions can be taken to motivate parent involvement in the school improvement process focusing on mathematics at P. W. Moore Elementary School?

P9.02

USING A MATLAB/PHOTOSHOP INTERFACE TO ENHANCE IMAGE PROCESSING IN THE INTERPRETATION OF RADAR IMAGERY

Kalyx McDonald

Mississippi Valley State University, Itta Bena, MS USA

The Center for Remote Sensing of Ice Sheets (CReSIS) has developed many radars that operate over the frequency range from 140 to 230 MHz with multiple receivers developed for airborne sounding, and imaging of ice sheets. Understanding the echogram data depends on knowing the process of how radar waves interact with natural surfaces. The purpose of this project was to use the Bas Relief filter for image processing in order to improve the interpretation of radar imagery. The filter Bas Relief, currently in Photoshop, was once a sculpture technique in which figures or other design elements were just barely more

prominent than the overall background. The University of Kansas CReSIS office heavily relies on the use of MATLAB along with Photoshop to perform several tasks. MATLAB is a high-level programming language and interactive environment with strong mathematical and graphics capabilities while Adobe Photoshop CC allows you to use advanced image processing algorithms that are not available in MATLAB. With Adobe Photoshop Extended we hoped to combine MATLAB commands with Photoshop's image editing features to further interpret imagery. With the implementation of this algorithm in MATLAB, it would allow researchers to conveniently retrieve and use the newly edited image. By comparing the original image versus enhanced, researchers would be able to improve the tracking of features such as internal layers and the ice bottom.

P9.03

TOWARDS ONLINE TEACHING OF ELECTRICAL AND COMPUTER ENGINEERING LABORATORIES

Abdelnasser Eldek and Mahmoud Manzoul

Jackson State University, Jackson, MS, USA

Online education or distance learning is now attracting most of the educational institutions. It is a good way for the educational programs seeking to expand their programs and facilitate the educational goals of working professionals. In addition, online education allows one to fit study around work, social or family commitments. One can study at home, in the office, or any place and time that suits him/her. In the past few years, the quality of distance learning has greatly improved, as both students and educators have become more comfortable with the technology, and as stories of best practices have been shared and duplicated. However, introducing online education in Engineering Programs is still facing challenges. This is because engineering education includes a lot of lab work which necessitates student's attendance. For example, the student in the Electrical Engineering has to attend labs with many classes such as Electric Circuits, Electronics, Digital Logic, Embedded Systems, and Microwave Theory. In this study, we developed a new Circuits Laboratory based on virtual equipment that allows student to do the experiments anywhere. All what is needed beside a laptop is an inexpensive small board, breadboard and few components, and the student will create a virtual work station that has DC Voltage Generator, Function Generator, Oscilloscope, and Voltmeter. The total cost of the board, breadboard and components is \$150.

P9.04

IMPLEMENTATION OF AN ARBITRARY PRECISION INTEGER ARITHMETIC PACKAGE

Krishna Aditya and Nishant Suresh

Alcorn State University, Lorman, MS USA

In Algorithm Implementation classes we have been developing an arbitrary precision integer arithmetic package suitable for number theory research. It is implemented entirely in C++ language and because of the use of object oriented features, operator overloading user of the package can use a natural algebra syntax and a syntax natural to C++. For example to print a *bigint* variable *x*, user can use a statement like `cout << x` rather than a print function. And to add *bigint* variables *x* and *y* and leave the result in a *bigint* variable *z*, user can use a natural algebraic expression like `z = x + y`, rather than use a sum function. It

supports common integer arithmetic calculations like addition (+), subtraction (-), multiplication (*), integer division (/), remainder (%), power (**), increment (++), decrement (--), gcd(), lcm(), factorial() etc., For multiplication we have implemented both the older Karatsuba algorithm and a newer and faster FFT based multiplication algorithm. Package uses Mifsud division algorithm, Euclid algorithm for gcd computation, Bhakshali algorithm for integer square root computation, Miller-Rabin algorithm for primality testing. . We are planning to enhance the package to support arbitrary precision floating point number and complex numbers, add more functions, and use faster algorithms. We have used and tested the package in applications like generating first 50000 fibonacci numbers

P9.05

ADDING FUNCTIONALITY TO FREEMAT: IMPLEMENTING *ode45rev* FUNCTION TO SOLVE SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS

Isikeli Ongosia, Jathin Padmaiah, Isaac Sampson, Leonard Turner, and Lakenya Walker

Alcorn State University, Lorman Mississippi USA

In Fall 2014 Scientific Computation class we implemented and studied several algorithms to numerically solve ordinary differential equations (ODEs). The implementations were done in Freemath which is a freeware and is a clone of popular Mathematical software Matlab. Matlab has several functions like *ode45*, *ode23* etc., to numerically solve differential equations. For non-stiff initial value problems *ode45* is the most commonly used function. In Matlab this function uses Dormand-Price algorithm, which is an adaptive step size algorithm. Freemath has only one inbuilt function to solve differential equations. It is also named as *ode45*. It uses Runge-Kutta-Fehlberg algorithm which is an older algorithm as compared to Dormand-Price Algorithm used in Matlab function *ode45*. We implemented *ode45rev* (rev stands for revised) function which uses Bogacki-Shampine algorithm which is a newer and claimed to be better algorithm as compared to Runge-Kutta-Fehlberg algorithm and Dormand-Price Algorithms. We tested the implementation with several differential equations with known analytical solution.

Friday, February 27, 2015

MORNING

Room TC 226

9:00-10:00 Workshop

CHOICE OF STATISTICAL TECHNIQUES: PARAMETRIC VERSUS NON PARAMETRIC METHODS

Elgenaid Hamadain and Michelle Tucci

University of Mississippi Medical Center, Jackson, MS USA

The choice of statistical technique for any data has a profound influence on inference, interpretation, and, therefore, the conclusion derived from it. Understanding this choice is important for critical evaluation of biomedical literature. A potential source of confusion in analyzing any data is whether to use parametric or non-parametric statistics. The importance of this issue cannot be underestimated. Knowledge of several statistical concepts are needed to understand the difference between parametric and nonparametric methods. If measurement scale is nominal or ordinal then one should use non-parametric statistics. If interval or ratio scales are used, then parametric

statistics should be used. Other consideration is distribution of the data. If data are approximately normal, parametric methods should be used. Nonparametric tests are sometimes called distribution-free tests because they are based on fewer assumptions. Non-parametric procedures are less powerful because they use less information in their calculation. If a distribution deviates markedly from normality, then you take the risk that the statistic will be inaccurate. The safest thing to do is to use an equivalent non-parametric statistic. If you get it wrong, you risk using an incorrect method or you may use a less statistically powerful procedure. If sample sizes are large, parametric tests are robust to departures from normality. However, because of cost and potential risks to humans and animals, many of the sample sizes in the biomedical literature are far from being large. It can sometimes be difficult to assess whether a continuous outcome follows a normal distribution and, thus, whether a parametric or nonparametric test is appropriate. Several statistical tests exist to assess normality including Kolmogorov-Smirnov test, the Anderson-Darling test, and the Shapiro-Wilk test. Each test is essentially a goodness of fit test. This presentation discusses all aspects of statistical test choice comparing parametric tests with equivalent nonparametric counterpart for t-test, Paired t-test, one-way ANOVA, and regression and correlation techniques with real examples using several statistical software primary, SPSS.

PHYSICS AND ENGINEERING

Chair: Pradip Biswas

Tougaloo College

Vice-Chairs: James Stephens

Southwest Mississippi Community College

Vice-Chairs: Alakabha Datta

University of Mississippi

Thursday, February 26, 2015

MORNING

Room TC 218B

O10.01

08:30 DIRECT VISUALIZATION OF SHEAR WAVE IN MICELLAR FLUID

Cecille Labuda

University of Mississippi, Oxford, MS, USA

Wormlike micellar fluids are viscoelastic and can thus support shear waves to depths of the order of tens of centimeters depending on concentration. The fluid is birefringent under stress allowing visualization of the shear waves through crossed polarizers. By seeding a CTAB-NaSal wormlike micellar fluid with microspheres, we have been able to directly visualize the shear waves by observing the particle vibration. The study of shear waves in viscoelastic media is increasingly important with the emergence of ultrasound shear wave elastography techniques. These fluids provide a good laboratory model for investigating the propagation of shear waves in viscoelastic media.

O10.02

8:45 EFFECT OF FLUORINATION TREATMENT ON THE HYDROLYTIC DEGRADATION RESISTANCE OF Y-TZP

Gaurav Joshi, Jason A Griggs, and Jeffrey Piascic

University of Mississippi Medical Center, Jackson, MS, USA

Purpose: To determine whether fluorination will improve the resistance of Y-TZP to low-temperature degradation as simulated by autoclaving. **Materials:** Rectangular beam specimens (25 mm x 4 mm x 3 mm) of Y-TZP (IPS e.max ZirCAD, Ivoclar Vivadent) were fabricated. **Methods:** The specimens were polished (15 μ m) and divided into four groups (n=10/11). F groups were subjected to the fluorination treatment in a planar, inductively coupled 13.56 MHz plasma operated at 800 W with a dc bias of -300 V for a total time of 20 minutes. Then, A groups were subjected to an autoclave at 134°C and 2.15 bar pressure for 20 h. X-ray diffraction analyses (n=3) were performed using a diffractometer (XDS 2000, Scintag) with Cu-K α radiation ($2\theta = 27-33^\circ$, step size=0.02°, and dwell time = 1.5 s). The monoclinic phase fraction was calculated using the Garvie and Nicholson method. Then, all of the specimens were subjected to rapid monotonic loading (10 MPa/s) until failure (4-point flexure) in deionized water at 37°C, and the strength of each specimen was calculated. The groups were compared using two-way ANOVA followed by Tukey's HSD with $\alpha=0.05$ (SigmaPlot, Systat). **Results:** The monoclinic phase fractions (mean $\pm$ standard deviation) for Groups C (control), A, F, and FA were 0 $\pm$ 0%, 3.9 $\pm$ 0.3%, 0% $\pm$ 0%, and 18 $\pm$ 7%, respectively. The mean strength values (MPa) were 750 $\pm$ 86, 817 $\pm$ 59, 916 $\pm$ 47, and 834 $\pm$ 45, respectively. **Conclusions:** Two-way ANOVA showed a significant effect of fluorination resulting in higher strength (p<0.001), and aging was associated with a significantly higher proportion of monoclinic phase for both fluorinated and non-fluorinated specimens (p=0.002).

O10.03

9:00 AN INVESTIGATION OF WIND-GROUND COUPLING

Vahid Naderyan, Richard Raspet, and Craig Hickey

University of Mississippi, Oxford, MS, USA

Wind noise at low frequency is a problem in seismic surveys which reduces seismic image clarity. The driving pressure perturbations on the ground surface associated with wind-induced ground vibrations is investigated. The ground surface pressure and shear stress at the air-ground interface were used to predict the displacement amplitudes of the horizontal and vertical ground motions as a function of depth. The measurements were conducted at a site in Marks, MS, having a flat terrain and low seismic ambient noise under windy conditions. Multiple triaxial geophones were deployed at different depths to study the wind-induced ground vibrations as a function of depth and wind velocity. The measurements show that the wind excites horizontal components more than vertical component on the above ground geophone due to direct interaction with the geophone. By mounting the geophones flush with the ground the amount of noise on all three components reduces drastically. For geophones buried flush with the ground surface and at various depths below the ground, the vertical and the horizontal components of the ground particle displacements are at the same level. There is a very small decrease in displacements with depth. The results of the measurements are compared to the predictions results. [This work is supported by

USDA under award 58-6408-1-608]

O10.04

9:15 COMPUTING OF ULTRASONIC PRESSURE FIELDS IN FELINE BRAIN

Nazanin Omid, Charles Church, and Cecille Labuda

University of Mississippi, Oxford, MS, USA

The overall goal of this project is to determine the actual acoustic pressure present during experiments performed in the brains of anesthetized cats. The project involved calculation of the acoustic pressure waveform in cat brain produced by a spherically focused transducer given the source pressure amplitude, frequency, transducer diameter and focal length. For low source pressure, the focal intensity is matched to experimentally determined values, and the computed wave forms are the same as those determined using linear theory. For higher source pressures, the intensities may still match, but the pressure waveform must be computed using nonlinear theory.

9:30 BREAK

O10.05

9:45 ON THE NATURE OF HIGH FREQUENCY LOCALIZED VIBRATIONS IN HYDROGENATED AMORPHOUS SILICON: A FIRST-PRINCIPLES STUDY

Minaspi Bantawa and Parthapratim Biswas

University of Southern Mississippi, Hattiesburg, MS, USA

We discuss the nature of the vibrational modes of hydrogen atoms in amorphous silicon hydride for different concentration of hydrogen by constructing models that are consistent with the experimental infrared (IR) data [1]. The dynamical matrices have been obtained within the framework of the first-principles density-functional formalism in order to determine the nature of the vibrational modes. The relation between the high-frequency stretch modes (of vibration) and the concentration of hydrogen atom in the network is addressed with particular emphasis on the localization character of the modes. Furthermore, we also address the relation among the various silicon-hydrogen bonding configurations, the concentration of hydrogen in the network, and its effect on the shift of the high frequency stretch modes. [1] A.H.M. Smets.

O10.06

10:00 STRUCTURAL MODELING OF AMORPHOUS GRAPHENE: A FIRST-PRINCIPLES APPROACH

Basu Dev Oli and Parthapratim Biswas

University of Southern Mississippi, Hattiesburg, MS, USA

We present a new approach to model structural properties of amorphous graphene using a combination of Monte Carlo and a population-based optimization technique in conjunction with a first-principle total-energy functional. Structural models of amorphous graphene for different density have been generated using a bond-order potential, which is then followed by a first-principle density-functional relaxation of the total energy. Structural properties of the models have been characterized by calculating the pair distribution function, the bond angle distribution function, and the statistics of the ring-

size distribution. The variation of the total energy as a function of the planar density of the models is studied to predict the equilibrium density for models consisting of 300 and 500 atoms. The atomic-scale character of the models is examined by calculating the Delaunay triangulation, the Mermin order parameter, and the ring statistics for the amorphous networks.

O10.07

10:15 COMPARATIVE STUDY OF SATURATION EFFECT IN LASER INDUCED BREAKDOWN SPECTROSCOPY (LIBS) AND LASER INDUCED MOLECULAR EMISSION SPECTROSCOPY (LIMES)

Bader Alfarraj, Herve Sanghapi, Chet Bhatt, Fang Yueh, and Singh Jagdish

Mississippi State University, Starkville, MS, USA

Laser induced breakdown spectroscopy (libs) is widely used laser spectroscopic techniques in various fields, such as material science, forensic science, biological science, and the chemical and pharmaceutical industries. In most of libs work, the analysis is performed using radiative transitions from the atomic emissions. Recently, some work on laser induced molecular emission spectroscopy (limes) has started. The limes analysis was performed using radiative transitions from the molecular band emissions. In this work, the comparative study of saturation effect in libs and limes is performed to obtain the optimum experimental condition to lessen the saturation problems. A binary mixture of strontium oxide and aluminum oxide of different concentrations in powder form was used as sample. Libs and limes spectra were collected by varying various parameters, such as laser energy, gate delay, and gate width to optimize the libs and limes signals. The atomic emission from sr and al lines observed in libs spectra of different sample composition were used to characterize the laser induced plasma and correlate the effect of saturation.

O10.08

10:30 RADIAL OSCILLATIONS OF A GAS BUBBLE VIA CANONICAL PERTURBATION THEORY: FREQUENCY EXPANSION TO FOURTH ORDER

James M. Stephens

Southwest Mississippi Community College, Summit, MS, USA

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. 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. Building on our earlier work to second order, we extend the frequency expansion to fourth order. The fourth order result shows good agreement with a numerical approach to the dynamics of the bubble.

10:45 BREAK

O10.09

11:00 NEW PHYSICS EFFECTS ON DEEP INELASTIC TAU NEUTRINO SCATTERING THROUGH CHARGED CURRENT

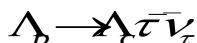
Hongkai Liu, Ahmed Rashed, and Alakabha Datta

University of Mississippi, Oxford, MS, USA

Neutrinos can only interact with matter through weak force and gravitational force, which makes it hard to detect and study them. However, it provides us a good window to study the new physics involved in neutrino interactions, since the effect of new physics can be easily observed as the SM cross section is small. In this project, we first study the cross section of the process of tau neutrino nucleon deep- inelastic scattering $\nu_{\tau} + N \rightarrow \tau + X$ in the lowest-order approximation within the Standard Model. In the quark parton model, this reaction are described as the scattering of neutrino and quarks, the constituents in nucleon, which can be studied by using structure functions. We then introduce the effect of leptoquark. And finally we can get the ratio of the leptoquark contribution to the SM cross section to see the deviation. The reason why we are interested in the DIS region is because this is the place where neutrino cross section is measured well

O10.10

11:15 SEMI-LEPTONIC DECAY RATE OF



Wanwei Wu, Shanmuka Shivashankara, and Alakabha Datta

University of Mississippi, Oxford, MS, USA

Heavy quark decays provide a very advantageous investigation to test the Standard Model. The analysis of the huge data produced at the B factories, leads to many sensitive measurements of b quark decays. We calculate the semi-leptonic

decay rate for the process $\Lambda_b \rightarrow \Lambda_c \tau^- \bar{\nu}_\tau$ in the Standard Model using the quark model of heavy baryons and the heavy quark effective theory (HQET). In our calculations, we use two different methods, involving the transition probability and the helicity formalism. One can use the latter approach to derive the complete formulas for the joint angular decay distributions occurring in this semi-leptonic decay. We also consider the effects beyond the Standard Model, including the right-handedness of the $b \rightarrow c$ transition as well as new scalar and tensor interactions. Our results are relevant for the coming measurement of this semi-leptonic decay at LHC b experiment in CERN, and also provide sufficient theoretical predictions to explore the physics beyond the Standard Model.

O10.11

11:30 EXACT DIAGONALIZATION OF FRUSTRATED QUANTUM SPIN CHAINS

Khagendra Adhikari and Kevin Beach

University of Mississippi, Oxford, MS, USA

We present numerical results for the frustrated quantum Heisenberg chain, a model of mutually interacting quantum spins arranged at regular intervals along a line. The interactions extend over a finite range up to a few spins away and are antiferromagnetic, meaning that they favor the opposite

alignment of spins. The ratio between the strength of the nearest- and next-nearest-neighbour interactions acts as a tuning parameter that can drive the infinite-size, zero-temperature system from a phase that is spin-liquid in character to one that is spin-crystalline. Both are truly quantum phases with no classical analog; the latter phase is a consequence of strong "frustration," which is the competition between interactions that favor incompatible spin orderings. Our simulations are carried out using exact diagonalization on finite-size systems of increasing size, with results extrapolated to the infinite-size limit. We compare our numerical measurements to known results for the nonfrustrated model and to an exactly solvable point at intermediate frustration, known as the Majumdar-Ghosh point. We discuss which physical observables can distinguish the two phases, and we contrast the behaviour of the low-lying excitations on either side of the phase transition.

O10.12

11:45 MASS TREND ANALYSIS OF THE AME2003 WHICH ASSUMES CLUSTERING LEADS TO AN EMPIRICAL MASS FORMULA THAT IMPROVES ON THE SEMI-EMPIRICAL MASS FORMULA, PARTICULARLY FOR N = Z NUCLEI

James Lee Tracy, Jr. and Jeffry Winger

Mississippi State University, Starkville, MS, USA

A new look at empirical mass data in the Atomic Mass Evaluation 2003 (AME2003) reveals that a non-uniform distribution of binding energy exists within the nucleus. This suggests an empirical model for the nucleus, in which preformed substructures exist in a steady state within the nucleus, specifically alpha clusters, a deuteron ($Z = \text{odd}$), and "excess" neutrons. A linear relationship between these excess neutrons and the atomic mass as catalogued in the AME2003 database confirms that the masses of nucleons in each cluster form are distinct and follow smooth trends. The constant term in each quadratic fit of the excess neutrons for a given alpha core gives $N = Z$ nuclear masses; these masses have been compared to the measured data and the Semi-Empirical Mass Formula (SEMF). This formula for $N = Z$ nuclides improves the mass calculation over the SEMF. Approximate values for inter-cluster (alpha-alpha, alpha-n, n-n) binding energies are also revealed. Analysis of nuclei with fixed numbers of excess neutrons suggests shell closures corresponding to a modified harmonic oscillator rather than infinite square well. This work is supported by the Office of Science of the Department of Energy under the grant number DE-FG02-96ER41006.

12:00 LUNCH & BUSINESS MEETING

AFTERNOON

Room TC 218B

O10.13

1:30 NOVEL TESLA-TYPE HEAT EXCHANGERS FOR MICROFLUIDIC APPLICATIONS

Piyush Porwal, Scott M. Thompson, and D. Keith Walters

Mississippi State University, Starkville, MS, USA

Tesla-type valves for passive flow control in microfluidic applications is promising, because of its unique

design of no-moving-parts. The effectiveness of the valve (measured via its diodicity) can be increased with a series setup, hence creating a multi-staged Tesla valve. This investigation is focused on studying the effect of varying the flow inlet temperature (20 °C, 50 °C, 80 °C), Reynolds number (50,100,200), working fluid (water, glycol, air) and number of valves (4,10,14) on the diodicity of the MSTV, by employing high performance computing and Computational Fluid Dynamics. Another very important aspect of this investigation is to determine the potential of an MSTV as a heat exchanger—which is of interest for biomedical applications. The results indicated that with an increase in the inlet temperature, the diodicity (performance) of the MSTV decreased significantly for liquids (water, glycol), and increased for gases (air). Compared to a straight micro-channel, enhanced heat transfer was noticed in the MSTV. Considering the heat transfer capability, simulations were run for a single Tesla valve to determine heat transfer coefficient that could be used for deriving a Nusselt's number for a single Tesla valve.

O10.14

1:45 HORMONE INDEPENDENT PROTEIN TARGETS AND DRUG DESIGNING FOR BREAST AND PROSTATE CANCERS

Pradip K. Biswas

Department of Physics, Tougaloo College, Tougaloo, MS, USA

Breast and prostate cancers together affect about three million people every year and kills about 30% of them (16% in USA). Estrogen Receptor (ER) alpha and Androgen Receptor (AR), are the two main nuclear hormone proteins that are responsible for the progressions of breast and prostate tumors, respectively, and represent the main targets for hormonal therapies. However, about 70% of breast and prostate tumors develop resistances in hormonal therapies and they sustain growth in hormone-independent manners. In order to develop hormone-independent inhibitors, we elucidate protein-protein and protein-DNA interfaces of ER and AR and identify and validate alternate targets for drug designing. Using the crystal structures of ER and AR DNA and Ligand binding domains, molecular modeling, molecular dynamics simulations, and bioinformatics we identified the hydrogen-bonding contacts and the sequence motifs that are responsible for dimerization and/or DNA recognition. The crucial amino acids of a motif are then grafted on stable helices (alanine or leucine) in order to develop peptidic inhibitors. In ER ligand binding domain, out of the three sequence motifs found to be responsible for dimerization, DXXTD (480-484) and LQXXHQXXAQ (497-506), are being used as templates for designing peptide-based and small molecule inhibitors for ER dimerization – an essential process in ER mediated transcription. In AR, we didn't find any suitable target in the ligand binding domain but found a suitable target in AR DNA binding domain: This LCAXRXD motif (578-584) has been grafted on alanine and leucine helices and in-silico and in-vitro testings are in progress. Author acknowledges financial support from MS-INBRE funded by NCRR/NIH-5P20RR016476-11 and NIGMS/NIH-8P20GM103476-11.

2:00 BREAK

O10.15

2:15 DEVELOPMENT OF A REMOTE LABORATORY

HuiRu Shih, Lashayla T. Gilbert, Dameisha L. Wilson, Cassandra Ellis, Devon M. Stepney, and Shannan V. Williams

Department of Technology, Jackson State University, Jackson, MS, USA

The goal of Remote Laboratory is to grant the distance learning students' access to laboratory equipment. This can increase the type of courses that can be offered through distance learning. This project studies the feasibility of several potential approaches for developing a Remote Laboratory: LabVIEW, NI ELVIS, LAN eXtensions for Instrumentation (LXI), Universal Serial Bus (USB), and Remote Desktop Connection. LabVIEW can be adopted to implement instrument control. LabVIEW programs are called virtual instruments (VIs). LabVIEW possesses a very convenient web interface. The Web Publishing Tool can publish the front panel of a VI as a HTML document to the web. With the LabVIEW built-in Web Server, it is possible to view and control a VI remotely from a Web browser. Students can actually access the experiments with web browser in the same way a conventional website is accessed. National Instruments (NI) Educational Laboratory Virtual Instrumentation Suite (ELVIS) integrates several most commonly used instruments into a compact form factor. This platform has made it easy to interface those instruments remotely. LXI is a new test instrumentation standard which defines the communication protocols for instrumentation and data acquisition systems using Ethernet. The connection with the LXI instruments is over an Ethernet connection. Currently, many test and measurement instruments are configured with USB interfaces. This makes for a simple way for accessing instrument controls. Microsoft Remote Desktop Connection can connect two computers over the Internet. Many instruments can be accessed remotely via this direct connection.

O10.16

2:30 POPULATION MONITORING AFTER RADIATION INCIDENT

Pao-Chiang Yuan, Jessica Murphy, H.R. Shih, and. Ebony A. Davis

Jackson State University, Jackson, MS, USA

Population monitoring is a process that begins soon after a radiation incident is reported and continues until all potentially affected people have been monitored and evaluated. Generally, they are monitored and evaluated due to a) needed medical treatment; b) presence of radioactive contamination on the body or clothing; c) intake of radioactive materials into the body, and e) removal of external or internal contamination. These included nuclear power plant failures, terrorist attacks, and situations related to radiation incidents. There are 400 plus nuclear reactors in the world, and one is located in Port Gibson, Mississippi - Entergy Nuclear (Grand Gulf Nuclear Station). When a radiation incident results in mass casualties occurs, one or more population monitoring and decontamination sites are needed to monitor people for exposure, contamination and decontamination or further medical treatment access. Population monitoring sites are called Community Reception Centers

(CRC). The CRC monitors people and decontaminates them, and it provides food and shelter to those who live in evacuated areas. It also facilitates re-unification of displaced family members and makes it possible for later claims to be easily processed. Lastly, there is medical assistance and counseling accessible if necessary. Jackson State University is located at the edge of the 50 miles emergency planning zone (EPZ). This paper describes the task of population monitoring by the seven stations at the CRC, and how the academic community is initiating efforts to assist in radiation control and monitoring.

O10.17

2:45 STUDY OF (NORM) RADIONUCLIDES IN FARM RAISED CATFISH IN STATE MISSISSIPI (MS)

Sam Aceil

Alcorn State University, Lorman, MS, USA

The state of Mississippi ranks first in farm-raised catfish production. More than 75% of catfish consumed in the nation are produced in Mississippi. Catfish farming in MS State covered an area as high as 112,700 acres. It has an economic impacts of over a billion dollars from feed, raising, processing, storing and distribution.^{1,2} Presence of various radionuclides and trace elements has been reported in aquatics from all over the world for both surface and offshore waters³. This study concentrates on the existence of any Naturally Occurring Radioactive Materials (NORM) in farm-raised catfish at different locally produced catfish. Sample are collected from various farms on the northeast and northwest of the state where all the farms are located. Samples for study are prepared from bone, meat and the skin. Catfish in MS are fed with a high protein based fish-feed produced by local plants, especially for these farms. Because of that, feed samples also been collected and analyzed for any possible contribution. The data include the presence of radionuclides and their concentration in both fish and the feed samples.

3:00 Plenary Session & Dodgen Lecture

EVENING

Poster Session (following Dodgen Lecture)

P10.01

FETUIN-A THERAPY: A NEW APPROACH FOR THE TREATMENT OF VASCULAR CALCIFICATION

Erick Vasquez, Janice Cunningham, Justin McMahan, Keisha Walters, and C. LaShan Simpson

Mississippi State University Starkville, Mississippi USA¹

Arteriosclerosis is a risk factor that accounts for an increase in cardiac-related mortality in patients with end-stage renal disease, and it is promoted by the length of time in which patients receive dialysis and deficiency of the Fetuin-A protein. Fetuin-A, an inhibitory protein on arteriosclerosis development, functions by binding to the calcium mineral present in arteries and facilitating the cellular clearance of the mineral debris from the artery walls. Towards the development of a Fetuin-A therapy to reverse arteriosclerosis, this study focused on characterizing the stabilizing effects of Fetuin-A on suspended CaCO_3 nanoparticle growth in simulated body fluid (SBF). To our knowledge, this is the first reporting of the Fetuin-A protein

using ATR-FTIR and we positively identified the protein presence on the surface of the CaCO_3 nanoparticles. UV/Vis spectral analysis showed protein unfolding transitions as a result of protein absorption onto CaCO_3 nanoparticles and was measured by the absorbance increase at 287 and 291 nm for tyrosine and tryptophan, respectively. Morphological characterization of the CaCO_3 nanoparticles and the fetuin-mineral complexes were obtained with TEM and SEM. The results show that interactions between Fetuin-A and calcium can form shell-like encapsulations of the CaCO_3 mineralized core and nominal concentrations of Fetuin-A partially encapsulate the suspended CaCO_3 nanoparticles. Higher Fetuin-A concentrations are expected to improve Fetuin-A's encapsulation and stabilizing effects on mineral nuclei. Future work will examine concentration-dependent Fetuin-A-mineral complex morphologies and binding mechanisms. "This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476. •

P10.02

MONTE CARLO SIMULATION OF THE MISSISSIPPI STATE AXION SEARCH

Mikhail Gaerlan, John Madsen, Prajwal Mohanmurthy, Dipangkar Dutta, and Singh Jagdish

Mississippi State University Mississippi State, MS USA¹ and Massachusetts Institute of Technology Cambridge, MA USA²

The study of dark matter has been of interest to physicists, and a candidate dark matter particle called the axion has been theorized. The Mississippi State Axion Search (MASS) project will use a light shining through a wall technique to search for the particle. The MASS project will search in the meV range. This range was estimated by the Polarizzazione del Vuoto con LASer (PVLAS) in Italy in 2008. A beam of photons will be fired at a wall through a vacuum within a magnetic field. If this produces axions, they will pass through the wall and decay into photons which will be detected by sensors. Before the completion of the experiment, a Monte Carlo simulation written in Mathematica will model the experiment using known parameters of the experiment. The simulated data will be used to test the analysis package and to compare against the experimental data.

P10.03

CHARACTERIZING AND ANALYZING HAMMAMATSU MULTIANODE PHOTO MULTIPLIER TUBES FOR USE IN THE RICH DETECTOR IN THE JEFFERSON LAB HALL B CLAS 12 SPECTROMETER

Cameron Clarke¹, Jenna Samuels³, Valery Kubarovsky³, Dipangkar Dutta¹, and Singh Jagdish¹

Mississippi State Mississippi State, MS USA¹, Jefferson Lab Newport News, VA USA², and Florida International University Miami, FL USA³

The Large Acceptance Spectrometer (CLAS12) at the Thomas Jefferson National Accelerator Facility will use a ring-imaging Cherenkov (RICH) detector. RICH is designed to measure the velocity of near-light speed particles from nuclear and particle interactions by detecting the tens of photons emitted as Cherenkov radiation. It is imperative that enough of the Cherenkov photons be detected by photomultiplier tubes

(PMTs). The detector requires a high spatial resolution for identifying rings and measuring their radii, used to facilitate particle identification. PMT producer Hamamatsu continues to develop new, smaller, high-gain, multianode PMTs (MAPMTs) which may be able to achieve the necessary sensitivity, resolution and gain desirable in the CLAS12 RICH detector. Hamamatsu develops several of these new MAPMTs, including their H8500 and newer H12700 models, and we sought to determine which was best suited for use in the RICH detector. First we studied the MAPMTs' single photoelectron (SPE) spectra, dark current, and crosstalk to determine which MAPMT design was better. We built a test bench and automatic system for data acquisition, analysis and database storage and we also implemented two fitting procedures for this data. This will be used for characterization of all PMTs in the CLAS12 RICH detector. We show that the Hamamatsu H12700 PMTs are more suitable for use in the CLAS12 RICH detector in regards to resolution of the single photoelectron spectrum, average number of photoelectrons, and dark current and we also showed the necessity of a new fit to model the behavior of PMTs which are near the pedestal and with few photons. We saw that although there is little difference in dark current, the H12700 PMTs suffer less from crosstalk, have narrower SPE spectra, and have higher efficiencies. We see that the relative efficiency on average 29(5) percent higher in H12700 than H8500 MAPMTs. We find that the new fit better describes the data for H12700 PMTs, providing a more accurate, and a seemingly more physically meaningful model of the MAPMTs performance. These results mean that the H12700 MAPMTs will increase the efficiency of the RICH detector. Although there are some concerns about below average pixels on the edges of the tubes, we find that the H12700s should prove useful across the field of Cherenkov ring measurements and particle identification.

P10.04

NOVEL TREATMENT OF OSTEOSARCOMA VIA MAGNETIC NANOPARTICLES

Taylor Szasz, AnneMarie Kovach, Jun Liao, Lakiesha Williams, Camillo Bulla, Sandra Bulla, and Raj Prabhu

Mississippi State University, Mississippi State, MS USA

This study functionalized anti-VEGFA antibodies and ligand CD80 to iron oxide magnetic nanoparticles treated with an n-hydroxy succinimide biocompatible coating. Osteosarcoma is a bone cancer common in adolescents hitting their first growth spurt. Treatment of osteosarcoma consists of chemotherapy and radiation, which loses effectiveness when the cancer metastasizes (20% of cases). Targeted drug delivery via nanoparticles is an alternative method of treatment for osteosarcoma. This less invasive treatment has the potential to reduce negative effects of cancer treatment and allows more vulnerable patients better survival rates. The anti-VEGFA antibodies are used as a targeting agent on the nanoparticle. Interaction of the ligand CD80 with the CTLA-4 receptor in osteosarcoma has been postulated to induce cellular apoptosis. Concentrations of 0.1, 1.0, 10.0, and 100.0 ug/ml of CD80, VEGF antibodies, and CD80 + VEGF antibodies were tested against a rat osteosarcoma line. Cells were inoculated with nanoparticles three times, with cell counts taken every 24 hours to determine the proliferation rate of osteoblasts after treatment. Preliminary results find that nanoparticles functionalized with 1.0 ug/ml of CD80 + VEGF

antibodies resulted in the greatest decrease in cell proliferation. Further research will be conducted in clinical trials of this treatment in canine animal models.

P10.05

MICROSTRUCTURAL CHANGES OF PORCINE LUNG PARENCHYMA UNDER COMPRESSIVE LOADING

Haden Andrew Johnson, Lakiesha Williams, and Patrick Corley

Mississippi State University, Starkville, MS USA¹

The lung is a highly complex yet organized tissue. Although the underlying microstructure of the lung is well known, the mechanics is not well understood. Evaluation of the material properties of the lung will help in elucidating the overall tissue response for computational simulation studies. The goal of this research was to observe lung microstructure evolution under compressive loading. A porcine animal model was used for studying the lung tissue. All tissue samples were collected from a local abattoir and processed immediately. Interruption testing and Hematoxylin and Eosin (H&E) staining were used to capture the structure changes under mechanical load. The tissue was interrupted at levels of 3000, 6000, and 9000 gram force load to determine structural change. In order to perform formaldehyde fixation on the samples, customized compression clamps were constructed in-house to allow for the sample to be loaded, held, and then removed from the mechanical testing device in its intended loaded condition. Following being in fixative for 24 hours, samples were prepped for H&E staining. Following staining, particle analysis was performed and used to compare native tissue samples and the damaged samples. Particle analysis was done using ImageJ software. Based on the results, it can be determined that lung tissue is characterized by a biomechanical behavior that is viscoelastic in nature. As the samples were compressed to loads of 6000 and 9000 gram force, the max true strain achieved was approximately 60%. Further particle analysis is being performed to determine any irreparable damage to the tissues. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

P10.06

REPORTING ON THE A=74 CHAIN IN THE BETA DECAY OF Z=29-31

Umesh Silwal, Durga Prasad Siwakoti, and Jeff Allen Winger

Mississippi State University, Starkville, MS USA

Data on gamma-ray emission following beta-decay in the energy range 20-5200 keV along with gamma-gamma and beta-gamma coincidences starting from ⁷⁴Cu, ⁷⁴Zn, ⁷⁴Ga, ⁷⁴Ge have been collected and analyzed. Using gamma-gamma and beta-gamma coincidences, decay schemes have been constructed and compared to existing data at the National Nuclear Database Center. For energy gated gamma-gamma spectra, possible peaks were fitted to a standard Gaussian function to determine the relevant peak area. The fitting was performed on both of peak gate and an adjacent background gate to enable us to identify the statistically significant peaks. By this careful analysis, we have established new transition lines and energy levels for all three daughter nuclei. We have also readjusted some previously placed transitions due to better understanding of the gamma-gamma relationships. This work is supported by the office of Science of

the Department of Energy and Grand number is DE-FG02-96ER41006

Friday, February 27, 2015

MORNING

Room TC 218B

O10.18

9:00 HIGH TEMPERATURE RESONANT ULTRASOUND SPECTROSCOPY STUDY ON LEAD MAGNESIUM NIOBATE - LEAD TITANATE (PMN-PT) RELAXOR FERROELECTRIC MATERIAL

Sumudu Tennakoon¹ and Joseph Gladden²

¹Department of Physics and Astronomy, ²National Center for Physical Acoustic, University of Mississippi, Oxford, MS, USA

Lead magnesium niobate-lead titanate [(1-x)PbMg_{1/3}Nb_{2/3}O₃-xPbTiO₃] is a perovskite relaxor ferroelectric material exhibiting superior electromechanical coupling compared to the conventional piezoelectric materials. In this work, unpoled single crystal PMN-PT material with the composition near morphotropic phase boundary (MPB) was investigated in the temperature range of 273 K - 800 K. High temperature resonant ultrasound spectroscopy (HT-RUS) technique was used to probe temperature dependency of elastic constants derived from the measured mechanical resonances. Significantly high acoustic attenuation is observed at temperatures below 400 K where the resonance peaks cannot be resolved from the spectra. The temperature range of 395 K - 405 K was identified as a transition temperature range, where the material showed an abrupt change in the resonant spectrum. This transition temperature compares favorably with dielectric constant measurements reported in the literature, where the material emerges out from the rhombohedral phase near the MPB and transforming into cubic phase. Elastic constant trends in the temperature range of 400 K - 800 K indicate stiffening of the material, followed by gradual softening. Stiffness constants C₁₁ and C₄₄ were increased approximately by 40% and 33% respectively in this temperature range, and peaked at two different temperatures respectively around 673 K and 573 K. Acoustic attenuation, quantified by the mechanical quality factor, exhibits a minimum in the temperature range where the stiffness is maximum.

O10.19

9:15 ULTRASONIC BAND GAPS IN TWO-DIMENSIONAL PHONONIC METAMATERIALS WITH PERIODIC ARRAYS OF COPPER RODS

Ukesh Koju and Joel Mobley

University of Mississippi, Oxford, MS, USA

Phononic crystals are composite metamaterials consisting of periodic arrays of scatterers embedded in a homogenous matrix. Under certain conditions these crystals exhibit forbidden gaps in their ultrasonic transmission spectra (i.e., band gaps) irrespective of the direction of propagation of elastic waves. The contrast between the physical characteristics (e.g., density and elastic moduli) of the scatterers and of the matrix mainly determines the width of the band gaps. Other characteristics such as filling factor, geometry of the array, and the shape of the scatterers also contribute to gap widths. We

present some examples of band gaps in the elastic wave spectrum of two-dimensional phononic crystals composed of periodically arranged copper rods in various matrices.

O10.20

9:30 AN ASSESSMENT OF THE ANGULAR SPECTRUM METHOD FOR THE PROPAGATION OF ULTRASONIC FIELDS COMPUTING OF ULTRASONIC PRESSURE FIELDS IN FELINE BRAIN

Taylor Miller and Joel Mobley

University of Mississippi, Oxford, MS, USA

The goal of this work is to test the validity of the angular spectrum technique as applied to broadband pressure fields generated in water by a submerged ultrasonic source. Using a motorized scanning system, detailed hydrophone measurements of the pressure field emitted by an ultrasonic immersion transducer (d=12.7 mm) were acquired over transverse planes at 10 axial depths. Using Fourier analysis, the measured time-domain fields are transformed into frequency-resolved field distributions. The angular spectrum technique is then applied to simulate the propagation of the fields among the 10 data planes. Through this work we will be able to assess the capabilities and limitations of the angular spectrum technique as applied to low-MHz ultrasonic waves in water.

O10.21

09:45 SHEAR WAVES IN VISCOELASTIC WORMLIKE MICELLAR FLUIDS

Sunethra Kumari Dayavansha, and Cecille Labuda

University of Mississippi, Oxford, MS, USA

Wormlike micellar fluids consist of an aqueous solution of a surfactant and a salt and the surfactant molecules can assume varying topologies depending various physical properties such as temperature and concentration. In this work, the variation of shear speed with temperature of a micellar fluid was studied. The fluid studied here is an aqueous solution of hexadecyltrimethylammonium bromide (CTAB, C₁₉H₄₂BrN) and sodium salicylate (NaSal) in a 5:3 ratio. This fluid is viscoelastic and can support shear waves to depths of the order of ten centimeters depending on concentration. The shearing of the fluid as the shear wave propagates through the fluid can be observed as a time varying birefringence pattern by using a high speed camera. The variation of shear speed with temperature will be presented.

O10.21

10:00 ACOUSTICAL MEMORY IN A YZ-CUT LITHIUM NIOBATE PLATE

Chandrima Chatterjee

University of Mississippi, Oxford, MS, USA

The acoustical memory (AM) consists of a non-exponential echo pattern with a specific behavior. The echo amplitude decreases first and at a later time increases. AM is observed in the yz-cut lithium niobate plate. The plate has dimensions of 52 mm x 19 mm x 1.8 mm. Acoustical waves are generated by 4.5 MHz transducers. The AM signal is observed at a frequency of 4.26 MHz. The first signal of the echo pattern is the bulk longitudinal mode. The internal microstructure of lithium niobate may be involved for the AM effect. Photoluminescence spectra are investigated because each type of

crystal defect has its own line. The excitation wavelength is fixed at 350 nm and photoluminescence spectra are obtained between 380 nm and 1000 nm. Photoluminescence spectra are taken from different locations along the z-axis of the sample at intervals of 120 micrometre. The spectra indicates the presence of defects such as Barium, Neon, Argon, Ozone, Potassium, Iron oxide, Xenon, Krypton and Caesium. Some of the defects are not distributed evenly along the z-axis, especially defects like Barium, Iron oxide. The distance between the maximum and minimum points in the defect location are in agreement with the frequency at which acoustical memory is observed.

O10.22

10:15 STUDY OF SrCl SPECTRA BY LASER INDUCED BREAKDOWN SPECTROSCOPY (LIBS)

Chet Raj Bhatt

Mississippi State University, Starkville, MS, USA

The use of a high energy laser pulse to produce a micro-plasma to vaporize, dissociate, excite or ionize species on material surfaces is known as Laser Induced Breakdown Spectroscopy (LIBS). The study of the atomic emission from the micro-plasma provides information about the composition of the material. LIBS is an ideal analytical technique for in situ analysis of any elemental composition. In this work, a mixture of Strontium chloride (SrCl₂) and Aluminium oxide (Al₂O₃) in powder form was used as sample. The atomic emission from Sr and molecular emission from SrCl in observed LIBS spectra were identified and analyzed. The optimum laser energy, gate delay, and gate width for the selected atomic lines and molecular bands were determined from the spectra recorded at various experimental parameters. The optimum experimental conditions were used to collect the calibration data and the calibration curve was used to determine the limit of detection (LOD) for selected atomic and molecular emission spectra. The details of the results of these measurements will be presented.

PSYCHOLOGY AND SOCIAL SCIENCES

Chair: Shaila Khan,
Tougaloo Collge

Co-Chair: Gary Chong,
Tougaloo Collge

Thursday, February 26, 2015

MORNING

Room Ballroom II/III

POPULATION HEALTH SYMPOSIUM -- IMPROVING HEALTH OUTCOMES IN MISSISSIPPI

FACILITATOR: Claude Brunson, M.D., University of Mississippi Medical Center

8:45 Welcome and Opening Remarks

9:00 Keynote Speaker – Mary Currier, MD, MPH, State Health Officer

9:45 BREAK

10:00 Invited Speaker – Kristi Henderson, DNP, Chief Telehealth & Innovation Officer

10:30 Invited Speaker – Dean, School of Public Health, USM

Thursday, February 26, 2015

MORNING

Room TC 226

O11.01

11:00 CULTURAL CONSIDERATIONS TO SUICIDE ATTEMPTS OF AFRICAN AMERICANS: THE POSTULATION OF CREATING A CULTURE SPECIFIC RISK ASSESSMENT

Theresa Stacy Kearns-Cooper, Alexis Davis, Milton Dawkins, Nuha Farah, and Sasha Williams

Jackson State University, Jackson, MS USA

Studies have indicated that acculturation, stress and cognitive distortions promote suicidal ideations. Continued exposure of these elements appear to have an overpowering impact for suicide attempts. It is postulated that particularly for the African American community, these cultural factors and experiences may indeed intensify the desire to attempt suicide. This presentation will delve into the concerns surrounding the cultural factors associated with suicidality amongst the African American population. A review of the literature demonstrates that acculturation, racial identity, socioeconomic factors predominantly experienced by African Americans, as well as the means utilized to attempt may be elements that possess predictive powers to which a risk assessment can be developed specifically for this ethnic set. The presenters will provide a historical overview of suicide in the USA and the statistical data

that is representative of African Americans. The discussion will also include findings from several studies that establishes the need to explore the development of a protocol that may facilitate in prevention and intervention measures that will educate those within the behavioral sciences and the community. Finally, the rationale for the development of an assessment tool to collect data within special populations of African Americans (i.e., Psychiatric patients and/or Inmates in prison) exists due to the lack of data currently available.

O11.02

11:15 EFFECT OF PERCEIVED GRANDPARENTAL ACCEPTANCE ON AFRICAN AMERICAN STUDENTS

Shaila Khan

Tougaloo College, Tougaloo, MS USA

Relationships among perceptions of grandparental and parental acceptance/rejection, and psychological adjustment of African American college students in Mississippi were investigated. Short form of adult versions of Grandparental and Parental Acceptance-Rejection Questionnaire (PARQ), Personality Assessment Questionnaire (PAQ), and the Personal Information Form (PIF) (Rohner, 2005), were administered to 127 college students (24 males and 103 females) who ranged in age from 18 through 43 years (mean=20.96, SD=3.09 years). No significant difference was found in psychological adjustment, perceived grandparental and parental rejection between males and females. Results of simple bivariate correlations suggested that the psychological adjustment of African American students was associated with their perceptions of rejection by grandmother ($r=.398, p<.001$), grandfather ($r=.255, p<.01$), mother ($r=.404, p<.001$) and father ($r=.315, p<.001$). Linear regression analysis found that grandmother rejection (but not grandfather) contributes significantly to psychological adjustment. Even when the effect of perceived parental rejection were removed, rejection by grandfather was found to have no significant contribution to psychological adjustment of students. Only, rejection by grandmother ($\beta=.275, t=3.28, p=.001$), mother ($\beta=.276, t=3.25, p=.001$), and father ($\beta=.164, t=1.96, p=.052$) contributed significantly to psychological adjustment. When analyzed separately, for males, none of these variables were found to have significant contribution to psychological adjustment. It may be concluded that while perceived acceptance/rejection by grandmother and mother have significant impact on psychological adjustment of African American students, perceived rejection by grandfather and father do not. Perhaps the unique nature of growing up family structure, and closeness to grandparents, particularly to grandmother, play a role in such relationship.

O11.03

11:30 ASSESSMENT OF PSYCHOLOGICAL RESILIENCE TO COASTAL DISASTERS

Timothy Williams, Kaitlynn Wright, Taralyn Rowell, and Shaila Khan

Tougaloo College, Tougaloo, MS USA

The purpose of the present study was to investigate whether psychological resilience is similar for a person who has experienced a natural disaster and a traumatic life event. Seventy six participants, (males=33, females=43) were conveniently selected from Jackson and Gulf Coast of Mississippi. Participants were given the modified Post Traumatic Growth Inventory of

APA (2004) that relies on five factors (Appreciation of life, Relating to others, New possibilities, Personal strength, and Spiritual changes as a result of crisis). The questionnaire had 21 items for evaluating psychological distress after a natural disasters event (B Factors) and 21 items for evaluating psychological distress after other traumatic life event (C Factors). It was hypothesized that that there will be similar patterns of psychological resilience among individuals faced by natural disasters and traumatic life events, there will be gender differences for psychological resilience for natural disaster and other traumatic life event and time elapsed will have no effect on experiencing any of the five traumatic events. Co-relational analysis showed that three out of five factors ('New Possibilities', 'Spiritual Change' and 'Appreciation of Life') had similar scores for dealing with psychological resilience for natural disasters and for traumatic life events. T tests results showed males were more traumatized compared to females on three of the B Factors ('New Possibilities', 'Personal Strength', and 'Spiritual Change'). No significant gender differences was found in any of the five C Factors. Finally results showed that time elapsed had no effect on experiencing any of the five traumatic events.

O11.04

11:45 RACIAL IDENTITY, RACIAL DISCRIMINATION AND PERCEIVED STRESS AMONG AFRICAN AMERICAN COLLEGE STUDENTS

Roosevelt Parker IV, Stephen Rozman, and Shaila Khan

Tougaloo College, Tougaloo, MS USA

Racial discrimination is the prejudicial treatment of individuals or groups based on their actual or perceived racial group. It is believed that individuals who display race as more of a central part of their identity may experience more discrimination because they are likely to perceive racially ambiguous situations as discrimination, which may contribute to higher levels of stress (Sellers et al., 2003). This study investigated whether racial identity and racial discrimination add to stress in African American college students. Eighty participants were given the 10-items Perceived Stress Scale of Sheldon Cohen, the 56-items Multidimensional Inventory of Black Identity (MIBI) of Sellers and a demographical variable questionnaires. The MIBI had seven subscales namely, Centrality, Private Regard, Public regard, Assimilation, Humanists, Minority and Nationalist. It was hypothesized that the perceived stress will have a positive correlation with racial discrimination and identity, and that MIBI and perceived stress will vary among several demographic groups. The results showed no significant correlation between perceived stress and MIBI scores. The t-test results showed racially discriminated group and non-racially discriminated group differed significantly in perceived stress, $t(70)=1.862, p=.05$ and racially profiled group and non-racially profiled group differed significantly in Private Regard subscale, $t(70)=1.959, p=.05$ and The t-test results showed males and females differed significantly in perceived stress, $t(70)=3.570, p=.001$, in subscale of Public Regard, $t(70)=2.315, p=.024$, and in subscale of Nationalist, $t(70)=2.61, p=.011$. The t-tests results showed age significantly differed in subscale of Private Regard, $t(70)=1.934, p=.05$, and in subscale of Nationalist, $t(70)=2.836, p=.003$.

12:00 BREAK

AFTERNOON**Room TC 226****O11.05****1:00 THE ATTITUDES TOWARD PLEDGING AMONG AFRICAN AMERICAN GREEK AND NON-GREEK AFFILIATES**Adrienne Erby and Shaila Khan*Tougaloo College, Tougaloo, MS USA*

From the earliest records of civilization, secret societies have existed all over the world that developed into Greek systems. As African-Americans joined various institutions, only nine African American fraternities and sororities came about due to rules that prohibited them from joining pre-existing organizations. These organizations have promoted leadership, scholarship, and community spirit more than any other frivolous social activities. Despite the many benefits of joining any of the organizations, the very existence of these organizations has been questioned (Fyten, 1905); primarily due to the process of becoming a member known as pledging or the hazing process (Cokley & Wright, 1995). Purpose of this study was to measure attitudes about pledging among African American college students. A total of 80 participants were given a standardized questionnaire composed of demographics and the Survey of Attitudes About Fraternities and Sororities (SAAFS). Forty-seven items described six exploratory factors of Purpose of Pledging, Impact of Pledging, Conformity to Pledging Rules, Beliefs and Perceptions of Greek Organizations, Moral Concerns About Pledging, and Beliefs About Pledging Difficulty. It was hypothesized that Greek affiliates will have more positive attitude towards pledging than non-Greeks, and females will have a more negative attitude towards pledging compared to males. ANOVA results showed a statistically significant difference between Greek status and attitudes toward pledging for factor 3 (conformity to pledging rules), $F(2,77)=4.115$, $p=.02$, and factor 6 (moral concerns about pledging), $F(2,77)=3.780$, $p=.027$. T-test results showed significant gender difference on factor 6 (moral concerns about pledging), $t(78)=2.210$, $p=.030$.

O11.06**1:15 BIRTH ORDER EFFECTS ON PERSONALITY AMONG AFRICAN AMERICAN COLLEGE STUDENTS**Sharone Bolden and Shaila Khan*Tougaloo College, Tougaloo, MS USA*

This study investigated to see whether the only-child and birth order of African American college students' have an effect on development of personality and closeness of relationship with parents. Birth order is the sequence at which children are born into a family. Birth order, with the exception of twins, is a variable that distinguishes children in a family, and studies of behavior and personality highlights its importance of non-shared environmental influences. The current research examined the hypothesis that personality trait such as extraversion, agreeableness, conscientiousness, neuroticism and openness to experience, will be significantly different for only-child and children's birth order. It is also hypothesized that only-child and children's birth order will have an effect on

experiences of closeness in relationships. Eighty college students were given the Big Five Inventory (John & Srivastava, 1991), the Experience in Close Relationship Questionnaire – revised (ECR-R) (Fraley, 2011), and a demographical questionnaire. The ECR-R had four subscales of attachment –related anxiety scale and avoidance scale for mother and father. The independent variable in this study was birth order and the dependent variables were scores on Big Five Inventory and Relationship Structure questionnaire and scores on the ECR-R. The ANOVA results showed that there were significant differences in extraversion, $F(4, 75)=2.80$, $p=.032$ and conscientiousness, $F(4, 75)=2.80$, $p=.032$ among only child and different birth order. Anxiety with father was also significantly different among only child and different birth order, $F(4, 75)=2.87$, $p=.02$.

O11.07**1:30 RACE AND PERCEPTION OF POLICE MISCONDUCT AND CONFIDENCE IN THE POLICE**Timothy Williams and Shaila Khan*Tougaloo College, Tougaloo, MS USA*

Citizens in neighborhoods reflecting distinct cultures have different values concerning the appropriateness of different police practices that are incompatible with culturally-based attitudes, and may result in ineffective policing (Dunham and Alpert, 1988). It is generally believed that most African Americans do not trust in the police, while Caucasians happen to typically favor the police, and side with them on incidents. This study investigated whether African American and Caucasian participants perceive police misconduct, police confidence, police demeanor and police characteristics differently. The hypothesis for the study was that Caucasians and older age group have a positive perception about police misconduct, police confidence, police demeanor and police characteristics compared to African Americans and younger age groups. Eighty participants (40 African Americans, 40 Caucasians) between two age groups (20 and 40, 41 and older) were given a four section questionnaire. Section A included demographical variables, Section B dealt with "Officer Demeanors and Characteristics." (Webb and Marshall, 1995), Section C dealt with "Confidence in Police in the Community" (Cao and Frank, 1996), and the Section D dealt with "Perceptions of Misconduct, Personal Experiences, and Vicarious Experiences" (Weitzer and Tuch, 2004). Results confirmed the hypothesis. It can be concluded that Caucasians perceived the police to have good demeanor, $t(78)=3.60$, $p=.001$, good characteristics, $t(78)=4.159$, $p<.001$, and reported to have more confidence in police, $t(78)=2.832$, $p=.006$ compared to African Americans. Older age group perceived police to have less misconduct, $t(77)=3.268$, $p=.002$ compared to younger age group.

O11.08**1:45 LOCUS OF CONTROL AND GENDER AMONG AFRICAN AMERICAN COLLEGE STUDENTS**Kellie Waters and Shaila Khan*Tougaloo College, Tougaloo, MS USA*

This study investigated whether locus of control differed among African American male and female college students. Locus of control refers to the extent to which people think that they can control things/events that affects them. External locus of control people see life as a game of chance than

as one where their skills make a difference. Internal locus of control people on the other hand believe that they control their own destiny and see themselves as responsible for the reinforcements they receive in life. This is when individuals believe that events in their lives are caused by controllable factors (Grinnel & Renee, 2009). The hypothesis for this study was that there is a difference in locus of control among student groups of different gender, age, class and housing status. Eighty college students participated in research, (40 females and 40 males) who were given Locus of Control scale (Nowicki & Stickland, 1973) and a demographical questionnaire. The independent variable in this study was gender, age, class and housing status and the dependent variable was score of locus of control scale. The independent t-test results showed no gender difference in locus of control but there was a significant difference between class levels, $F(3,76)=4.046$, $p=.01$, and housing status, $t(78)=1.925$, $p=.05$. From the results it may be concluded that fresh-person have higher score (external locus of control) than sophomores, juniors and seniors (internal locus of control) students staying on campus have higher score (external locus of control) than commuting students.

O11.09

2:00 SOCIAL ANXIETY AND CONFLICT IN ROMANTIC RELATIONSHIPS

Kaitlynn Wright, and Shaila Khan

Tougaloo College, Tougaloo, MS USA

The purpose of the present study was to investigate the relationship between levels of social anxiety and conflict in romantic relationship as well as examining gender difference in social anxiety and conflict in romantic relationships. There were a total of 75 (40 male, 35 female) participants in this study. A social anxiety scale (SIAS), consisting of 20 items was used to measure the levels of social anxiety (Mattic & Clarke, 1989). The second scale used in this study was the Romantic Partner Conflict Scale established by Zaccilli. This scale had six subscales which include: Compromise, Avoidance, Interactional Reactivity, Separation, Domination, and Submission. It was hypothesized that participants who have more social anxiety will have more conflict in their romantic relationships. The independent variable for this hypothesis was social anxiety and the dependent variable was conflict in relationships. It was also hypothesized that there will be gender differences in social anxiety scale and romantic relationships. The independent variable for this hypothesis was gender and the dependent variable was social anxiety and conflict in romantic relationships. The result partially confirmed the first hypothesis. The correlation co-efficient results showed that there was a positive correlation between social anxiety and interactional reactivity ($r=.344$, $p=.002$), social anxiety and separation ($r=.232$, $p=.044$) and social anxiety and submission ($r=.418$, $p=.000$). T-test results also showed that men and women differed significantly on only submission, $t=2.417(73)$, $p=.0110$.

O11.10

2:15 SOCIAL ANXIETY PSYCHOLOGICAL EFFECTS OF RELOCATED DARFUR GENOCIDE SURVIVAL

Charden Virgil and Walter Davis

Tougaloo College, Tougaloo, MS, USA

This study investigated the psychosocial effects, specifically post-traumatic stress disorder, of Darfur genocide survivors among relocated Darfur refugees. Post-traumatic stress disorder is an anxiety disorder that may develop after exposure to a terrifying event or ordeal in which severe physical harm occurred or was threatened. Studies have shown that post-traumatic stress disorder is common amongst various genocide survivors due to the extreme violence that is witnessed. The purpose of this descriptive study is to find out if relocated Darfur genocide refugees suffer from post-traumatic stress disorder like other genocide refugees. If this is the case, to what extent do they experience it. A group of Darfur refugees (N=58) were surveyed using a 20-item scale adopted from the Harvard Trauma Program in Refugee Trauma. The independent variables in this study include: household structure, gender and education attainment. Cross tabulations and chi-square statistical analysis were used in this study. For the purpose of preliminary results, household structure, gender and educational attainment was crossed with some post-traumatic stress disorder symptoms (recurrent thoughts, trouble sleeping and feeling guilty for having survived). The major findings include: females were more likely to suffer from recurrent thoughts, trouble sleeping and feeling guilty than males. Refugees in extended family households were more likely to experience all of the symptoms more than those in nuclear families. Refugees with secondary/post secondary education were more likely to suffer from all of the symptoms as well.

2:30 - 3:00

DIVISION BUSINESS MEETING

Ballroom II/III

3:15 Member Recognition and Dodgen Lecture

EVENING

POSTER SESSION

Immediately Following Dodgen Lecture

P11.01

THE RELATIONSHIP BETWEEN PERSONALITY AND METACOMPREHENSION ACCURACY

Larisa K. Alfsen, and Lin-Miao L. Agler

The University of Southern Mississippi Gulf Coast, Long Beach, MS USA

The purpose of this study is to review research on the relationship between personality characteristics and reading ability and ability to accurately assess reading comprehension (i.e., metacomprehension). Metacomprehension involves knowledge about cognition and regulation of cognition; regulation of cognition consists of evaluation and regulation of comprehension. Individual's accurate evaluation of one's own comprehension of text material is essential for effective learning because it enables one to choose appropriate strategies and to guide learning of new information. High levels of metacomprehension accuracy are important in many areas of our lives, from employment to leisure activities to education. Reading is one of the most important academic skills. The process of reading comprehension and monitoring of one's comprehension are affected by both the text/task factors and the reader factors. One of the important reader variables is

personality, in that it influences not only cognitive skills and task performance but also motivation, goal setting, effort expenditure and persistence. Different individual characteristics and personality types contribute differently to choices of learning strategies and reading comprehension performance. In the present paper we review current research examining the role of personality on comprehension and comprehension assessment accuracy.

P11.02

DETECTING MALINGERING BY THE MILLER FORENSIC ASSESSMENT OF SYMPTOMS TEST

Chasity Torrence, and Jon Jackson

University of Mississippi Medical Center, Jackson, MS, USA

Malingering is the intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external incentives. Although easily defined, malingering is not so easily diagnosed. It should be suspected when there is marked discrepancy between an individual's claimed stress or disability and the objective clinical findings. As medical and mental healthcare costs continue rising, more efficient and accurate diagnoses in a timely manner are important. Laboratory results do not aid in exclusion of malingering; however, neuropsychological testing has proven effective in determining the likelihood of feigning symptoms in some cases. The Miller Forensic Assessment of Symptoms Test (M-FAST) is a relatively new tool with a high sensitivity and negative predictive power when demonstrating probable psychiatric feigning verses honest groups and is thus effective in screening for manipulation of symptoms. This case demonstrates how clinical judgment combined with objective testing can assist in diagnosing malingering. As the inequality of reimbursement for mental health services combined with shrinking mental health budgets remains, physicians' duties remain to care for patients who are rendered non-functional with debilitating illnesses while making accurate diagnoses to protect the integrity of our community.

P11.03

PERSISTENT NEGATIVE EFFECTS OF ALCOHOL DRINKING ON NOVEL OBJECT RECOGNITION IN RHESUS MACAQUES

Cassie Chandler, Meagan Follett, and Donna Platt,

University of Mississippi Medical Center, Jackson, MS USA

Humans with histories of heavy alcohol use exhibit poorer performance on cognitive tasks associated with problem solving, short-term memory, and visuospatial reasoning, even following the cessation of drinking, compared with healthy controls. It is unclear whether the cognitive problems are a consequence of alcohol exposure or a contributing factor to alcohol use disorders. We examined the relationship between performances on a novel object recognition (NOR) does task and total alcohol consumption (TAC) in 12 adult monkey (Group 1). We also compared the NOR scores of Group 1 to those of a second group (Group 2) that had no drinking history. In the NOR task, novelty recognition was defined as increased exploratory behavior directed to the novel object on the test day. Task difficulty was manipulated through specific object features as well as duration of access. TAC was defined as the total g/kg of a 4% (w/v) alcohol solution consumed in one month. Contrary to

expectations, we found a positive relationship between higher initial NOR performance and higher TAC. Also, we found significantly lower NOR scores in Group 1 upon re-test compared to Group 2. Finally, we found a negative relationship between TAC and NOR performance following the abstinence period. We conclude that pre-existing cognitive deficits are not predictive of subsequent heavy alcohol use; instead, higher initial performance on the NOR task is predictive of higher levels of TAC. Cognitive deficits appear to be a direct consequence of alcohol use, and are long-lasting, persisting even after a year of abstinence.

P11.04

USING GIS TO STUDY THE IMPACT OF NATURAL DISASTERS IN MISSISSIPPI AND HOW IT DISPROPORTIONATELY AFFECTS DIFFERENT DEMOGRAPHIC GROUPS

Ivy Alexander, Alexander Hopkins, Jasmine Davis, Abyssinia Stamps, Anthony Saracino, and Santanu Banerjee

Tougaloo College, Tougaloo, MS USA

In recent years, Mississippi has experienced an unusual number and intensity of natural disaster events in the form of Hurricanes (Katrina, 2005) and Floods (Mississippi River, 2011), causing considerable damage to life and property. The Hurricanes primarily affect the coastal region and the floods affect mostly the Mississippi Delta. In this study, we study the impact of these two types of natural disasters using Geographical Information System. We study the different demography and vulnerable population affected by the Hurricanes and Floods in Mississippi. In addition to mapping the disaster impact areas, we link the disaster areas to the availability of health care facilities in the vicinity of the damage areas and also show that the different types of natural disasters disproportionately affect different demographic groups. This study will help us understand the potential impact of possible natural disaster incidence in Mississippi and provide information necessary to make policy decisions on equitable allocation of disaster mitigation resources. This work is supported by the Interdisciplinary Minor: Disaster coastal studies, funded by the Homeland Security Center of Excellence.

P11.05

WEIGHT STIGMA AND REGIONAL LOCATION: SURPRISING CORRELATIONS

William Brewer¹, Jessica Cornick², Cambridge Teter², and Andrew Kurt Thaw¹

¹Millsaps College, Jackson, MS USA, ²University of California, Santa Barbara, CA USA

Obesity and obesity related illnesses have increased dramatically in the USA. Recent research has focused on aspects of obesity that are not always investigated by researchers, most notable, the effects accompanying weight stigma. Perceived (or real) weight stigma can lead to over eating and exercise avoidance, two very counterproductive behaviors for overweight persons. Additionally, the impact of cultural/geographical influences on body weight are not well understood. For example, while the Southern USA is the most overweight, the West coast of the USA is often noted as the least obese location. Here we investigate the regional differences in the relationship between body mass index (BMI), exercise, and

weight stigma concerns (WSC) relative to geographic location. Specifically, we tested the regional moderation of the mediation of the relationship between BMI, exercise, and WSC. A sample from Mississippi (n=81) and California (n=131) completed WSC and exercise measures to help elucidate possible cultural influences affecting body weight. Results reveal that increased BMI was related to higher WSC. However, this effect was more pronounced in the West with a positive correlation between BMI and WSC. Participants with higher WSC in the South engaged in less strenuous activity (vigorous exercise) than those in the West, regardless of BMI. We conclude that the relationships between BMI, WSC, and exercise should be considered for specific sub-populations throughout the USA, and that region-specific cultural factors may be contributing the overall higher obesity rates experienced in Southern states.

SCIENCE EDUCATION

Chair: Ryan Walker

Mississippi State University

Poster Session

Immediately Following Dodgen Lecture

P12.01

BE SMART, BE ACTIVE, BE A LEADER: A HEALTH SCIENCE EDUCATION CURRICULUM AND INSTRUCTIONAL MATERIALS FOR EARLY CHILDHOOD CLASSROOMS IN MISSISSIPPI

Julie Parker and Ginger Cross

Mississippi State University, Mississippi State, MS USA

In Mississippi, a state with consistently high childhood and adult obesity rates, efforts that promote healthy lifestyles are critical and must begin early. The purpose of the project, Partnerships to Promote Healthy Lifestyles for Children and Communities, funded by a Science Education Partnership Award from the National Institutes of Health, is to build upon partnerships to develop health education materials that set a foundation for healthy food choices and physical activity in young children. The project team conducted child assessments to determine what children knew about health-related topics like food groups, food origin, how to make a healthy plate, and activities that make their hearts beat faster. These data, combined with information gathered during parent and teacher focus groups, were used to develop an age-appropriate and standards-based teacher curriculum, family activity booklet, and field trip program for preschool and kindergarten-aged children. All use three bee characters (Sunny Smart, Andy Active, and LaToya Leader) to teach children to Be Smart and make healthy food choices, Be Active and make their hearts beat fast, and Be a Leader by sharing what they've learned about being healthy with others. The integrated curriculum includes math, science, creative expression, and language/literacy activities to teach children about health-related topics. It aligns with Next Generation Science Standards and provides children opportunities to use science practices such as asking questions, planning and carrying out investigations, analyzing and interpreting data, using math and computational thinking, and

obtaining, evaluating and communicating information, all while teaching about nutrition and physical activity.

Friday, February 27, 2015

AFTERNOON

Room

O12.01

1:00 STUDENT PERCEPTIONS OF THE RECEIVED CURRICULUM: THE RELEVANCE AND USEFULNESS OF HIGH SCHOOL BIOLOGY

Sammy Sullivan, and Ryan Walker

Mississippi State University, Mississippi State, MS USA

A component of curriculum design that is often overlooked is the student. Almost all philosophical approaches to curriculum development take into account the students prior knowledge, but very few address students perceptions of the received curriculum. This study used grounded theory methodology to address four areas of interest: (1) student views about the current Biology curriculum, (2) according to the students, how can the teaching of Biology be improved, (3) will Biology be used in the students future careers, and (4) what would motivate students to learn Biology? The sample population was selected from a rural Mississippi school and participants were first time test takers of the Biology I state mandated subject area test. Results indicate that students fail to see the relevance of the subject matter presented in this curriculum. Student responses were disaggregated to identify issues that could be shared by the students and teacher. This study concluded by identifying issues with student/teacher motivation, and teacher/student communication, which brought to light an overall shortfall in understanding the importance of learning the received Biology curriculum. The grounded theory methodology guided the researcher to more pointed and specific questions for a follow-up study that would delve into possible interventions and solutions for dealing with these issues.

O12.02

1:15 OPTIMIZATION OF ONLINE DISCUSSION FORUMS FOR STUDENTS' CLIMATE LITERACY

Renee Clary¹ and James Wandersee (1946-2014)²

¹*Mississippi State University, Mississippi State, MS USA,*

²*Louisiana State University, Baton Rouge, LA USA*

When we implemented semester-long discussions on climate change in online classrooms, students exhibited significant increases in climate literacy. We next attempted to address 4 current topics, including climate change, throughout the semester, in 3-week units. However, this second investigation revealed many students retained non-scientific opinions with the shorter units. In the current study, we addressed climate change in online discussions in a 6-week unit. Students in online Earth History classes (n=23, 30, 11) were randomly placed in discussion groups (N = 6), and assigned mandatory weekly discussions on climate change. For each weekly unit, 2-3 resources (e.g., graphs, scientific articles) and 2 multi-threaded critical thinking questions were posted. For the final unit, student groups assembled a consensus. The Climate Change Survey (N=57) assessed content knowledge. Comparison with earlier results revealed the 6-week unit students' climate change knowledge and opinions closely paralleled the semester-long

population, although there were slight differences. However, final examination essay responses hinted that transferability issues with climate change content knowledge existed outside the discussion realm. We propose 6-week discussions are sufficient for content climate literacy, but more research is needed into the role of group summaries and transferability.

O12.03

1:30 SENSE OF PLACE WRITING TEMPLATES: INTEGRATION OF FORMATIVE SCIENCE ASSESSMENTS, STUDENT EXPERIENCES, AND COMMON CORE ENGLISH LANGUAGE ARTS STANDARDS

Renee Clary¹ and Jeanne Sumrall¹, and James Wandersee (1946-2014)²

¹Mississippi State University, Mississippi State, MS USA,

²Louisiana State University Baton Rouge, LA USA

Sense of Place Writing templates probe students' backgrounds and personal experiences with science content before instruction formally begins. Each template consists of 17 memory probes, 5 mini-essay prompts, and 3 concept associations. Through the memory probes and essays, students reflect upon their earlier interactions with content before instruction, while association prompts can be used to review content, or assess instruction impact. Templates reveal students' incoming knowledge and experiences, and help teachers develop more effective instruction. The Botanical Sense of Place and Geological Sense of Place templates were originally implemented with students enrolled in introductory college science classes (N = 74 BSP ; N = 246 GSP). This research documented that the local environment had the greatest influence, and most students experienced similar Earth and plant interactions. The research also pointed to a lack of plant and Earth mentors, and less-than-optimal student interaction with the natural world. The Meteorological Sense of Place, investigated in online classrooms (N = 53), revealed far greater diversity in students' experiences and memories than students in traditional classroom environments. In addition to assessing incoming knowledge and experience, Sense of Place templates also facilitate writing across the curriculum and demonstrate the value of writing within science classrooms.

O12.04

1:45 IMPLICATIONS OF DEGREE MODIFICATION AND AN INNOVATIVE SCIENCE ARTIFACTS PORTFOLIO IN SECONDARY SCIENCE EDUCATION PROGRAM

Christina McDaniel and Ryan Walker

Mississippi State University, Mississippi State, MS USA

The 2012 National Science Teachers Association (NSTA) Standards for Teacher Preparation outlines advanced and core competencies for each area of science education licensures. The 2012 NSTA spa report for the Mississippi State University secondary science education program highlighted deficiencies in alignment with the NSTA standards, indicating that the curriculum fell short at the level of supporting competencies and overall alignment of 54% for the biology, 81% for the chemistry and 66% for the physics licensure programs. In an effort to align 100% with NSTA standards, degree modifications were designed to standardize requirements across

all science education concentrations. The degree modifications allowed for more flexibility in licensure areas, potentially alleviating difficulties with critical shortage areas, issues with rural communities, and matriculation from other institutions by providing opportunities for multiple licensure with one degree. In addition, a science artifact portfolio including a teacher laboratory practical, discrepant events in science, misconceptions in science, classroom-based lesson plans, laboratory-based lesson plans, and professional development was designed to allow for intervention of standards not met by teacher candidates in the fall 2014 secondary science methods course. Preliminary results of this single subject research suggest strong mastery of content knowledge with identifiable barriers in instructional organization, such as understanding by design lesson planning that need to be clarified prior to teaching internships. A case study analysis will be conducted to determine effectiveness of the alignment as well as the science artifact portfolio upon completion of the 2014 fall secondary science methods course.

O12.05

2:00 USING ARGUMENTATION AND DISCREPANT EVENTS TO INCREASE STUDENT INTEREST IN THE BIOLOGICAL SCIENCES

Johnny Mattox

Blue Mountain College Blue Mountain, MS USA

Use of argumentation and discrepant events in the biology classroom are excellent ways to peek student interests and involvement in lessons presented. With argumentation, students must defend a position after data have been collected through research, study, or experimentation. With discrepant events, students are presented information that contradicts their conception of an occurrence and offers an element of surprise. Both of these approaches can be used to enhance cognitive gains and enhance favorable dispositions in the biology classroom.

O12.06

2:15 COMMUNITY SERVICE SHADOW-EDUCATION PROJECTS AND ACTIVITIES TO REINFORCE BASIC SCIENCE PRINCIPLES

Neil Patel, Darrow Thomas, Kaylan Carter, Nadee Samaradivakara, Aaron Zenon, Valerie St. Fleur, and Angela Whittom Reiken,

Mississippi College, Clinton, MS, USA

Disadvantaged students throughout the nation experience social and economic complications that may impede their natural learning abilities. Using a "shadow-education" system, we strived to provide a group of disadvantaged students with the proper assistance to reinforce understanding of basic science principles during their high school education. Various courses in natural sciences and mathematics were taught by a professional instructor and later reinforced by volunteer college biology student tutors. Supplemental activities were provided by volunteers twice a week, for a three-month period.

2:30 BREAK

O12.07

2:45 TEACHER'S PERCEIVED BENEFITS AND BARRIERS TO HANDS-ON PERFORMANCE TASKS IN THE SCIENCE CLASSROOM

Renee Clary¹, Deborah Tucker, James Dunne, and Charles Wax¹

¹Mississippi State University, Mississippi State, MS USA,

²Independent Science Education Consultant, Napa, CA USA

The new US K-12 Next Generation Science Standards are organized around performance expectations (PEs), and emphasize students doing science. Hands-on performance tasks offer alternative assessment opportunities for students to demonstrate science process skills. As part of a 3-year teacher Mathematics and Science Partnership professional development program, we implemented hands-on tasks appropriate at the middle grade level (grades 6-8) for participating teachers. After teachers practiced performance tasks within the professional development program, they returned to their schools, implemented the tasks within their classrooms, and disseminated them to their non-participating peer teachers. At the end of the professional development program, we surveyed a subset (N=13) of participating teachers in order to investigate their perceptions of both the advantages and disadvantages of performance tasks. Content analysis of teachers' responses revealed that time was the limiting factor and primary classroom constraint. Teachers also noted that the presence of scoring guides was important, as well as availability of required task materials. However, teachers felt that hands-on tasks were more appropriate for revealing students' knowledge and problem-solving skills.

O12.08

3:00 WORKSHOP FOR PRE-SERVICE TEACHERS TO DEVELOP UNDERSTANDING OF THE ROLE OF INQUIRY AND PLACE-BASED INSTRUCTION IN ENVIRONMENTAL EDUCATION

Kimberly Carroll and Ryan Walker,

Mississippi State University, Mississippi State, Mississippi USA

Environmental education (EE) programs do not have an established niche in the traditional schooling curriculum. Many schools do not incorporate EE programs, or they serve only as supplements existing curriculums. Environmental education is interdisciplinary by nature and can be used as a tool to connect subjects within traditional school systems. The primary purpose of the research was to understand how preservice teachers' perceptions of effective teaching practices are influenced by exposure to an immersive experience featuring inquiry and place-based instruction. Subjects were Mississippi State University students participating in a course designed to provide students with experience in teaching science in the outdoors, including exposure to research-based effective instruction methods, assessment strategies, use of inquiry to teach science process skills, civic responsibility and citizen science. The activities and lessons were designed to challenge participants' current thinking of effective teaching, then reconstruct that perception by gaining experience in inquiry and place-based instructional strategies. Preservice teachers were asked to participate as learners and teachers throughout the experience. Using a reductionist coding approach to qualitative data analysis, five areas of influence were identified. These themes included improved understanding of 1) place-based instruction, 2) inquiry-based instruction, 3) self-reflection, 4)

longitudinal aspects of experience and 5) interdisciplinary instruction. Environmental education and informal instructional is a powerful tool that is underused within the formal education system. It is important that teachers are exposed to the benefits of place-based and inquiry learning, through professional development workshops and/or teacher education programs.

O12.09

3:15 UTILIZING MULTIMEDIA PRE-TRAINING AND AN INTERACTIVE ENZYME MODEL TO FOSTER UNDERSTANDING OF SUBSTRATE SPECIFICITY OF ENZYMES

Mounir Saleh and Sherry Herron

The University of Southern Mississippi, Hattiesburg, MS USA

In many ways, we have been a multimedia society for decades. Realizing its importance, educational researchers for the last two decades have been studying how people learn science from multimedia. However, literature on multimedia learning is replete with research studying the relation between knowledge transfer and cognitive load. It also includes massive reports on motivation and achievement. No known research though provides empirical evidence on how the interaction of both relates to knowledge transfer. To bridge this gap, I prepared a multimedia pre-training session to manage essential cognitive load during explaining the concept of substrate specificity of enzymes. I also designed and built an interactive instructional enzyme model to boost the learner's motivation during instruction. Upon testing the effect of this combined treatment on over 110 college science students, I found desirable learning outcomes in terms of cognitive load, motivation, and achievement. The multimedia pre-training group reported significantly less cognitive load, higher motivation, and demonstrated higher transfer ability than the control group. After utilizing proper statistical analysis, I was able to suggest a moderated mediation model explaining how cognitive load and motivation play in concert to foster learning from multimedia. This type of research goes beyond simple forms of what works to a deeper understanding of how it works thus enabling informed decisions for instructional design and redesign.

O12.10

3:30 MISSISSIPPI SCIENCE TEACHERS UTILIZING THE COOPERATIVE TEACHING MODEL TO INCREASE PERCEPTIONS OF EFFECTIVE COMMUNICATION METHODS AMONG STEM GRADUATE STUDENTS

Sarah P. Radencic¹, Ryan M. Walker¹, Darrel W. Schmitz¹, Donna M. Pierce¹, Karen S. McNeal², and Lori M. Bruce¹

¹Mississippi State University, Mississippi State, MS USA,

²North Carolina State University, Raleigh, NC USA

Initiating New Science Partnerships in Rural Education (INSPIRE), a NSF Graduate K-12 grant at Mississippi State University, pairs STEM graduate students with local K-12 teachers to bring new inquiry and technology experiences to the classroom. The graduate students prepare and lead activities incorporating different facets of their research into the curricula of participating local 7th-12th grade classrooms. Each year INSPIRE selects approximately ten new STEM graduate students to partner with the returning teachers. The Science Teaching Efficacy Belief Instruments (STEBI-B) was administered pre- and post to teachers and graduate students. An analysis of years

one, two and three revealed no significant difference between pre-and post-values for overall scores. An analysis of differences between subscores revealed that there was no statistical difference between pre-assessment values for the graduate students from years one, two and three. Post assessments also revealed no significant difference between the same groups on the Science Teaching Efficacy subscale. However on the Outcome Expectancy subscale fellows for year three had a statistically significant increase in scores from earlier years ($p = .030$). These results could be linked to the change in participant teachers perception and the development of coaching skills over the duration of the program. As teachers become more experienced with the implementation of the cooperative teaching model, their ability to impact fellows perceptions of effective teaching increases. These promising results show a longitudinal influence of the INSPIRE program. Year four data is currently being evaluated for comparison and inclusion to overall results.

O12.11

3:45 A CALL FOR DIFFERENTIATED INSTRUCTION TO BE A NORMAL COMPONENT OF PROFESSIONAL DEVELOPMENT

Suanrong 'Sarah' Chen and Sherry S. Herron.

University of Southern Mississippi, Hattiesburg, MS USA

We investigated whether a four-week intensive professional development workshop for math teachers was effective in improving their knowledge and skills of mathematics concepts and technology, as well as improving their attitudes toward integrating technology into teaching math. Instruments for data collection included a pre- and post- test for math concepts and technology and four different surveys: concerns, proficiency, frequency of use, and confidence. Data also included participants' background information and their weekly reflections. The results revealed that this workshop was effective overall, but not for all teachers. We conclude that the trainer should implement differentiated instruction in order to maximize the learning experience for all teachers.

ZOOLOGY AND ENTOMOLOGY

Chair: M. S. Zaman

Alcorn State University

Vice-Chair: Julius Ikenga

Mississippi Valley State University

Thursday, February 26, 2015

MORNING

Room Union H

O13.01

9:00 COMPARATIVE ANALYSIS OF QPCR AND DDPCR METHODS FOR QUANTIFICATION OF BACTERIAL LOAD IN TICK TISSUES

Khemraj Budachetri

University of Southern Mississippi, Hattiesburg, MS USA

Ticks harbor native microbiota communities in tick tissues (Budachetri et al 2014). The quantification of overall bacterial load would further provide the basis for microbiome and pathogen interactions. In this study, we want to estimate the bacterial load based on universal 16S ribosomal RNA primers using qPCR standard curve method and newly arrived digital droplet PCR (ddPCR) method. In qPCR, we amplified 16S rRNA gene from *Staphylococcus aureus* and amplified product was serially diluted to prepare standard curve. And, cycle threshold (Ct) values of each amplified samples were used for quantification. We observed that, the bacterial load decreases with the blood meal in tick tissues by qPCR. The validation of this information was also performed by ddPCR and we achieved the similar results trends. The two methods were applied in different conditions to assess the relative advantages between two methods.

O13.02

9:15 PENTATRICOPEPTIDE REPEAT PROTEINS AND MITOCHONDRIAL RIBOSOMES

Marta A Piva, J. Ignacio Moreno, Tamikka Coleman, Classie Johnson, and Jacquais Dukes

Alcorn State University, Lorman, MS USA

Animals, as all eukaryotic organisms relay on mitochondria to obtain energy via oxidative phosphorylation. Mitochondria have their own genome that encodes for a few but essential components of the electron transport chain. These proteins are synthesized in the mitochondrial ribosomes, which as composed by nuclear-encoded proteins and mitochondrially-encoded ribosomal RNA. The pentatricopeptide repeat (PPR) is a motif of thirty-five amino acids thought to be involved in RNA metabolism. The baker's yeast protein Ccm1p localizes to mitochondria and has two PPR motifs in tandem. Experiments have been carried out on the most canonical domain to elucidate its effect on protein activity. Studied have assessed growth phenotype, gene expression by reverse transcription-quantitative PCR, protein expression and import to mitochondria, and co-purification of Ccm1p with the RNA component of the mitochondrial ribosome small subunit (15S rRNA). Lack of PPR abolished: (i) Growth of yeast cells on substrates that require mitochondrial functionality, (ii) Accumulation of 15S rRNA in

yeast cells, (iii) Translation in mitochondria, (iv) Co- purification of Ccm1p with 15S rRNA, and (v) Interaction of Ccm1p with specific proteins. The results show that PPR domains are directly involved in the biogenesis of mitochondrial ribosomes via interaction with specific partners. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174

O13.03

9:30 STUDIES ON THE DISTRIBUTION OF POLLUTANTS IN THE LOWER MISSISSIPPI RIVER IN PORT GIBSON AREA AND ALCORN STATE UNIVERSITY (ASU) POND NEAR MEDGAR EVERS WILEY VILLAGE DORMITORY DURING THE SPRING AND SUMMER OF 2014

Alex D.W. Acholonu and Shannen Price

Alcorn State University, Lorman MS USA

Water quality is a measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose. It can be affected by farming, urban and industrial use, and recreation. The purpose of this study was to assess the distribution of pollutants in the Mississippi River and a pond at ASU. For this study, water samples were taken from the Lower Mississippi River (lotic) in Port Gibson Area and from the pond (lentic) near the Medgar Evers Village Dormitory on the ASU campus during the Spring and Summer of 2014. Water samples were collected for three consecutive weeks in each season and from three different sites at each location. The samples were taken to the laboratory at ASU and tested for pollutants. Using the methods of LaMotte pollution detection kits, 11 chemical tests were performed; the bacterial pollution was tested with water bacterial pollution kit. The results were recorded, analyzed, and compared with the Mississippi Water Quality Criteria (MSWQC). The results showed that the Summer, 2014 readings were mostly higher than the Spring, 2014 readings. A comparison of the MS River and ASU Pond water samples showed that the MS River results were higher for Alkalinity, Hardness, Carbon Dioxide, and Nitrate Nitrogen. Alkalinity, Hardness, and Phosphate exceeded the MSWQC for both bodies of water. Coliform bacteria and *E. coli* were found in both bodies of water indicating that they were polluted and not potable. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

O13.04

9:45 A COMPARATIVE STUDY ON THE SEASONAL DISTRIBUTION OF POLLUTANTS IN TWO BODIES OF LOTIC WATER, MUD ISLAND CREEK AND COLES CREEK

Alex D.W. Acholonu and Tyantria Leflore

Alcorn State University, Lorman MS USA

The Mississippi Department of Environmental Quality set up regulations to protect water quality. These regulations are important because water is essential for our survival. Microorganisms (viruses, bacteria, and protozoa) can exist in

water supply for a long period of time and contaminate water. Water quality is commonly assessed by its physical, chemical, biological, and aesthetic characteristics. This study was conducted to find out if Mud Island Creek and Coles Creek in Jefferson County met the Mississippi water quality criteria (MSWQC). It was also to compare the water quality of both and the seasonal distribution of pollutants in them. Water samples were collected from three different sites for three consecutive weeks. All of the samples were taken back to Alcorn State University laboratory and tested according to the methods of the LaMotte water pollution detection kits and analyzed. 11 chemical parameters were tested. The results showed some similarities and differences between the two creeks with respect to contaminant concentrations and seasonal distribution of contaminants. It also showed that they met the MSWQC with the exception of hardness, alkalinity, and phosphate for both creeks in the spring and summer. Both creeks tested for bacterial contamination in the spring and summer was detected to have Coliform bacteria and *E. coli*. There was more bacterial growth in the summer than in the spring. These results indicate that Mud Island Creek and Coles Creek were polluted and not good for human consumption.

O13.05

10:00 ECOLOGICAL SERVICE OF CAVITY DWELLING BIRDS

Charles C. Barnes, Darrell D. Barnes, Mark L. Montgomery, Maithri Adris, James Sylvester, Brent Lavers, Paul Grisham, Piyatilake Adris, Ray Cox, Sarah Mattox, K.N.Thimmaiah, Padma Thimmaiah, Kyle Ellis, and Jeremy Isome

Northwest Mississippi Community College-DeSoto Center, Desoto, MS USA

The 2014 project, which extended from April-June, included a survey of insect and prey populations using pit fall traps near existing man-made cavities for bluebirds on the Northwest MS Community College-DeSoto Campus in Southaven, MS. The hypothesis was that there would be **more** insect/prey biodiversity (utilizing Simpson's index of biodiversity) near the bird-occupied cavities (sites 1, 2, 3 and 7) than at the control sites (sites 4, 5 and 6). All sites were located on the Northwest MS Community College-DeSoto Campus. It was determined in this brief experiment that the insect/prey biodiversity was slightly less (2.373) when all of the experimental bird-occupied cavity sites (House Sparrow, *Passer domesticus* and Eastern Bluebird, *Sialia sialis*) were compared to the control sites (2.395). The biodiversity was markedly less at the single site 1 (2.010, occupied by House Sparrow, *Passer domesticus*) when compared against all of the controls (2.395). The presence of bird lice/mites heavily contributed to the diminished biodiversity around the control sites.

O13.06

10:15 NATAL ENVIRONMENT EFFECTS ON FEMALE SIZE, EGG SIZE AND EGG NUMBER IN CONTAINER-INHABITING MOSQUITOES

Nnaemeka Ezeakach, Donald Yee

University of Southern Mississippi, Hattiesburg MS USA

Maternal effects, such as carry-over effects from the adult stage to offspring performance, are poorly documented in container mosquitoes. Such effects may take the form of egg size variation, oviposition site selection, and increased variability in egg number. Environmental conditions experienced by adult

females can also influence their size, life span and fecundity, thereby affecting lifetime egg production. We tested the hypothesis that natal environment affects female size, egg size, egg number in three container-inhabiting mosquitoes: *Aedes aegypti*, *A. albopictus*, and *Culex quinquefasciatus*. Mosquitoes were reared under three natal environments: animal detritus (crickets), leaf detritus (red maple), and animal and leaf detritus. For each natal environment per species, the number of eggs laid by 10 females randomly selected 10 days after oviposition were obtained and egg size was measured as mean egg volume. Females were also killed and their body sizes obtained, following oviposition. Path analysis showed a significantly positive direct effect of natal environment (animal detritus) on female size for all species. The effect of animal detritus on egg number was significantly positive in *A. albopictus* and *C. quinquefasciatus*, but negative for *A. aegypti*. Egg volume in *A. albopictus* was positively affected by leaf detritus alone and negatively affected by animal detritus alone, in *A. aegypti*. There was no relationship between female size and egg number for all species; consequently, there was no indirect effect of natal environments on egg number. This investigation suggests that the quality of natal environment is important in maintaining the strength of relationships between natal environments and life-history traits in container-inhabiting mosquitoes. Future studies would focus on the relationships and interactions among maternal effects and their roles in competition, survival, reproductive fitness, vectorial capacity and other attributes of offspring performance.

O13.07

10:30 NATAL ENVIRONMENT EFFECTS ON FEMALE SIZE, EGG NUMBER AND EGG VOLUME IN CONTAINER-INHABITING MOSQUITOES

Nnaemeka Ezeakach and Donald Yee

University of Southern Mississippi, Hattiesburg, MS USA

Maternal effects, such as carry-over effects from the adult stage to offspring performance, are poorly documented in container mosquitoes. Such effects may take the form of egg size variation, oviposition site selection, and increased variability in egg number. Environmental conditions experienced by adult females can also influence their size, life span and fecundity, thereby affecting lifetime egg production. We tested the hypothesis that natal environment affects female size, egg size, egg number in three container-inhabiting mosquitoes: *Aedes aegypti*, *A. albopictus*, and *Culex quinquefasciatus*. Mosquitoes were reared under three natal environments: animal detritus (crickets), leaf detritus (red maple), and animal and leaf detritus. For each natal environment per species, the number of eggs laid by 10 females randomly selected 10 days after oviposition were obtained and egg size was measured as mean egg volume. Females were also killed and their body sizes obtained, following oviposition. Path analysis showed a significantly positive direct effect of natal environment (animal detritus) on female size for all species. The effect of animal detritus on egg number was significantly positive in *A. albopictus* and *C. quinquefasciatus*, but negative for *A. aegypti*. Egg volume in *A. albopictus* was positively affected by leaf detritus alone and negatively affected by animal detritus alone, in *A. aegypti*. There was no relationship between female size and egg number for all species; consequently, there was no indirect effect of natal environments on egg number. This investigation suggests that the quality of

natal environment is important in maintaining the strength of relationships between natal environments and life-history traits in container-inhabiting mosquitoes. Future studies would focus on the relationships and interactions among maternal effects and their roles in competition, survival, reproductive fitness, vectorial capacity and other attributes of offspring performance. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476

O13.08

10:45 THE EFFECT OF *DENDROCTONUS FRONTALIS* ON *PINUS TAEDA*

Ernest Ford, Jr., Gwendolyn Boyd, Voletta P. Williams

Alcorn State University, Alcorn State, Lorman, MS USA

This research expository explores the effects the Southern Pine beetle (SPB), *Dendroctonus frontalis*, on pine trees which are found in the Southern USA Alabama, Kentucky, North and South Carolina, Tennessee, Florida and western Canada. The SPB are heavily populated in these areas and aggregated in forms referred to as "spots." This outlines some of the problems associated with the existence of the Southern Pine Beetles and how they are affecting farming, crops, and other environmental areas. This research discusses the seasonal attacks and their growth rate during these seasonal changes. The major objective of the research is to determine the negative effects on the economy, farms, and the environment.

11:00 BUSINESS MEETING

EVENING

Poster Session

Immediately Following Dodgen Lecture

P13.01

COMPARATIVE TOXICITY OF PYRETHROID INSECTICIDES TO SQUASH BUG

Tahir Rashid¹ and Paul McLeod²

¹*Alcorn State University, Lorman, MS USA* and ²*University of Arkansas Fayetteville, Arkansas, USA*

The squash bug, *Anasa tristis* (De Geer), can cause significant economic loss to cucurbits. Adults start feeding on cucurbit seedlings shortly after emergence or transplanting in springtime. Squash bug feeding can also transmit pathogens to the plant. High numbers of this pest can become difficult to manage with insecticide sprays. Pyrethroid insecticides are generally the most often used group with highly variable individual chemistries and effectiveness. This study was conducted to compare pyrethroid toxicity to squash bugs and to develop a toxicity profile based on past performance of bifenthrin in the field. Fifth stage squash bug nymphs were used in a leaf disk test to compare toxicity of six pyrethroid insecticides. After 6 hours post treatment Brigade was the only insecticide that produced 100% mortality at the highest recommended field rate of 0.1 lb ai/A. Percent mortalities reached 100% with *Anasa* at 48 h and *Ambush* at 96 h. Toxicities of Mustang Max, Warrior and Brigade were low. Based on these

results combined with previous field tests, Brigade was selected for development of a toxicity profile. At 24 h after exposure, LC50 values ranged from 0.6 ppm for 2nd stage nymphs to 253.4 ppm for adults. In a field study Brigade applied at the highest recommended rate of 0.1 lb ai/A was also highly effective in killing squash bug nymphs and adults on each sample date. Based on this study Brigade can still prove an effective method of squash bug management.

P13.02

EFFECTS OF HUMAN INTERACTION OF SQUIRRELS IN MISSISSIPPI RIVER DELTA

Taylor Brooke Holland, and AHM Ali Reza

Delta State University, MS, USA

Effects of Human Interaction of Squirrels in Mississippi River Delta Taylor Holland and A.H.A. Ali Reza, Department of Biological Sciences, Delta State University, Cleveland, MS 38733. E-mail: areza@deltastate.edu Abstract Eastern grey squirrels (*Sciurus carolinensis*) and fox squirrels (*Sciurus niger*) are the only two species of native land squirrel occur in Mississippi. The third species, southern flying squirrel (*Glaucomys volans*), is more active at night and is not a game species. Both of the grey squirrel and fox squirrel are common throughout the urban and rural habitats of the Mississippi River Delta. We studied the interaction of the two species with humans in different habitat types in a rural and an urban setting in Mississippi Delta to investigate their behavioral adaptations based on the amount of human traffic. Four study sites were selected: two urban sites were in Delta State University campus with high human traffic and two rural sites were in and around Cleveland, MS which had very low human traffic. By observing the flight initiation distance and distance to their temporary refuges taken by a total of 48 different squirrels, we collected data to determine if their refuge locations changed their reaction to human approach. There were no significant differences between squirrels that encounter heavy human traffic compared to the ones that do not encounter minimum human traffic.

P13.03

SOCIAL ASPECTS OF BASKING BEHAVIOR IN FRESHWATER TURTLES

Elizabeth Russell, Thomas Biber, Hannah Melton, and Frank Hensley

Mississippi College, Clinton, MS, USA

Until recently not much was known about social behavior among turtles, but new discoveries include apparent social bonds between adult Leatherback Sea Turtles (*Dermochelys coriacea*) and vocalization by adult South American River Turtles (*Podocnemis expansa*) directed toward hatchlings. We explored the possibility of social interactions among basking freshwater turtles at an artificial pond of 28,200 m² surface area in Hinds County, MS. The turtle community includes two species that readily emerge from water to bask, Red-eared Sliders (*Trachemys scripta*) and River Cooters (*Pseudemys concinna*). We captured turtles using hoop nets or basking traps. We collected individual measurements, and sex was determined in adults by length of front claws and shell morphology. All turtles were given unique colored identification tags. We presented turtles with a choice of 3 adjacent, nearly identical artificial wooden platforms on which to bask, and used a time-lapse camera set to take a picture in 30-second intervals.

We discuss the results of tests for platform preference, positive and negative social association, and differences in duration of basking, comparing males and females and the effects of body size.

P13.04

ALTERNATIVE MATERIAL NEST BOXES AND IMPACTS ON NESTING PHYSIOLOGY AND ADULT BEHAVIOR IN THE EASTERN BLUEBIRD

Jamie Jackson, Jodie Jawor

University of Southern Mississippi, Hattiesburg, MS USA

In the mid-nineteenth century, Eastern Bluebird (*Sialia sialis*, a native cavity nesting species) populations experienced serious declines because of a decrease in natural cavities and the introduction of non-native, highly competitive cavity nesting species. The creation of nest box programs led to an increase in bluebird populations and these programs continue to be of importance and human popularity. In this study, a recycled metal ammunition can was used as a nest box to determine if this was a viable resource that could be used by bluebirds. Specifically, this work investigated the effects of this alternate material nest box on nestling physiology and adult behavior with special emphasis on the impacts of temperature (metal boxes are assumed to be warmer). From mid-February through July 2014, behavioral observations and physiological data were collected at fifteen ammunition can nest boxes and fifteen wooden nest boxes being used by bluebirds at Camp Shelby Joint Forces Training Center in Hattiesburg, MS. It was found that there were no statistical significance differences between the wooden and ammunition can nest boxes for temperatures, female incubation rates, parental feeding rates, nestling growth measures, or nestling stress levels. However, it was found that offspring who were part of larger broods had higher stress levels and this may be linked to the lower feeding rates larger broods received. These results show that one nest box type was not significantly better in quality than the other, validating the idea that an ammunition can nest box is a safe, alternative habitat for secondary cavity nesters. This may serve as a beneficial resource not only for the species using them but for the work load and finances of property managers deploying nest boxes of this type.

P13.05

ROLE OF PENTATRICOPEPTIDE REPEAT MOTIFS ON PROTEIN-RNA INTERACTIONS

Tamikka Coleman, J. Ignacio Moreno, and Marta A Piva

Alcorn State University, Lorman, MS USA

Mitochondria are the powerhouses of all eukaryotic cells, including animals. Production of essential components of the aerobic respiratory system requires mitochondrial ribosomes (mitoribosomes). Accumulation of 15S rRNA, one of the mitoribosomal components produced inside the organelle requires Ccm1p, a pentatricopeptide repeat (PPR) protein. The goal of this project is to characterize the molecular interactions between Ccm1p and 15S rRNA. Heterozygous diploid yeast cells were transformed with plasmids carrying either the wild-type (pW) or mutant (pM) CCM1 open reading frame (ORF). The mutant ORF lacks the second PPR (PPR2) motif. After selection of recombinants, the diploid cells were induced to sporulate. Deltaccm1 meiotic segregants carrying pW or CCM1 meiotic segregants carrying pM were chosen for further study. These cells were incubated under conditions of maximal protein

expression and subjected to the isolation of crude mitochondrial fractions. The Ccm1p-15S rRNA content of these fractions was subsequently assessed by affinity chromatography, followed by reverse transcription quantitative PCR, and immunoblot analysis. Both types of meiotic segregants expressed similar amounts of CCM1 mRNA and were able to synthesize the corresponding proteins. However, only the wild-type protein co-purified with 15S rRNA. Therefore, PPR2 is absolutely essential for Ccm1p-RNA interaction, either directly or by allowing this protein to acquire a competent conformation for the accumulation of 15S rRNA. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174

P13.06

ASSEMBLY OF MITOCHONDRIAL RIBOSOMES

Dominique Green, J. Ignacio Moreno, and Marta A Piva
Alcorn State University, Lorman, MS USA

Mitochondrial ribosomes are cellular organelles where the production of essential proteins for aerobic respiration is carried out. Each subunit is composed of a ribosomal RNA molecule and two dozen proteins. In baker's yeast, the accumulation of the RNA requires Ccm1p, a pentatricopeptide repeat (PPR) protein. The goal of this study is to understand the role of Ccm1p in the assembly of these organelles by detecting its protein partners. Highly purified mitochondria were obtained by gradient ultracentrifugation. The quality of the preparation was assessed by immunoblotting with organelle-specific antibodies. Ccm1p and its putative protein partners were isolated from mitochondrial preparations by affinity chromatography, separated by two-dimensional protein electrophoresis and detected by silver staining or anti-Ccm1p antibodies. A mutated Ccm1p lacking the second PPR domain (PPR2) was used as negative control to rule out any non-specific interactions. Immunoblot analysis of the preparation detected two mitochondrial proteins Ccm1p and porin, but not cytoplasmic (Pgk1p) or vacuolar-cytoplasmic (V-ATPase 60) markers. Staining of the protein gel showed that Ccm1p co-purified with two protein partners which were not detected on the mutated protein gel. Therefore, Ccm1p forms an intra-mitochondrial complex with other similarly localized proteins in vivo. Specifically, the presence of PPR2 is required for these protein-protein interactions which are essential for well-being of the organism. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476, by NIH/NIGMS/SC3GM087169 and DoD/W911NF-13-1-0174.

P13.07

INVESTIGATION OF WATER QUALITY OF ROSS BARNETT RESERVOIR, MISSISSIPPI, USA

Rayford Parnell, Padmanava Dash, and Saurav Silwal
Mississippi State University, Starkville, MS, USA

Contaminants such as nitrogen-rich fertilizers and farm wastes end up in lakes and man-made reservoirs as byproducts of agricultural and urban runoff. This results in harmful algal blooms and increased presence of harmful microorganisms. Ross

Barnett Reservoir, located along the Pearl River between Rankin and Madison counties, is the largest source of drinking water in Mississippi. It also serves as a host to various recreational activities. This study was aimed to look at the water quality of Ross Barnett Reservoir. A time-series of satellite data was processed and true color images were generated to investigate the presence of phytoplankton blooms from August 2013 to July 2014. A sampling trip was undertaken on June 25, 2014 to collect water samples from eight sites. In addition, a Hanna instrument was used to measure temperature, salinity, dissolved oxygen, and pH at each site. After completion of the trips, the water samples were vacuum filtered so that the filter papers could be analyzed for suspended particulate matter (SPM), photopigments, phycocyanin, phycotoxins, bacterial counts, toxic metals, and microscopy. The time-series analysis of satellite images showed several phytoplankton bloom events in Ross Barnett Reservoir. The SPM analysis showed the presence of both organic and inorganic suspended particulates. The bacterial counts revealed high concentration of total coliforms and heterotrophic bacteria at all sites and presence of *E. Coli* and Enterococci bacteria at few sites. These findings suggest frequent monitoring of water quality of Ross Barnett Reservoir to ensure the continued health and safety of the general population.

Acknowledgments: This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

P13.08

ECOLOGICAL SIGNIFICANCES OF CLIMATE CHANGE

M. S. Zaman

Alcorn State University, Lorman, MS USA

Climate change refers to long-term changes in the weather condition. Such changes may occur due to both anthropogenic (such as production of greenhouse gases) and non-anthropogenic (such as volcanic eruption, cosmological radiation, plate tectonics, etc.) conditions. Studies suggests that the global warming is the leading cause of rapidly changing weather pattern, and during the past 30 years, the earth's surface has warmed up faster than the base period (1957-1980). Rising levels of carbon dioxide and other heat trapping gases in the environment have gradually warmed the earth and are causing wide-ranging impacts, including drought, fires, melting snow/ice, rising sea levels, extreme weather conditions, etc. Predictions are, this trend will continue and even may accelerate, posing threats to various ecosystems and natural resources. Scientists are continuously working to understand the past and present climates by studying geological evidences, records of past sea levels, core samples from ice and earth crust sediment samples, glacial data, etc., and they predict the future climatic condition by developing mathematical and computer models, and theoretical approaches. This paper aims to discuss the predicted effects of global warming and climate change on various ecosystems.

AUTHOR INDEX

AGRICULTURE AND PLANT SCIENCE

Abdurakhmonov, Ibrokhim	Igbokwe, Patrick	Reiken, Angela Whittom
Anderson, LaShunda	Ighoavodha, Miriam	Rogers, Anna Clair
Begonia, Gregorio	Jenkins, Johnie N.	Rosado, Dale
Begonia, Maria	Jones, Amber	Ryan, Peter L.
Blythe, Eugene	Khurshut, Ernest	Saha, Sukumar
Bridges, Latoya	Kingery, William	Saha, Sulagna
Burton, Brianna	Kostyleva, Elena	Salakhutdinolo, Iikhom
Carry, Timothy	Liao, Shengfa F.	Salazar-Mejia, Germania
Chukwuma, Franklin	Long, Leanna	Shanmugam, Shankar
Clemente, Henry	McKenzie, Raveen	Shorter, Marcus
Collins, Michael	Miller, Gloria	Sims, Jarvis
Cook, Krystin	Miller-Butler, Melinda	Smith, Barbara J.
Crenshaw, Mark A.	Morales, Isabella C.	Spiers, James M.
Curry, Kenneth J.	Nanjundaswamy, Ananda K.	Steadman, Christy S.
Deng, Dewayne	Nannapaneni, Ramakrishna	Stevenson, Jamal
Dhowlaghar, Nitin	Nelson, Hannah R.	Thomason, Yan
Dillard, Darby S.	Nimmakalaya, Padma	Tyler, Leonna
Egamberdiev, Sharof S.	Njiti, Victor	Vance, Crystal Lenora
Fain, Glenn B.	Norwood, Tasha	Willard, Scott T.
Feugang, Jean M.	Panicker, Girish Kumar	Witcher, Anthony
Funtikova-White, A.	Pittman, Cori	Xia, Qun
Gao, Ming	Rana, Shivalika	Zenon, Aaron
Hampton, Torri	Reddy, Umesh	Zhang, Chunquan

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Acharya, Dhiraj	Batte, Justin	Burns, Zachariah
Adams, John	BC, Khem	Cannon, Gordon C.
Age, Joshua	Bell, Anthony	Cannon, John
Ahmad, Omama	Bengten, Eva	Cao, Mengyi
Albukhari, Fahad	Blancett, Logan	Casanova-Torres, Angela M.
Anderson, Christoper D.	Both, Andries	Chamberlain, Nicholas B.
Appukutti, Nadeema	Both, Pieter	Chandler, Shuh-Marraka
Bai, Fengwei	Brandon, Elizabeth	Chen, Chien-Chung
Baig, H.	Brown, Erica	Chigbu, Paulinus
Bailey, Eleanor L.	Buck, W.	Ching, Wei-Mei
Barefield, Meredith	Budachetri, Khemraj	Crawford, Jelicia
Barr, Jennifer	Buford, Thomas	Crispell, Gary P.
Bates, Cassandra	Bullard, Rebekah	Crossley, Davida

DeCruz, Matthew	Leal, Sandra	Rodgers, Christian
Dorsett-Martin, Wanda A.	Li, Jiaxu	Rosado, Dale
Dukes, Jacquais	Lightsey, Emily	Rosenberg, Sam
Earl, Truman M.	Lloyd, Mariah	Ross, Courtney
Elasri, Mohamed O.	Ma, Din-Pow	Sahukhal, Gyan
Fadavi, Meheri	Maranon, Rodrigo	Saleh, Mounir R.
Fernandes, Joseph D.	Marcos, Luis	Samanta, Dhritiman
Flynt, Alex	May, Ianna Danielle	Sanders, Alexis
Freeman, Alicia	McDaniel, Olga	Sengupta, Partha Pratim
Fu, Emily	McDonnell, Mary	Shao, Wenjie
Gates, Linda	Meruvia, W.	Shearer, Glen
Ghag, Gaurav	Mo, Yin-Yuan	Shenwu, Ming
Girimaji, Anjaneyulu	Mondal, Mosharrof Hossain	Singh, Nitesh
Gordon, Donna M.	Moreno, Jon Ignacio	Solangi, Sana
Guerrier, Sabrice	Morris, Michael W.	Spencer, David
Gunn, Rosalynn	Mukherjee, Dipaloke	Stewart, Jr., James A.
Haque, Zahur	Mukherjee, Soma	Sudduth, Jack
Harris, Zacharia	Murali, Beddhu	Sundaresan, Alamelu
Heda, Ghanshyam D.	Omotola, Oluwabukola	Takkallapelly, Sriram
Hegazy, Yassmin	Osborne, James	Taylor, Erin
Heinhorst, Sabine	Pacurari, Maricica	Tchounwou, Paul B.
Hicks, Chindo	Padway, Shelby	Thomas, Darrow
Hirt, Samantha	Papas, Steven Sollon	Thompson, Alexandria Nicole
Ho, Tsui-Ting	Parker, Terra	Tolbert, Kaneshia
Hogue, Paul	Paul, Amber	Townes, Jonathon
Holland, Carter G.	Penfornis, Patrice	Vallabhaneni, Krishna C.
Huang, Jianguo	Petrosky, P.	Visic, Petra
Huddleston, Mary Elizabeth	Phillips, Charles	Wahl, Matt
Hussa, Elizabeth Ann	Piletz, J.E.	Walker, Scharri Ezell
Jackson, Angela R.	Piva, Marta A.	Wang, Ran
Jayana, Bina	Pochampally, Radhika	Watabe, Kounosuke
Jelinski, Joseph	Rangachari, Vijay	Whitt, Jason
Jennings, Jasmine Irene	Reagan, Jr., Jerry W.	Whitwam, Ross
Johnson, Classie	Reckelhoff, Jane	Williams, Jaclyn
Johnson, Derreon	Redd, Danielle Amaris	Willis, K.
Johnson, Joscelyn	Reed, Randi Gail	Wilson, Melanie
Kamassa, Mawusi	Reese, Jeremiah John	Worsham, Rebecca A.
Karim, Shahid	Reiken, Angela Whittom	Wright, Jeneau
Kimbrell, Elizabeth	Ribeiro, Jose	Xing, Fei
Kolli, Udhghatri	Roberts, Evan	Yan, Jingyi
Kumar, Deepak	Robinson, Chase	Yedjou, Clement
Kumari, Neeta	Robinson-Taylor, Kendra S.	Young, Ronald

Zhang, Junlin

Zhang, Xue

Zhang, Zhiwen

Zhang, Ziqiang

Zhao, Jia

Zhou, Nanjiang

CHEMISTRY AND CHEMICAL ENGINEERING

Abel, Brooks

Abshire, Anthony

Ahmed, Lucky

Aker, Winfred

Alamgir, Azmain

Allred, Anna K.

Ardeshir, Adeli

Armstrong, George

Arslan, Zikri

Basaran, Ismet

Begum, Salma

Billa, Jermiah

Bolhofner, Robert L.

Boone, Mason

Brickson, Benjamin

Buchanan, J. Paige

Buchanan, Randy

Campbell, Naomi F.

Cao, Bei

Celik, Ahmet

Chen, Chuan

Cleveland, Michael

Coats, Alex

Cooper, Precious D.

Corey, Tiera

Corrao, Irene S.

Covan, Terriona

Cullen, David

Curry, B. Woods

Daemo, Menase

Dasari, Thabitha P. Shareena

Dass, Amala

Deskewies, Austin M.

Dickerson, Shelby

Dionysiou, Dionysios

Dixon, Karien

Donahue, Matthew

Engel, Alexa

Feng, Manliang

Finley, GeNita N.

Fitzkee, Nicholas

Foster, Dominique

Garcia, Rafael Fernandez

Giurintano, Jonathan P.

Grayson, Jonathan

Griesbeck, Axel G.

Griffin, Alyssa

Guo, Kai

Guo, Song

Hackett, Brandon

Hammond, Neil

Han, Fengxiang

Haney, Kristina Claire

Haque, Syed

He, Xiaojia

Hossain, Md. Alamgir

Hoth, Lauren M.

Hwang, Huey-min

Hydrick, Carley

James, Makiesha

Jefcoat, Jennifer A.

Jefferson, LaCrissia

Jentsch, Nicholas

Johnson, Corey R.

Jones, Chinyere D.

Kaur, Gurjit

Kelley, Sarah Ariel

Keyes, Jamal

Khansari, Maryam Emami

Khawaja, Muzamil A.

King, Danviona

Kotapati, Hari Kiran

Kramer, Wolfgang H.

Kumara, Chanaka Kapila

Landrum, Jonathan

Lee, Ken S.

Leszczynska, Danuta

Leszczynski, Jerzy

Lin, Yunfeng

Lowe, Patrick Michael

Mackey, Nicole

Madsen, John Kristian

Magers, David

Mao, Xinyu

Masterson, Douglas

Matthews, Emily

McComb, Jacqueline

McCormick, Charles

McFarland, Frederick

McVaugh, James P.

Morales, Amber

Mullins, Courtney B.

Netchaev, Anton

Njemanze, Stephanie

Owens, III, Harold

Parsons, Keith Hampton

Patel, Priya P.

Pelaez, Miguel

Perlote, Turquoise C.

Pickett, Phillip

Pigza, Julie

Pinto, Henry

Portis, Bobby

Powell, Douglas R.

Quresh, Maryam

Rasulev, Bakhtiyor

Raucher, Drazen

Realini, Erin

Rhaman, Md Mhahabubur

Robinson, Jamarii

Rogers, Christian

Rosado, Dale

Rose, LaKeshya

Roy, Juganta Kumar

Sandlin, David S.

Schwartz, Philip

Siefker, David



Smith, Eli A.	Vo, Tam	Yadav, Dinesh
Smith, Shelley	Walters, Samuel	Yilmaz, Vedat
Solomon, Melinda K.	Wang, Ailin	Yu, Hongtao
Stewart, Emily H.	Wang, Jing	Zakaria, ABM
Tachikawa, Hiroyasu	Westrope, Marissa	Zereen, Fahmida
Tchounwou, Paul	White, Jeremy	Zhang, Yazhou
Thomas, Catherine	Wilcosky, Amy	Zhang, Ying
Toles, Ashli R.	Windham, Amber	Zikri, Arslan
Toyota, Cory	Woods, Karen	Zuo, Xiaobing

ECOLOGY AND EVOLUTIONARY BIOLOGY

Baghai-Riding, Nina	Garig, Dustin	Martin, Thomas
Balius, Madeline	Goddard, Jerome	Matos, Taynara
Ball, Rhandi	Gundry, Shawnee	Moretan, Steve
Bishop, Amanda	Hall, Darryl	Napier-Jameson, Rebekah
Bruce, Walthena	Hall, Louis	Olinger, Harrison
Cardoso, Renata	Hendrixson, Brent	Outlaw, Diana
Clark, Megan	Huff, Mary	Patterson, Kenneth
Cosnahan, Margaret	Hughes, Jeffrey	Reza, A.H.M. Ali
Cuda, Zach	Jordan, Cody	Simpson, Rebecca
Cummings, Joseph	Kandies, Amanda	Stevens, Tyler
Doan, Duc Anh	Larson, David	Tellkamp, Markus
Eads, Dylan	Little, Sara Beth	Toyota, Cory
Fast, Kayla	Manly, Michael	Walstrom, V. Woody
Feist, Sheena	Mann, Debora	
Felton, Mack	Mann, Tom	

GEOLOGY AND GEOGRAPHY

Ables, John	Harvey, Omar	Rinderer, Nicholas
Dixon, Ricky	Heitmuller, Franklin	Sherif, Abdulaleem Rida
Dockery, III, David T.	Kar, Bandana	Simmons, Andrew
Galicki, Stan	Lowery, Steven	Wylie, Luke
Galtney, Jeb	Mavrodi, Dmitri	

HEALTH SCIENCES

Abdul-Haqq, Deja	Amaral, Lorena	Bean, Cynthia
Acholonu, Alexander D.W.	Anderson, Chris	Bear, Matthew
Adah, F.	Araujo, Joseph	Beebe, Diane K.
Ahmad, Omama	Arrington, Amy	Bell, Preston
AlAmodi, AA	Bagwell, Jana	Benghuzzi, Hamed
Alford, Tim	Banerjee, Santanu	Bennett, Russell
Algahtani, Ohud	Barnes, Jeremy	Benton, Scott
Allison, Jerome	Barvie, Maria	Bergey, Elizabeth



Betson, Nicole	Davis, M.	Hamadain, Elgenaid
Bettagere, Ramesh	Day, Tim	Haque, Amin
Bhatt, Abhay	Dechend, Ralf	Harmon, Ashlyn
Bhuiyan, Azad	Didlake, R.H.	Harpole, Jennifer
Bilbro, Augusta	Dillard, Darby S.	Harris, Andrew
Bittle, J. Scott	Dolbow, David	Harrison, R.
Blocker, Aaron	Dove, C.	Harvey, Erin
Boggan, Ricky	Dove, Cassandra	Haven, Xan
Bowles, Teylor	Duhé, Roy J.	Hawkins, Jackie
Bradley, Denae L.	Earl, Truman	Hawkins, Johnnie
Brandon, Elizabeth	El-Sadek, L.	Hayes, Sandra
Brodell, Robert	Elsasser, T. H.	Hegazy, Yassmin
Brooks, Tracy	England, Barry	Hester, Robert L.
Brown, C.	Erby, Lauren	Hickson, DeMarc
Brown, LaVonne	Eubanks, Robert	Hodge, Hallie
Brownlee, B.	Ezelle, Karen	Hodges, Victoria
Bryan, Christine	Famiyude, Mobalaji	Hosick, PA
Burns, Zachariah	Fan, Lir-Wan	Howard, Arletha
Burse, Nakeitra	Farah, Ibrahim	Huang, Jun
Burton, Blair	Faruque, Fazlay	Huang, Min
Butler, Kenneth R.	Faulkner, Jessica	Hunt, Barry
Buys, DR	Feng, Ruiqi	Hyde, Justin
Campbell, Douglas	Fernandez, Giancarlo	Ibrahim, Jamil
Campbell, Nathan	Feugang, Jean M.	Ibrahim, Tarek
Cannon-Smith, Gerri	Fleming, Keunshea	Irby, Josh
Carter, Kaylan	Fox, A.	Jackson, Jon Corey
Castillo, Javier	Freeman, Kevin B.	Jernigan, Courtney
Chen, Erica	Frizzell, Ciara	Johnson, Angela
Chinthaparthi, Sireesha	Garner, Angelia D.	Johnson, Dick
Choi, Hwanseok	Ghonim, Elham	Johnson, James T.
Clemente, Henry	Gomez, Emily	Johnson, Keara
Cobb, Jr., Keith	Gousset, MU	Johnson, Kina
Cole, Amanda	Grace, Sharon Fooshee	Johnson, Meghan
Collier, Charlene	Grant, Giorgio	Johnson, Will
Copeland, J.	Gray, W.	Jones, Ellen
Cornelius, Denise	Green, John	Jones, Jasmine
Credeur, Daniel	Griswold, Michael E.	Jones, ML
Crenshaw, Mark A.	Gunter, Barak	Jones, Sylvia
Cuadra, E.J.	Gunter, N.	Jones, Tembra
Dai, Xuemai	Guo, Mary	Jones-Taylor, Aurelia
Dalmasso, Carolina	Hall, Katherine	Jordan, Courtney
Daniel, BJ	Hall, Margot	Judge, Allison K.

Jung, Y.	Moll, George	Robertson, Jewel
Kamassa, Mawusi	Moll, Teresa	Rosado, Dale
Kennedy, RE	Morales, Isabella C.	Ross, Courtney
Kimmons, Jennifer	Morgan, Jacob	Rowlett, James
King, Ashley N.	Morgan, Rhianna	Rueedi-Bettschen, Daniela
King, Bria	Morris, Rachael	Russell, KJ
Kishinhi, Stephen	Moseley, Janae	Ryan, Peter L.
Knopp, Alexandra	Mosley, Jr., Thomas H.	Salu, Loren
Kotnour, Joseph	Moss, T'Kylia	Sanders, Cameron
Krause, Denise D.	Mustain, William	Sandlin, David
Kyle, Patrick	Naylor, Jennifer E.	Schmidt, Mike
LaMarca, Babbette	Nelson, Hannah R.	Schwam, Maxwell
Larson, J.	Nichols, Elizabeth N.	Seawright, Ashley
Lee, John M.	Niswonger, Alexandria	Selmon, Shequida
Leggett, Sophia	Nittala, Philip	Shaffery, James
Lewis, Ashlee	Norcross, Erin W.	Shen, Juying
Liao, Shengfa F.	Obamwonyi, Josephine	Shepherd, Taylor
Locher, JL	Oliver, Brittney	Smith, Clinton
Lott, L.	Paige, Alexuis	Smith, F.
Lott, Tamarcus	Pang, Yi	Smith, Swyah
Love, Demetria L.	Parshotam, Tanita	Snazelle, Theodore E.
Lux, Mary	Patel, Niki	Snell, Sannie
Mackin, Andrew	Patel, Yatrik J.	Spears, Olicia
MacNeill, R.	Perryman, Brianna	Spencer, Shauna-Kay
Maklad, Adel	Phillips, Molly	Spires, Denisha
Mamoon, Samir	Piland, Scott	Steadman, Christy S.
Marshall, Gailen	Platt, Donna	Stec, DE
Mason, M.C.	Porter, Justin	Storm, MV
Mathis, Keisa	Prodduturu, Swati	Stout, III, J.
McCoy, Pamela	Pruett, BE	Stray, Stephen
McDaniel, Justin	Przybyl, Lukas	Sullivan, Donna C.
McDonald, Tyrone	Puckett, Aaron	Taitano, Matthew
McDonnell, Mary	Purvis, Victoria	Tang, Xuehui
McGee, Delicia	Qizilbash, Bilal	Taylor, DT
McKenzie, Ernest	Radican-Wald, Amy	Taylor, Lateia
McPherson, Kasi	Rahman, Khondaker Miraz	Tchounwou, Paul
Meade, John	Ramey, Kristen	Thomas, Alexia
Mena, Leandro	Reckelhoff, Jane	Thompson, Niketa A.
Mendy, Vincent	Reeves-Darby, Royce	To, Harrison F.
Mitchell, John R.	Reeves-Darby, Vonda	Torrence, Chasity Lynne
Mitchell, Jonathan M.	Reiken, Angela Whittom	Toyota, Cory
Mitchell, Matt	Reynolds, Mary Catherine	Tribit, Givanta



Truong, Nhan	West, Lydia	Wright Camilla
Tucci, Michelle	Whitt, Anna Lyn	Xie, Yue
Tucker, A.R.	Willard, Scott T.	Yelverton, Eden
Twiner, Chelsea	Williams, CP	Yu, Yue
Vance, Stacy Hull	Williams, Jan	
Wallace, Kedra	Williams, Melinda	Zhang, Xu
Walls, Tameka	Williams, Ronald	Zhou, Lan
Wang, Ran	Wilson, Gerri A.	Zhou, Wu
Wang, Wanmei	Windham, B. Gwen	Zhu, Hong

HISTORY AND PHILOSOPHY OF SCIENCE

Bower, Lauren	Kittrell, Dylan Lee	Penchev, Vasil Dinev
Byrd, Nick	Kolmes, Sara	Rainer, Georgia Rae
Cruz, Christopher Samuel	Martin, August W. M.	Schmidt, Mike
Curry, Kenneth J.	Nemati, Nedah	Smithka, Paula J.

MARINE AND ATMOSPHERIC SCIENCES

Abdullah, Stone	Harvey, Jaylond	Morris, Vernon
Adenihun, Julius	Hofmann, Eileen E.	Powell, Eric N. Reddy,
Armstrong, Roy	Hwang, Huey-Min	Remata Reddy, R.
Ben-Horin, Tal	Klinck, John M.	Suseela Rogers,
Bhowl, Pradip	Linhos, Anna	Christian Shankar,
Bidegain, Gorka	Longwith, Hope-Anne L.	Vijaya Tchounwou,
Bushe, David	Lu, D.	Paul Tuluri, Francis
Chigbu, Paulinus	Lu, Duanjun	White, Loren
Fadavi, Meheri	Mallory, Lenetta	
Gorai, Amit	McComb, Jacqueline	
Han, Fengxiang	Min, Qilong	

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Aditya, Krishna	Hayden, Linda	Onyenweaku, Ifeanyi
Bailey, Joshua	Howard, Ervin	Ridgeway, Jefferson
Carlis, DaNa	Ibrahim, Jamil	Suresh, Nishant
DeWitt, Carl	Johnson, Darnell	Tiwari, Tapan Kumar
Dickinson, Gail	Jones, Derrick	Tucci, Michelle
Eldek, Abdelnasser	Mallard, Deanna	von Laszewski, Gregor
Frizell, Tayla	Manzoul, Mahmoud	Zhang, Ping
Grant, Nyjah	McDonald, Kalyx	
Hamadain, Elgenaid	Meghanathan, Natarajan	

PHYSICS AND ENGINEERING

Aceil, Sam	Bantawa, Minaspi	Bhatt, Chet Raj
Adhikari, Khagendra	Beach, Kevin	Biswas, Pradip K.
Alfarraj, Bader	Bhatt, Chet	Bulla, Camillo

Bulla, Sandra	Labuda, Cecille	Silwal, Umesh
Chaterjee, Chandrima	Liao, Jun	Simpson, C. LaShan
Church, Charles	Liu, Hongkai	Siwakoti, Durga Prasad
Clarke, Cameron	Madsen, John	Stephens, James M.
Corley, Patrick	McMahan, Justin	Stepney, Devon M.
Cunningham, Janice	Miller, Taylor	Szasz, Taylor
Datta, Alakabha	Mobley, Joel	Tennakoon, Sumudu
Davis, Ebony A.	Mohanmurthy, Prajwal	Thompson, Scott M.
Dayavansha, Sunethra Kumari	Murphy, Jessica	Tracy, Jr., James Lee
Dutta, Dipangkar	Naderyan, Vahid	Vasquez, Erick
Ellis, Cassandra	Oli, Basu Dev	Walters, D. Keith
Gaerlan, Mikhail	Omidi, Nazanin	Walters, Keisha
Gilbert, Lashayla T.	Parthapratim, Biswas	Williams, Lakiesha
Gladden, Joseph	Piascik, Jeffrey	Williams, Shannan V.
Griggs, Jason A.	Porwal, Piyush	Wilson, Dameisha L.
Hickey, Craig	Prabhu, Raj	Winger, Jeff Allen
Jagdish, Singh	Rashed, Ahmed	Winger, Jeffry
Jagdish, Singh	Raspet, Richard	Wu, Wanwei
Johnson, Haden Andrew	Samuels, Jenna	Yuan, Pao-Chiang
Joshi, Gaurav	Sanghapi, Herve	Yueh, Fang
Koju, Ukesh	Shih, H.R.	
Kovach, Anne Marie	Shih, HuiRu	
Kubarovsky, Valery	Shivashankara, Shanmuka	

PSYCHOLOGY AND SOCIAL SCIENCES

Agler, Lin-Miao L.	Dawkins, Milton	Rozman, Stephen
Alexander, Ivy	Erby, Adrienne	Saracino, Anthony
Alfsen, Larisa K.	Farah, Nuha	Stamps, Abyssinia
Banerjee, Satanu	Follett, Meagan	Teter, Cambridge
Bolden, Sharone	Hopkins, Alexander	Thaw, Andrew Kurt
Brewer, William	Jackson, Jon	Torrence, Chasity
Chandler, Cassie	Kearns-Cooper, Theresa Stacy	Virgil, Charden
Cornick, Jessica	Khan, Shaila	Waters, Kellie
Davis, Alexis	Parker, IV, Roosevelt	Williams, Sasha
Davis, Jasmine	Platt, Donna	Williams, Timothy
Davis, Walter	Rowell, Taralyn	Wright, Kaitlynn

SCIENCE EDUCATION

Bruce, Lori M.	Clary, Renee	Mattox, Johnny
Carroll, Kimberly	Cross, Ginger	McDaniel, Christina
Carter, Kaylan	Dunne, James	McNeal, Karen S.
Chen, Suanrong 'Sarah'	Herron, Sherry	Parker, Julie



Patel, Neil
Pierce, Donna M.
Radencic, Sarah P.
Reiken, Angela Whittom
Saleh, Mounir
Samaradivakara, Nadee

Schmitz, Darrel W.
St. Fleur, Valerie
Sullivan, Sammy
Sumrall, Jeanne
Thomas, Darrow
Tucker, Deborah

Walker, Ryan M.
Wandersee, James
Wax, Charles
Zenon, Aaron

ZOOLOGY AND ENTOMOLOGY

Acholonu, Alex D.W.
Adris, Maithri
Adris, Piyatilake
Barnes, Charles C.
Barnes, Darrell D.
Biber, Thomas
Boyd, Gwendolyn
Budachetri, Khemraj
Coleman, Tamikka
Cox, Ray
Dash, Padmanava
Dukes, Jacquais Ellis,
Kyle Ezeakach,
Nnaemeka Ford, Jr.,
Ernest

Green, Dominique
Grisham, Paul
Hensley, Frank
Holland, Taylor Brooke
Isome, Jeremy
Jackson, Jamie
Jawor, Jodie
Johnson, Classie
Lavers, Brent
Leflore, Tyantria
Mattox, Sarah
McLeod, Paul
Melton, Hannah
Montgomery, Mark L.
Moreno, J. Ignacio

Parnell, Rayford
Piva, Marta A.
Price, Shannen
Rashid, Tahir Reza,
AHM Ali Russell,
Elizabeth Silwal,
Saurav Sylvester,
James Thimmaiah,
Padma Thimmaiah,
K.N.
Williams, Voletta P.
Yee, Donald
Zaman, M. S.

REMEMBRANCE

Vale Jim Wandersee (1946-2014) **

Long Time Member of Our Academy

Jim was apart of the Mississippi Academy and contributed to the Science Education Division for over a decade. Jim contributed to the founding conference of the International History, Philosophy and Science Teaching Group held at Florida State University in 1989. His paper was titled 'On the Value and Use of the History of Science in Teaching Today's Science: Constructing Historical Vignettes'. His research on the efficacy of historical vignettes on student motivation and learning continued for many years, and he was regarded as the 'world authority' on the subject. One of his central research interests was in seeing how the history of science connected with student conceptions



and misconceptions in learning; he was a participant in the large and influential 'Misconceptions' conferences of 1983 and 1987 and he worked closely with their organizer, Joseph Novak. Thirty years ago he published a 'landmark', much-cited study on this topic - 'Can the History of Science Help Science Educators Anticipate Students' Misconceptions?', *Journal of Research in Science Teaching* 1985, 23(7), 581-597. Jim was a valued member of the Editorial Committee of *Science & Education* since its inception in 1992 and many have gained from his always careful and informed reviews of their submitted manuscripts. Jim's career at Louisiana State University began in 1989 as Associate Professor of Science Education and Associate Editor of the *Journal of Research in Science Teaching*. Prior to 1989 Jim taught science at middle school, high school, and college levels for nearly 20 years, specializing in the life sciences. During his nearly 25 years at LSU Jim received numerous awards for outstanding research, teaching, and service, including: 1) *IBC Scientist of the Year Award* by Cambridge University for research in botany education, 2) *Fellow* of the Linnean Society of London in biology, 3) *Fellow* of the American Association for the Advancement of Science, 4) *Charles E. Bessey Medal* by the Botanical Society of America, 5) *William W. Craig Outstanding University Educator* by Louisiana Science Teachers Association, and 6) *W.H. LeBlanc Alumni Association Endowed Professorship* in the LSU College of Human Sciences and Education. Jim enjoyed traveling the world, often with his wife Carol at his side, to seek out botanical gardens, including the northern-most garden above the Arctic Circle in Tromsø, Norway, to as far south as Melbourne, Australia. Jim's life was filled with his passion for teaching and learning and his work touched the lives of thousands of students over his 44 year career. He worked at LSU until 2012 when his health no longer allowed him to teach, and he retired. Jim's research excellence and professional dedication are reflected in more than 250 articles, books, and professional presentations, some of which have been translated into seven languages and published in 15 countries. Perhaps more than anything else Jim loved working with his graduate students as they became part of his community of scholars in the *15° Lab* at LSU and the *EarthScholars™* Research Group (co-founded with Renee Clary). Jim's dedication to his students and his commitment to an ongoing research program that focused on graphic representation of scientific knowledge and its effects on science learning are evidenced in the following comments by three of his doctoral students: *Jim was a kind and generous graduate advisor who took the time (in my case, a semester of weekly luncheons) to understand his students' strengths, experiences and natural inclinations before they together finalized research plans. When I see how many graduate students he has advised over the years, I don't know how he managed to make me feel that I was his only one at the time. His mentorship continued after my graduation, and rarely has a month gone by in the 15 years since that he hasn't popped in with a news bit he thinks I'll like. I will forever be grateful to Jim for redirecting my thinking about teaching as what the teacher does to what the learner should be gaining from it.* (PBG) *Jim Wandersee was highly respected around the world for his incredible research productivity, immense knowledge, and incredible insight on the state of science education research. Not only did he instill research ethics and professionalism, but he also built a community of scholars. He facilitated multiple networking opportunities each year for doctoral students and past graduates, including the 15 Degree Lab Banquet. The careful mentoring and guidance served former students well, as Jim's students make major research contributions in both national and international forums.* (RMC) *Jim was a great role model for emerging scholars because he was an active scholar in two fields—botany and science education. He launched so many graduate students' careers, including mine. He shaped the direction in so many ways and, through me, continues to greatly influence my graduate students' research. I can't begin to express my gratitude to Jim for all he has done for me. His legacy lives on.* (EA) Those of us who knew Jim Wandersee well will miss him greatly, and his work will continue to have a positive impact on science education, through his students, his many publications, and the numerous services he provided to science education throughout the U.S. and abroad. We salute a truly gentle man and a dedicated scholar. ** Authors: Ron Good, Professor Emeritus LSU (1987-2002) and FSU (1968-1986); Renee M. Clary, Associate Professor of Geosciences, Mississippi State University.; Phyllis Baudoin Griffard, Lecturer in Biology, University of Houston-Downtown; Eleanor Abrams, Professor and Executive Director of Engagement and Faculty Development, University of New Hampshire; Michael Matthews, School of Education, University of New South Wales.

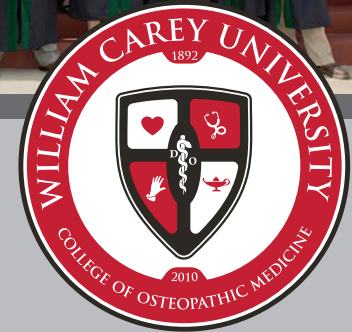
COLLEGE OF OSTEOPATHIC MEDICINE

WILLIAM CAREY UNIVERSITY • INAUGURAL GRADUATION, MAY 24, 2014



With an emphasis on primary care, the College of Osteopathic Medicine, at William Carey University, utilizes a community-based training model to educate and train graduates who are committed to serving the healthcare needs of all individuals, with special attention directed to the medically underserved and diverse populations of the state, region, and nation.

- **Fully Accredited by The Commission on Osteopathic College Accreditation (COCA)**
- **Total Residency Match Rate 98%**
- **Primary Care Match Rate 73%**



For more information, please call, email, or visit our website at:
601.318.6235 • wcucum@wmcarey.edu • www.wmcarey.edu/com