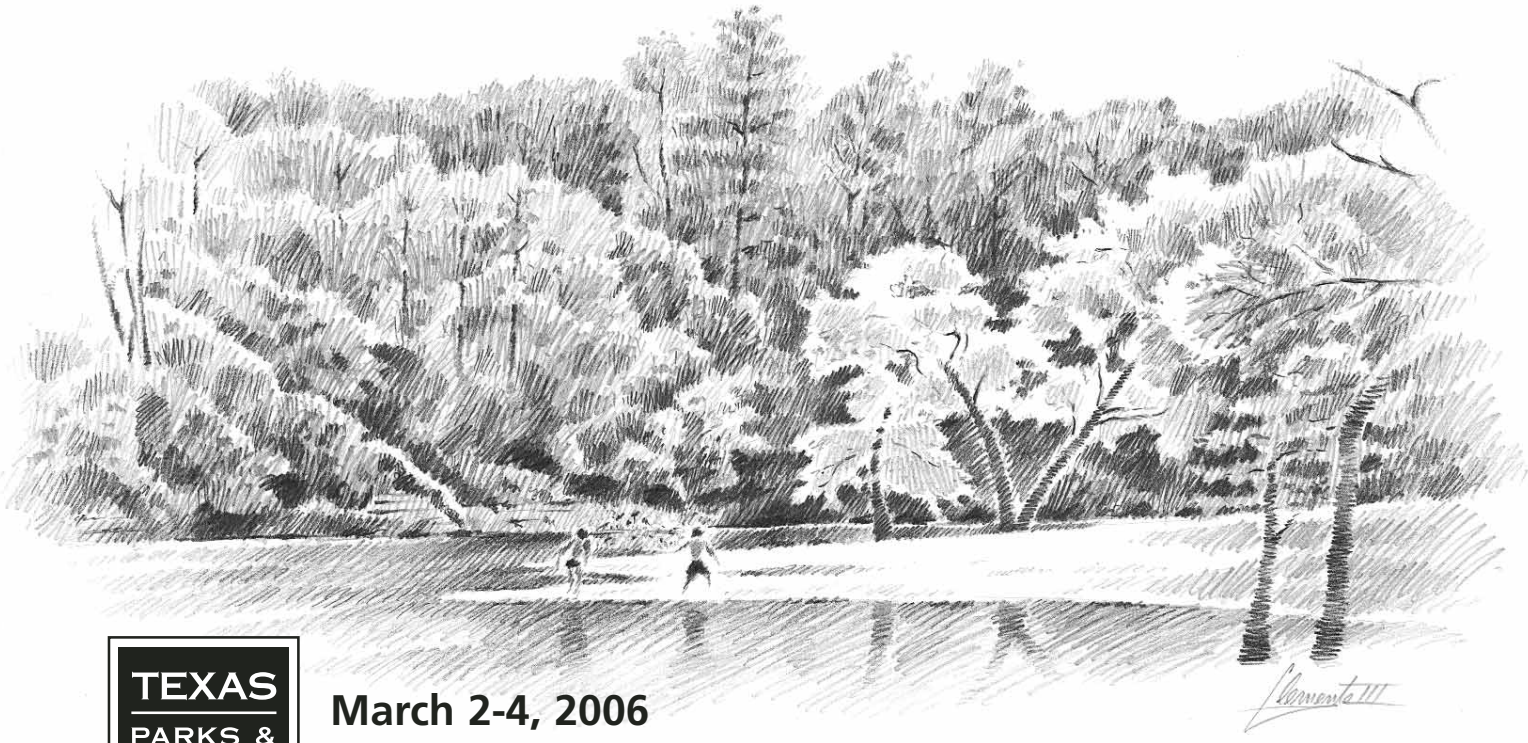
109th Annual Meeting of the Texas Academy of Science

PROGRAM and ABSTRACTS



TEXAS PARKS & WILDLIFE

March 2-4, 2006

Lamar University • Beaumont, Texas

2006 PROGRAM CHAIR

Dr. David S. Marsh

PROGRAM EDITOR

Bob Murphy

PROGRAM SPONSOR

Texas Parks and Wildlife Department

CS BK V3400-477 (2/06)

SCHEDULE OF EVENTS

TIME	EVENT	LOCATION
THURSDAY – MARCH 2, 2006		
1:00 – 5:00 pm	Registration	Holiday Inn
2:00 – 5:00 pm	Board Meeting	Holiday Inn
6:00 – 9:00 pm	Ice Breaker	Rockies Roadhouse
FRIDAY – MARCH 3, 2006		
7:30 am	Breakfast	Setzer Center Ballroom
8:00 am	Registration	Setzer Center Ballroom
8:00 – 5:00 pm	Exhibits	
8:00 – 5:00 pm	Poster Sessions	Setzer Center, 2nd floor
8:00 – 10:00 am	Paper Sessions	Hayes & Geology Buildings
10:00 – 10:30 am	Break	Setzer Center
10:30 – 11:50 am	Paper Sessions	Hayes & Geology Buildings
11:50 – 12:00 pm	Sectional Business Meetings	Hayes & Geology Classrooms
12:00 – 1:15 pm	Lunch	Setzer Center Ballroom
1:15 – 1:45 pm	**TAS Business Meeting**	Science Auditorium
1:45 – 2:30 pm	**2006 Distinguished Texas Scientist**	Science Auditorium
2:40 – 5:20 pm	Paper Sessions	Hayes & Geology Buildings
4:00 – 5:00 pm	**2006 Outstanding Texas Educator**	Science Auditorium
5:20 – 5:45 pm	All Section Chairs Meeting	Science Auditorium
6:00 – 7:00 pm	Social with Cash Bar	J. Gray Library, 8th floor
7:00 – 9:00 pm	Awards Banquet	J. Gray Library, 8th floor
SATURDAY – MARCH 4, 2006		
7:30 am	Continental Breakfast	Setzer Center Ballroom

FIELD TRIPS
(see next page for details)

FIELD TRIPS

All trips are on Saturday March 4, 2006.

ORNITHOLOGY

7:15 am	Meet for departure in Holiday Inn-Midtown (host hotel) parking lot
	Transportation provided via Lamar Biology Van
7:30 am	Depart for Bolivar Flats
8:30 am–12:30 pm	Birding on Bolivar Peninsula (Boy Scout Woods, Smith Woods, Waterbird Colony, Bolivar Flats)
1:30 pm	Arrive at host hotel
NEED TO BRING:	Sack lunch and drinks, binoculars/scope, insect repellent. A large ice chest and cold water will be provided.

GEOLOGY, COASTAL EVOLUTION, AND EROSION IN THE GALVESTON ISLAND AREA

R. LaRell Nielson, Chris A. Barker, Patricia S. Sharp, and Joe McShane

Saturday, March 4, 2006 7:00 am

This field trip will focus on the evolution of the Texas coastline between High Island and Freeport, Texas, and the effects of decades of erosion on manmade structures in this ephemeral environment. The Texas coast has been subject to gradual sea level rise since the end of the last Ice Age, and one of the effects may have been the destruction of delta in the area now occupied by Galveston Island, Bolivar Peninsula, and Galveston Bay. Evidence for the existence of this former delta and the effects of recent coastal erosion will be discussed as we visit High Island Salt Dome, Rollover Fish Pass, Galveston Seawall, Galveston Island State Park, San Luis Pass, Surfside Jetty near the old Brazos River delta, the new Brazos River delta and diversion point near Freeport. Basic geologic concepts will be explained.

Field trip participants should arrive at 6:30 am, Saturday, March 4, 2006, and depart at 7:00 am from Holiday Inn in Beaumont and return to Beaumont by 7:00 pm. The field trip will be led by LaRell Nielson, Chris Barker, Pat Sharp and Joe McShane from Stephen F. Austin State University Department of Geology (936) 468-2248 (rnielson@sfasu.edu). Vans will be provided or participants may use their own transportation.

WHAT TO BRING: Money for lunch in Galveston, insect repellent, hat, sun protection, jacket for possible cold, windy, or rainy conditions, water bottles, and comfortable/protective field clothes (appropriate for walking in the back marsh and on the beach).

COST	Option 1:	$70 for those using TAS vans; includes guidebook, park fees and tolls.
	Option 2:	$30 for those that provide their own transportation; includes a guidebook but not park fees and toll bridge fees.
	Student Option 1:	$60 for those using TAS vans; includes guidebook, park fees and tolls.
	Student Option 2:	$20 for those that provide their own transportation; includes a guidebook but not park fees and toll bridge fees.

We strongly encourage participants to ride in the vans provided to avoid a caravan of vehicles, which can be difficult and unsafe to manage through city traffic and at stop locations.

HURRICANE RITA

Geology Field Trip: Hurricane Rita and the Louisiana Chenier Plain.

Donald E. Owen, Lamar University, and Richard A. Ashmore, Texas Tech University

A one-day field trip to study the sedimentologic origin and geomorphological expression of the unique Chenier Plain of southwestern coastal Louisiana and the effects of Hurricane Rita on natural and human structures along the coast.

NECHES RIVER CANOE TRIP

Canoe trip to Neches River cypress swamps in the Cook's Lake area, Big Thicket National Preserve (National Park Service).

Park Naturalist Lisa Jameson will lead this waterbourne trip to observe Big Thicket species diversity and Hurricane Rita impact. No canoe experience necessary.

Depart Holiday Inn 8:00 am, return to hotel 2:30 pm. Bring hat, sunblock and lunch. Canoe fee $15.

TABLE OF CONTENTS

FUTURE ACADEMY MEETINGS

2007 110th annual meeting . . . . . Baylor University, Waco, Texas

ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIR

Welcome to the 109th meeting of the Texas Academy of Science. For this meeting, we've prepared a total of 180 papers divided into 115 oral presentations and 65 posters. As in years past, you will find a healthy mix of papers from Collegiate (N=63) and Graduate Student (N=63) members, as well as Senior Academy members (N=49). This distribution highlights the importance of the Academy and this meeting as a means to introduce young scientists to the professional community and for the more experienced to share their research and view the upcoming future teachers and researchers of the scientific community.

It takes a true army of people to produce a program, and I would like to thank all the people who helped. My utmost thanks goes to Pati Milligan, our TAS webmaster at Baylor University. Her work on the submittal site and patience with the Program Chair made abstract submission possible. In addition to the tremendous local responsibilities of actually hosting the meeting, the Local Host Committee, especially Jim Westgate and Andrew Kasner, provided maps, room schedules, contact information and other supporting material to help make the program complete. This information gathering would have come to absolutely nothing if not for the support of the Texas Parks and Wildlife Department. Special thanks and extreme gratitude to Bob Murphy who oversaw program printing, Chris Hunt for graphic design and layout, and Larry McKinney for his continued support of the Texas Academy of Science. Finally, I would like to thank last year's Program Chair and our current President, Damon Waitt. His guidance helped ease the burden of pulling it all together.

David S. Marsh,
109th TAS Program Chair

ACKNOWLEDGEMENTS FROM THE LOCAL HOST

The 109th meeting of the Texas Academy of Science would not have been possible without the dedication and efforts of the Local Organizing Committee:

Chair: Dr. Jim Westgate

Committee:
Ana Christensen
Brooke Hall
Andy Kasner
Jeff Pittman
Mike Warren
Jim Westgate
Stuart Wright

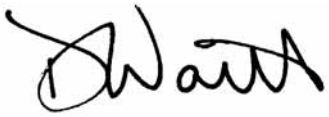
LETTER OF WELCOME FROM THE TAS PRESIDENT

Welcome to the 109th meeting of the Texas Academy of Science. 109 meetings in 126 years! Those are impressive numbers and it is doubtful that many organizations in Texas can claim such an extensive history. One thing that has always amazed the geneticist in me is that the Academy has persisted for such a long time. Unlike a rare allele in a small population subject to loss by random genetic drift, our small organization has remained stable for a large number of years. There are a number of forces that contribute to our stability including our ability to adapt to changing circumstances, a shared commitment to a common purpose, and the widespread willingness of members to devote time and energy to the Academy. The fact we are meeting at a location that only six months ago witnessed a major hurricane is a perfect example of that adaptability, commitment, and dedication. A very special thanks is extended to Lamar University and the local host committee for making this meeting possible.

While it is impossible to predict exactly where the Academy will be one, ten, or a hundred years from now, I have noticed a few trends in the ten years I have been involved with the Academy. Firstly, the Academy has become financially stable. This is due, in large part, to the activities of treasurer, Jim Westgate, and immediate past president, John Ward and has enhanced our ability to promote the mission of the academy through awards and research grants. Secondly, the Academy is becoming a more active proponent for science education. This is evidenced by our support of the Texas Science Olympiad and testimony before the State Board of Education regarding evolution in textbooks and dual credit for High School students. Thirdly, the Academy is becoming more comfortable with technology as evidenced by the online version of the Texas Journal of Science, electronic newsletters, and de facto PowerPoint presentations at annual meetings. Lastly and by far the most encouraging sign for our future is increasing participation by members in the annual meeting. Each year seems to set a new record for abstracts submitted, posters presented, awards given, and numbers of participants.

In the tradition of the Academy, I will pass the gavel and official seal of the Texas Academy of Science to incoming President Dave Marsh at the meeting banquet. It has been my honor to serve the Academy in an executive capacity and a privilege to work with members of the board. In the years to come I hope all members will find ways to help sustain the proud tradition that is the Texas Academy of Science.

Sincerely,



Damon Waitt, Ph. D.
President, Texas Academy of Science

City of Beaumont

Guy N. Goodson
Mayor

To: The Texas Participants of the Academy of Science Annual Meeting

Dear Participants:

It is both an honor and a pleasure to welcome the members of the Texas Academy of Science Annual Meeting to our great city. We are thrilled to have the opportunity to be your host city for your Annual Meeting.

Although your schedules will be busy with activities and meetings, I hope you will have some time to explore Beaumont. We are proud of all our city has to offer, and would love the opportunity to share our exceptional museums, shopping centers, cultural attractions, as well as our many fine restaurants.

Some of the friendliest people in the world reside right here in Beaumont and they will do everything they can to make your stay an enjoyable one. They join me in extending a warm welcome to you. May your visit here be fruitful and rewarding.

Sincerely,

Guy N. Goodson
Mayor

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LAMAR UNIVERSITY
A Member of The Texas State University System

WELCOME TO LAMAR UNIVERSITY AND SOUTHEAST TEXAS!

March 3, 2006

Dear Members of the Texas Academy of Science:

On behalf of the faculty and staff of Lamar University, it is my pleasure to welcome you to our campus to hold the 109th annual meeting of the Texas Academy of Science. It has been nearly 20 years since we have had the privilege of hosting your society. With its origins in the 19th century, the Texas Academy of Science is one of the oldest science organizations in the state of Texas. Your nearly 200 research presentations and 400 participants at the 109th meeting attest to the success and diligence of your society and its members.

I hope you will take time to explore our campus beyond the facilities which will be housing your organized events. March is the time of year in which we experience spring's rebirth as our azaleas and flowering trees breakout in red and white blooms across campus. Also, our state-of-the-art dining facility opened this January and I invite you to try out the great selection of foods.

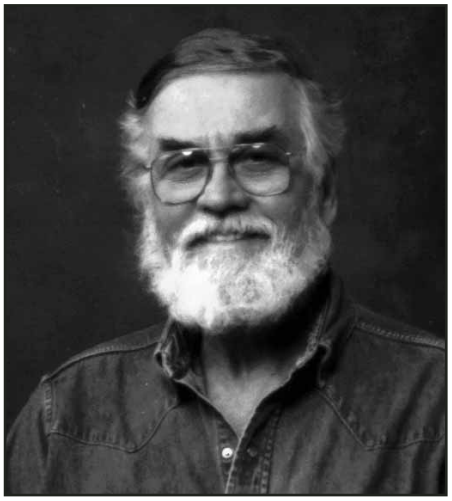
After Hurricane Rita left 40 million dollars worth of destruction to our campus six months ago, we were not sure if we would be prepared for your arrival this month. However, through a combined effort of numerous groups we have restored our classrooms and other support buildings to operational levels which will allow you to have a successful and productive conference. I am sure you will find your stay in Beaumont well worth the miles and miles of Texas you crossed to get here.

Sincerely,

James M. Simmons
President

Office of the President
P. O. Box 10001 Beaumont, Texas 77710 409 880-8405 Fax 409 880-8404

2006 DISTINGUISHED SCIENTIST



Dr. Eric R. Pianka
University of Texas at Austin

Four decades ago, Eric R. Pianka produced the first synthetic review of latitudinal gradients in species diversity which has strongly influenced the field ever since. His own personal long-term panglobal studies of factors influencing desert lizard diversity are widely recognized as a modern-day classic. Pianka has also developed a remote sensing study of the effects of wildfires on spatial-temporal dynamic habitat mosaics as well as the interaction between local and regional phenomena as they affect biodiversity in the Great Victoria Desert of Western Australia. Pianka has demonstrated a determinedness and staying power rare among scientists and still avidly pursues his fieldwork. He invented many new techniques and concepts — his publications, including four "Citation Classics," have changed the way most ecologists think, forever. Pianka's conceptual contributions are wide ranging and include foraging theory, reproductive tactics, allocation theory and optimality, intercontinental comparisons, resource partitioning, community structure, species diversity, and, among his more recent interests, biogeography, landscape ecology, metapopulation structure, and phylogenetic systematics.

Pianka's leadership in ecology is underscored by his classic textbook "Evolutionary Ecology," which has persisted over 25 years (through 6 editions) and has now been translated into Greek, Japanese, Polish, Russian, and Spanish. An entire generation of ecologists have now been educated from this very important book. Pianka has also published several other highly significant books, including a synthesis of his life's research, an autobiography, and a coffee table book on lizards. Many of his ex-graduate students are very well known and highly respected researchers, including Richard D. Howard (Purdue), Nancy T. Burley (U. C. Irvine), Jos. J. Schall (U. Vermont), Anthony Joern (Kansas State U.), Kirk O. Winemiller (Texas A & M.). Daniel T. Haydon (Glasgow), Gad Perry (Texas Tech), Christopher Schneider (Boston U.), Wendy Hodges (U. T. Permian Basin), and W. Bryan Jennings (Harvard).

Pianka holds the Doctor of Science degree (not an honorary, but an earned, degree) from the University of Western Australia. Pianka has given hundreds of invited lectures and keynote addresses at academic institutions all around the world. He has published a dozen papers in the prestigious journal The American Naturalist and has also published numerous times in Ecology (almost a dozen papers) as well as in PNAS, Science, Trends in Ecology and Evolution, among others. He is presently engaged in new path-breaking research exploiting molecular techniques and modern comparative methodology in phylogenetic systematics to trace the actual course of evolution. He has remained at the cutting edge of modern ecology for the last 40 years and is still going strong.

"Pianka" has become a household word to ecologists everywhere. He has been a professor at the University of Texas in Austin since 1968. Clearly, it is high time that he be recognized for his distinguished career and numerous seminal contributions to the burgeoning discipline of ecology.

2006 OUTSTANDING TEXAS EDUCATOR

Mrs. Sandra Laquey
Lamar High School – Arlington, Texas

Sandra Laquey earned her Bachelor of Science degree from the University of Texas at Austin in 1974. She is certified in Secondary Education with specialization in Biology/Health/Life Sciences. Following her undergraduate career, she attended and graduated from Texas Women's University in 1982 with a Master of Science degree in Chemistry/Physical Sciences. She is currently employed by Lamar High School in Arlington, Texas. Her primary responsibilities include chairperson of the Science Department and teaching Chemistry of the Community to 11th and 12th graders.

Prior to Lamar H.S., Mrs. Laquey was employed by Shackelford Junior H.S., South Oak Cliff H.S. and Sidney Lanier H.S. During her career, she has received numerous honors including the 2004 Science Teachers Association of Texas Secondary Teacher of the Year, the 2004 University of Texas Excellence Award for Outstanding High School Teachers, the 2004 Arlington ISD Secondary Teacher of the Year, and the 2004 AWARE Teacher Excellence Award Runner-Up. In addition, she was Lamar High School Teacher of the Year in 2003-04 and received an Arlington ISD Employee Service Award in 2003, the 1984 Shackelford Junior H.S. Teacher of the Year Award and is listed in Who's Who Among America's Teachers for 2000 and 2002.

Mrs. Laquey tries to develop lesson plans that allow students to be successful in life. Her philosophy of teaching is that given the right opportunity any student can learn. She believes that every student can be successful if the material is presented at a level that will challenge but not overwhelm them. It is important to her that her students understand what is taught and not just try to remember facts for evaluative purposes. She feels that if students truly understand the concepts and how it relates to them in their everyday lives he or she will retain the knowledge gained as well as experience academic success.

2006 TAS FELLOWS

Dr. Steven R. Goldberg

Dr. Goldberg of Whittier College in California is a nationally recognized herpetologist and parasitologist. While Dr. Goldberg is unable to attend the annual meetings of the Academy, he is one of our most prolific contributors to the Texas Journal of Science. Since 1997, he has published 20 manuscripts in the Texas Journal of Science (an average of over two per year for almost a decade). In addition to his numerous contributions to the Journal, he has served as a reviewer for numerous submissions by other authors. He has also served as a reviewer for the Student Research Grant program and maintained a Sustaining Membership in the Academy since 2000.

Dr. Robert D. Bradley

Dr. Bradley received his BS and MS degrees from Texas A&M University (the latter under David Schmidly), and his Ph.D. at Texas Tech University (under Robert Baker). After post-doctoral training at Texas A&M and the University of Texas, he accepted a position at TTU's biology department, where he has served for the past ten years.

Robert has played a large role in recent years in maintaining the visibility of Texas mammalogy, largely through the active involvement of himself and his students, in both regional and national societies. Presently an associate professor, Dr. Robert Bradley has been a major force in the training and teaching of students in his chosen area. He has served on almost 50 graduate committees during his tenure at TTU. He has also successfully graduated 11 M.S. students and 4 Ph.D. students of his own, and he is presently mentoring four graduate students. He represents a wonderful package of scholar, educator, and mentor.

Dr. Damon Waitt

Dr. Waitt holds a Ph.D. in Botany from the University of Texas in Austin where he studied the evolutionary ecology and population genetics of Phlox and an M.S. in Botany from Louisiana State University – Baton Rouge, for work on sex ratio evolution in sedges. Dr. Waitt has served on the faculty at Saint Edward's University and Southwestern University and has extensive experience developing web-based information resources. Dr. Waitt serves as the Wildflower Center's botanical authority and is the author of the Wildflower Center's Native Plant Information Network. Dr. Waitt also serves as the principal investigator on several grants as part of the Wildflower Center's Pulling Together Invasive Species Initiative.

Dr. Waitt has been a member of the Texas Academy of Science since 1996 and has sponsored numerous student presentations as an assistant professor at Southwestern University from 1996 to 2000. He has also served the Academy as Vice-chair and Chair of the Botany section, President, Vice President, and President-elect.

2005-2006 TEXAS ACADEMY OF SCIENCE

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2006
PROGRAM AGENDA

Codes indicate the following:

C Collegiate Academy Member
G Graduate Student Academy Member
S Senior Academy Member
I Invited Speaker or International Guest
J Student entering competition
* Indicates presenting author
? Abstract failed to indicate presenting author

DISCLAIMER

Despite the best efforts of the editors, some errors and misspellings will likely be found in this program. Every attempt was made to correct obvious typos and such, but aside from those corrections, abstracts appear just as submitted.

BIOLOGICAL SCIENCES
Session I
Friday Morning, March 3 • BIO 105

8:00 CJ 0 THE EFFECTS OF INTRACRANIAL AMPHETAMINE ON PACED MATING BEHAVIOR IN FEMALE RATS
Stephanie Troyer*, Russell J. Frohardt, Debra J. Hines, St. Edward's University, Austin, TX, and Fay A. Guarraci, Southwestern University, Georgetown, TX

8:20 GJ 1 MICRO CATFISH MICRO CATSCAN
Kerin M. Claeson*, The University of Texas at Austin, Austin TX, and John G. Lundberg, Department of Ichthyology, Academy of Natural Sciences, Philadelphia, PA

8:40 GJ 2 MICROHABITAT USAGE AMONG JUVENILE AND ADULT *ELIMIA COMALENMSIS* (PLEUROCERIDAE) FROM COMAL SPRINGS, NEW BRAUNFELS, TEXAS
Jeff A. Brooks*, University of Louisiana at Monroe, Monroe, LA, Russell L. Minton, Museum of Natural History, University of Louisiana at Monroe, Monroe, LA, Kathryn E. Perez, Institute for Science Learning, University of North Carolina at Chapel Hill and Duke University, Durham, NC, and Eugene D. Thibodeaux, University of Louisiana at Monroe, Monroe, LA

9:00 GJ 3 CYPRESS CREEK HABITAT AND GROUNDWATER ASSESSMENT
J. Eric Dedden*, Glenn Longley, Edwards Aquifer Research and Data Center, Aquatic Resources Program, Texas State University – San Marcos, TX

9:20 GJ 4 COMPARISON OF THE CATALYTIC ACTIVITIES OF THE WILD TYPE ENDOGLUCONASE FROM *PYROCOCCUS HORIKOSHII* AND ITS MUTANTS DEVELOPED BY COMPUTATIONAL APPROACH
Jorge Del Aguila*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX

9:40 GJ 5 MOLECULAR CHARACTERIZATION OF BACTERIAL COMMUNITIES IN OIL-CONTAMINATED SOILS OF EAST TEXAS
Alexander V. Fedotov*, Alexandra Martynova–Van Kley, Stephen F. Austin State University, Nacogdoches, TX

10:00 Break – Setzer Center

10:30 GJ 6 PHYLOGENETIC ANALYSIS AND IDENTIFICATION OF SOUTHEASTERN USA EARTHWORMS USING 16S RDNA AND COI SEQUENCES
Yulia Leontieva*, Armen Nalian, Alexandra Martynova-VanKley, Stephen F. Austin State University, TX

10:50 GJ 7 INVESTIGATION OF THE NUCLEAR IMPORT PATHWAY OF HUMAN IMMUNODEFICIENCY VIRUS TYPE 1 (HIV-1) INTEGRASE
Laura Martin*, Margaret Whitney, and Peter J. King. Department of Biology, St. Edward's University, Austin, TX

11:10 GJ 8 A LABORATORY STUDY OF THE BEHAVIOR OF GRASS SHRIMP (*PALAEMONETES PUGIO*) IN RESPONSE TO PREDATORY KILLIFISH (*FUNDULUS GRANDIS*) AND NON-PREDATORY STRIPED MULLET (*MUGIL CEPHALUS*)
Richard Pollock* and Andrew C. Kasner, Department of Biology, Center for Coastal and Marine Studies, Lamar University, Beaumont, TX

11:30 GJ 9 DIVERSITY OF ARBUSCULAR MYCORRHIZAL FUNGI IN EAST TEXAS HABITATS
Kevin Stroup*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX

11:50 Sectional Business Meeting

12:00 **Lunch – Setzer Center Ballroom**

1:15 **TAS Business Meeting – Science Auditorium**

1:45 **Distinguished Texas Scientist Lecture – Science Auditorium**

BIOLOGICAL SCIENCES
Session II
Friday Morning, March 3 • BIO 107

8:20 CJ 10 DEVELOPING A MODEL FOR MUCAB MUTAGENESIS: EXAMINATION OF POSTTRANSLATIONAL PATHWAYS FOR MUCA/MUCA' REGULATION IN *ESCHERICHIA COLI*
Ian R. Bothwell *and Martín Gonzalez. Department of Biology, Southwestern University, Georgetown, TX

8:40 CJ 11 STRESS PROTEINS IN CRAYFISH VENTRAL NERVE CORDS EXPOSED TO HIGH TEMPERATURE, SEVERANCE, ETHANOL AND UV EXPOSURE
Angela Nordin*, and Rebecca Sheller, Department of Biology, Southwestern University, Georgetown, TX

9:00 CJ 12 CALORIC RESTRICTION AND INCREASED LONGEVITY OF *CAENORHABTIDIS ELEGANS* UNDER NORMAL AND STRESSFUL CONDITIONS
Fidlema A. O'Leary, Angela Lopez, Biology Department, St. Edward's University, Austin, TX

9:20 CJ 13 THE *PSEUDOMONAS AERUGINOSA* DNA-BINDING PROTEIN AMRZ CONTROLS TWITCHING MOTILITY AND BIOGENESIS OF TYPE IV PILI
Hernandez, Paulina*, Baynham, Patricia B., St. Edward's University, Austin, TX

9:40 CJ 14 IDENTIFICATION OF GENES REGULATED BY THE AMRZ PROTEIN OF *PSEUDOMONAS AERUGINOSA*
Taggart T. Gauvain and Patricia Baynham, Department of Biology, St. Edward's University, Austin, TX

10:00 **Break – Setzer Center**

10:30 CJ 15 UBIQUITIN AND HEAT SHOCK PROTEINS IN THE SEVERED VENTRAL NERVE CORD OF THE CRAYFISH, *PROCAMBARUS CLARKII*
Manjah Fernandez* and Rebecca Sheller, Southwestern University, Georgetown, TX

10:50 CJ 16 THE CLONING AND EXPRESSION OF fimS, A PUTATIVE SENSOR KINASE IN *PSEUDOMONAS AERUGINOSA*
Joseph Diaz*, April Sprinkle, Daniel J. Wozniak. Wake Forest University, Winston-Salem, NC, St. Edward's University, Austin, TX

11:10 GJ 17 PATHOGEN INHIBITORY ACTIVITY OF INDIGENOUS *STREPTOMYCES* FROM LOWER RIO GRANDE VALLEY AGRICULTURAL SOILS
Atenea Garza, Christopher R. Little, and Anita Davelos Bains, Department of Biology, The University of Texas – Pan American, Edinburg, TX

11:30 GJ 18 APPLESNAIL (*POMACEA CANALICULATA*-complex) POPULATION DYNAMICS AND CURRENT DISTRIBUTION IN UPPER TEXAS GULF COAST REGION
David N. Hollas*, Lyubov E. Burlakova, Alexander Y. Karatayev, Leah D. Cartwright, Stephen F. Austin State University, Nacogdoches, TX

11:50 **Sectional Business Meeting**

12:00 **Lunch – Setzer Center Ballroom**

1:15 **TAS Business Meeting – Science Auditorium**

1:45 **Distinguished Texas Scientist Lecture – Science Auditorium**

BIOLOGICAL SCIENCES
Session III
Friday Afternoon, March 3 • BIO 105

2:40	GJ	19	MOLECULAR DYNAMICS SIMULATIONS OF ENDOGLUCANASES FROM *PYROCOCCUS HORIKOSHII* Jasmine Wong*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX
3:00	G	20	PURIFICATION AND CHARACTERIZATION OF AN ANTIHEMORRHAGIC FRACTION IN THE SERA OF THE VIRGINIA OPOSSUMS (*DIDELPHIS VIRGINIANA*) Gonzalo Lopez, Jr.*, Dr. Elda E. Sanchez, and Dr. John C. Perez, Natural Toxins Research Center (NTRC), Texas A&M University-Kingsville, Kingsville, TX
3:20	S	21	USING GENETICS TO UNRAVEL ENVIRONMENTAL FACTORS CRITICAL FOR DETERMINING LONGEVITY Ted Brummel, Department of Biology, Sam Houston State University, Huntsville, TX
4:00			**Outstanding Texas Educator Lecture – Science Auditorium**
5:20			**All Section Chairs Meeting – Science Auditorium**

BIOLOGICAL SCIENCES POSTERS

P1	CJ	EFFECT OF ANTHRAPYRAZOLES AP-10 AND AP-11 ON HUMAN MAMMARY (MCF-7) AND ENDOMETRIAL (HEC 1-A) ADENOCARCINOMA CELLS IN CULTURE Carolina Boet and Maria E. Cuevas, Biology Department, Southwestern University, Georgetown, TX
P2	CJ	INVESTIGATING MUTANT Y451F IN GLUTAMATE RECEPTOR GLUR4 BINDING SITE USING VIBRATIONAL SPECTROSCOPY Imene Bokhetache*, Vasanthi Jayaraman, PhD**, *Department of Natural Sciences, The University of Houston-Downtown, **Department of Integrative Biology and Pharmacology, The University of Texas Health Science Center at Houston
P3	CJ	EFFECTS OF 4-OH TAMOXIFEN ON HEC 1B ENDOMETRIAL CANCER CELLS Tracey Einem*, Carolina Boet, Dr. Maria Cuevas1, Dr. Maha Zewail-Foote2, Southwestern University, Georgetown, Texas 786261Biology Department, 2 Chemistry Department
P4	GJ	DEREGULATED EXPRESSION OF BRG1 AND E2F CELL CYCLE PROTEINS IN AN OVARIAN CANCER CELL LINE, PA-1 Jay Gupta*, Southwestern University, Georgetown, TX, and Maria C. Todd, Department of Biology, Southwestern University, Georgetown, TX
P5	CJ	CHARACTERIZATION OF THE BACTERIA PRESENT IN LABORATORY STRAINS OF *DROSOPHILA* Robyn Hall*, Christina Zellmer*, and Ted Brummel, Department of Biology Sam Houston State University, Huntsville, TX
P6	CJ	ASSESSMENT OF THE EFFICACY OF VARIOUS TECHNIQUES FOR SCREENING FOR WEST NILE VIRUS Diana M. Hook* and Ted Brummel, Department of Biology Sam Houston State University, Huntsville TX
P7	S	CARBONIC ANHYDRASE IN MOLTING CUTICLES OF THE SLIPPER LOBSTERS, *SCYLLARIDES LATUS* Francis Horne, Biology Department, Texas State University, San Marcos, TX

P8 C IT ISN'T EASY BEING GREEN: THE EFFECTS OF SIMULATED HERBIVORY AND WOUNDING ON THE GROWTH AND REPRODUCTION OF AN AMARANTHUS HYBRID
Sara Huie* and Daniel Taub, Southwestern University, Georgetown, TX

P9 CJ INVESTIGATION OF EXTRACTION PROCEDURES AND CHARACTERIZATION OF BACTERIALLY-PRODUCED BIOPOLYMERS
Jannie M. Dilber*, Martina Maier*, Poonam Gulati, Ph.D., Byron Christmas, Ph.D., and Janusz Grebowicz, Ph.D., University of Houston-Downtown, Department of Natural Sciences, Houston, TX

P10 GJ COMPARISON OF POLLEN MORPHOLOGY OF *QUERCUS* L. SPECIES FROM DIFFERENT EAST TEXAS HABITATS
Oksana O. Matryniuk* and James E. VanKley, Stephen F. Austin State University, Nacogdoches, TX

P11 CJ PRESENCE OF PROTEIN 26 IN *ARTEMIA FRANCISCANA*
Brenna McConnell*, Department of Biology, Texas Lutheran University, Seguin, TX, and Nicole Okazaki, Department of Biology, Weber State University, Ogden, UT

P12 CJ SMALL INTERFERENCE RNA (SIRNA)-MEDIATED SUPPRESSION OF OVEREXPRESSED CYCLIN E PROTEIN IN NIH-OVCAR-3 OVARIAN CANCER CELLS
Kristen Meerbrey* and Maria Todd, Department of Biology, Southwestern University, Georgetown, TX

P13 CJ SENSITIVITY ASSAY INVOLVING VARIOUS TYPES OF BANDAGE TYPES TO MULTIPLE STRAINS OF COMMON MICROORGANISMS FOUND IN NECROTIC WOUNDS
Carley K. Schulte*, Amber L. Mendoza, Ted. Brummel, Department of Biology Sam Houston State University, Huntsville, TX, and Robert Williams, Southeast Texas Center for Woundcare and Hyperbaric Medicine Conroe Regional Medical Center, Conroe, TX

P14 GJ *EIMERIA* SPECIES DETECTION AND IDENTIFICATION IN POULTRY
Andrew Syvyk*, Armen Nalian, Irina Teplova, Alexandra Martynova-Van Kley, Steven F. Austin State University, TX

P15 CJ SALT TOLERANCE MECHANISMS OF PANICOID GRASSES
Sheeba Varughese, Dr. Emily Niemeyer and Dr. Max Taub, Southwestern University, Georgetown, TX

P16 GJ THE DETECTION AND ISOLATION OF CELLULASES FROM LOCAL ENVIRONMENTS
Paul Whitehurst*, Armen Nalian, Alexandra Martynova-Van Kley, Steven F. Austin State University, TX

P17 G DETERMINATION OF THE LON RECOGNITION SITE ON THE UMUC PROTIEN IN *ESCERICHIA COLI*
S.E. Williams*, Southwestern University, Georgetown, TX and M. Gonzalez, Southwestern University, Georgetown, TX

P18 CJ MOLECULAR GENETIC ANALYSIS OF TWO LONG-LIVED MUTATIONS IN *DROSOPHILA MELANOGASTER*
W. Ryan Williamson* and Ted Brummel, Department of Biology Sam Houston State University, Huntsville, TX

BOTANY
Session I
Friday Morning, March 3 • BIO 102

10:30	S	22	THE DEVELOPMENT OF SPINES IN AFRICAN STAPELIADS Travis Block and David E. Lemke*, Department of Biology, Texas State University, San Marcos, TX
10:50	GJ	23	A FLORA OF THE DEAD HORSE MOUNTAINS, BIG BEND NATIONAL PARK, TEXAS Joselyn Fenstermacher, Sul Ross State University, Alpine, TX
11:10	S	24	VEGETATION AND STAND STRUCTURE OF A COLUMBIA BOTTOMLANDS FOREST REMNANT David J. Rosen*, U. S. Fish and Wildlife Service, Houston, TX, and Diane De Steven, USDA Forest Service, Southern Research Station, Center for Bottomland Hardwoods Research, Stoneville, MS
11:30	GJ	25	GAS EXCHANGE OF THREE SEDGES AND A GRASS AT VARIOUS LIGHT LEVELS E. R. Wayne, Department of Earth and Environmental Science, and O. W. Van Auken, Department of Biology, University of Texas at San Antonio, San Antonio, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

BOTANY
Session II
Friday Afternoon, March 3 • BIO 102

2:40	S	26	ANTHERIDIOGEN SYSTEMS IN FERNS OF WALKER COUNTY, TEXAS Joan E. N. Hudson, Department of Biological Sciences, Sam Houston State University, Huntsville, TX
4:00			**Outstanding Texas Educator Lecture – Science Auditorium**
5:20			**All Section Chairs Meeting – Science Auditorium**

BOTANY POSTERS

P19	GJ	RECRUITMENT AND COMPOSITION OF MACROALGAL SPECIES ALONG THE ROCKY JETTIES OF PACKERY CHANNEL IN CORPUS CHRISTI, TEXAS Ryan L. Fikes, Texas A&M University-Corpus Christi, Corpus Christi, TX
P20	GJ	PHYSIOLOGICAL RESPONSES OF *JUNIPERUS ASHEI* SEEDLING TO SIMULATED DROUGHT Mitsuru Furuya* and Paul N. Jurena, Department of Earth and Environmental Sciences, and O.W. Van Auken, Department of Biology, University of Texas at San Antonio, San Antonio, TX
P21	S	SOILS, HYDROLOGY, VEGETATIVE ECOLOGY, AND FLORISTICS OF NATURAL AND CONSTRUCTED WETLANDS ALONG THE LEON RIVER IN THE WEST CROSS TIMBERS, COMANCHE COUNTY, TEXAS Jeff Brister* and Allan Nelson, Department of Biological Sciences, Tarleton State University, Stephenville, TX
P22	G	COMPARISON OF POLLEN MORPHOLOGY OF *QUERCUS* L. SPECIES FROM DIFFERENT EAST TEXAS HABITATS Oksana O. Matryniuk* and James E. VanKley, Stephen F. Austin State University, Nacogdoches, TX

CHEMISTRY
Session I
Friday Morning, March 3 • GEO 108

8:00	S	27	EXCITED STATE CHEMISTRY OF 3,4-DIHYDRONAPHTHALENE OXIDE Benny E. Arney, Jr.*, Rick C. White, and Katherine White Stanfield, Sam Houston State University, Huntsville, TX
8:20	CJ	28	SIMPLE PROTECTION OF CARBONYL COMPOUNDS VIA BISMUTH NITRATE CATALYZED REACTION Clarissa Alvarez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX
8:40	CJ	29	AN EXPEDITIOUS IODINE-INDUCED THREE COMPONENT REACTION Isabella Garcia, Ramon Garza and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX
9:00	C	30	DEVELOPING AN OPTICAL CHEMOSENSOR FOR PHOSPHATE ANIONS Melissa Hill, St. Edward's University, Austin, TX
9:20	CJ	31	SYNTHESIS OF ANTICANCER BETA LACTAMS THROUGH CYCLOADDITION REACTION Jocabed Marquez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX
9:40	S	32	INTEGRATING MOLECULAR MODELING INTO THE UNDERGRADUATE CHEMISTRY CURRICULUM Thomas B. Malloy, Jr.*, Department of Chemistry, University of St. Thomas, Houston, TX and Tung Tran, Department of Biology and Biochemistry, Rice University, Houston, TX
10:00			**Break – Setzer Center**
10:30	C	33	LEAD CONTENT OF IMPORTED CANDIES AND THEIR WRAPPERS Michael M. Looney, David A. Mauk*, and Miguel P. Puga, Chemistry Department, Schreiner University, Kerrville, TX
10:50	C	34	AN INVESTIGATION OF THE CHEMICAL CONSTITUENTS OF VARIOUS BRANDS OF PERFUMES USING GAS CHROMATOGRAPHY AND MASS SPECTROMETRY Dahlia I. Campbell, St. Edward's University, Austin, TX
11:10	S	35	THE HEAT OF COMBUSTION OF ORGANO-CLAYS Alyx S. Frantzen, Stephen F. Austin State University, Nacogdoches, TX
11:20		36	A CORRECTED VALUE FOR THE CEC OF THE STANDARD CLAY SCA-3 Alyx S. Frantzen, Stephen F. Austin State University, Nacogdoches, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

CHEMISTRY POSTERS

P23 CJ BISMUTH NITRATE-INDUCED REACTION OF INDOLE WITH CARBONYL COMPOUNDS
Calista Aguilar, Jocabed Marquez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

P24 CJ BISMUTH NITRATE-INDUCED REACTION OF INDOLE WITH CARBONYL COMPOUNDS
Hector Aguilar, Karen Gomez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

P25 S METHYLATED DERIVATIVES OF 3,4-DIHYDRONAPHTHALENE OXIDE: EFFECTS OF SUSTITUENTS ON PHOTOCHEMISTRY
Benny E. Arney, Jr., Rick C. White, Michelle Black*, and Katherine White Stanfield, Sam Houston State University, Huntsville, TX

P26 CJ A NEW APPLICATION OF THERMO-RESPONSIVE POLYMERS
Jason Bragdon,* Chunmei Li, Stephen F. Austin State University, Nacogdoches, TX

P27 CJ ENANTIOMERIC SEPARATION USING MODIFIED SMECTITE CLAYS
Katie Clark, Stephen F. Austin State University, Nacogdoches, TX

P28 GJ THE USE OF SOLUTION CALORIMETRY TO DETERMINE CLAY IDENTITY BASED UPON ENTHALPY OF HYDRATION OF EXCHANGEABLE CATIONS IN MONTMORILLONITES
Jason Cole* and Dr. Alyx Frantzen, Stephen F. Austin State University, Nacogdoches, TX

P29 CJ WANDERING THE EXCITED STATE SURFACE OF BENZONORBORNADIENE ANALOGS
Benny E. Arney, Jr.*, Rick C. White, and Gydeon Gilzow, Sam Houston State University, Huntsville TX

P30 GJ PREDICTING BIOLOGICALLY IMPORTANT PROPERTIES USING SOLUBILITIES AND THE ABRAHAM GENERAL SOLVATION MODEL
Chelsea Givens*[a], Stephanie Keownb, Dawn M. Stovallb, Kaci R. Hooverb, William E. Acree, Jr.[b] and Michael H. Abraham[c], [a]NASA University Research Center, Texas Southern University, Houston, Texas, [b]Department of Chemistry, University of North Texas, Denton, TX ,[c]Department of Chemistry, University College London, London

P31 S IMPROVEMENTS IN PROTEIN DIGESTION
Robert Holloway, Schreiner University, Kerrville, TX

P32 CJ HIGH EFFICIENCY MICELLAR CHROMATOGRAPHY OF HYDROPHOBIC ANALYTES ON POLY(DIMETHYLSILOXANE) MICROCHIPS
‡Gregory T. Roman, *Kevin McDaniel and ‡Christopher T. Culbertson, ‡ Kansas State University, Department of Chemistry, Manhattan, KS, Texas Southern University, Houston, TX

P33 GJ THE SYNTHESIS AND ANALYSIS OF MAGNETIC NANOPARTICLES
Apollonia McMillan*, Dr. Kelley Bradley2, and Dr. Antony Jeeverajan, NASA University Research Center, Texas Southern University, Texas Southern University, Houston, TX; Human Adaptation & Countermeasures, NASA-JSC, Houston, TX

P34 CJ ISOLATION AND STRUCTURAL MODIFICATION OF EUGENOL
Marcelliono Medina, Louis Canales and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

P35 CJ SYNTHESIS OF MIXED-VALENT GOLD BROMIDE PEROVSKITES
D'Vesharronne J. Moore*, NASA University Research Center, Texas Southern University, Houston, TX, Dana E. Gheorghe, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX, Zhongjia Tang, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX, Arnold M. Guloy, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX

P36 CJ LEAD CONTAMINATION IN MEXICAN CANDIES AND THEIR WRAPPERS
Michael M. Looney, David A. Mauk, and Miguel Puga*, Chemistry Department, Schreiner University, Kerrville, TX

COMPUTER SCIENCE
Session I
Friday Morning, March 3 • GEO 213

8:20 S 37 DEVELOPING A FUZZY LOGIC SYSTEM FOR DIAGNOSIS USING A COMPOSITE INDEX
John A. Ward* and Stephen A. Harrison, Brooke Army Medical Center, Fort Sam Houston, TX

8:40 C 38 NAVIGATIONAL RESEARCH IN AUTONOMOUS ROBOTS
Rose Hogan*, Iris Beltran*, Xing Jin*, Bindiya Mansharamani*, CS Wired, Lamar University, Beaumont, TX

9:00 C 39 ART GALLERY APPLICATION AT TEXAS STATE UNIVERSITY
Steven P. Bitner, Texas State University, San Marcos, TX

9:20 G 40 THE BARRIERS ESL TEACHERS FACE WHEN USING CALL APPROACH IN SOUTH TEXAS
Shao-Chieh Lu, Texas A&M University-Kingsville, Kingsville, TX

9:40 CJ 41 ATMOSPHERIC REFRACTION IN A GLOBAL ILLUMINATION ENGINE
Cameron Rivers, St. Edward's University, Austin, TX

10:00 Break – Setzer Center

11:50 Sectional Business Meeting

12:00 Lunch – Setzer Center Ballroom

1:15 TAS Business Meeting – Science Auditorium

1:45 Distinguished Texas Scientist Lecture – Science Auditorium

CONSERVATION AND MANAGEMENT
Session I
Friday Afternoon, March 3 • GEO 200

2:40 S 42 ASPECTS OF THE LIFE HISTORY OF THE SAN FELIPE GAMBUSIA, *GAMBUSIA CLARKHUBBS*
Robert J. Edwards, Department of Biology, University of Texas-Pan American, Edinburg, TX, and Gary P. Garrett, HoH Fisheries Science Center, Texas Parks and Wildlife Department, Ingram, TX

3:00 CJ 43 COMPARISON OF FLIGHT HEIGHTS BEFORE AND AFTER THE ADDITION OF POWER LINE MARKERS AT A WATERBIRD COLONY IN SOUTHEAST TEXAS
Colt Westbrook* and Andrew C. Kasner, Department of Biology, Center for Coastal and Marine Studies, Lamar University, Beaumont, TX

4:00 **Outstanding Texas Educator Lecture – Science Auditorium**

5:20 **All Section Chairs Meeting – Science Auditorium**

CONSERVATION AND MANAGEMENT POSTERS

P37 G GREEN BUILDINGS TO THE RESCUE – USING CLEAN, RENEWABLE ENERGY
Seri, Sirisha, Boddu, Akshitha, Dr. Enno Koehn, Lamar University, Beaumont, TX

P38 CJ INITIAL CHARACTERIZATION OF A REPRODUCTIVE CHEMICAL SIGNAL IN THE RED-EARED SLIDER TURTLE (*TRACHEMYS SCRIPTA*)
Corrina D. Fox*, Diana K. Comuzzie and Robert Holloway, Schreiner University, Kerrville, TX

ENVIRONMENTAL SCIENCE
Session I
Friday Morning, March 3 • BIO 200

8:00 GJ 44 CHANGES IN VEGETATION COMPOSITION IN CONSTRUCTED WET PONDS IN CENTRAL TEXAS
Margaret M. Russell* and David E. Lemke, Department of Biology, Texas State University, San Marcos, TX

8:20 S 45 ACRYLAMIDE IN CARBOHYDRATE-RICH PROCESSED FOODS
Mohamed H. EL-Saeid*, Plant Protection Dept., Faculty of Food and Agric, King Saud Univ. Riyadh, KSA and John B. Sapp, Chemistry Department, Texas Southern Univ., Houston, TX

8:40 G 46 GROWTH OF TWO SUNFLOWERS AND TWO GRASSES AT INCREASING SOIL LEAD LEVELS
Andrea Anderson*, Department of Earth and Environmental Science, and O.W. Van Auken, Department of Biology, University of Texas at San Antonio, San Antonio, TX

9:00 GJ 47 VOLATILE ORGANIC COMPOUND DETERMINATION OF THE SEABROOK AIR MONITORING PROJECT
Latrice B. Babin, Siobhan L. Tarver, Gabriel Kristano, Felicia L. Conley, Renard L. Thomas, and Bobby L. Wilson, NASA University Research Center for Biotechnology & Environmental Health, Texas Southern University, Houston, TX

9:20 G 48 INVESTIGATION OF *JUNIPERUS* WOODLAND REPLACEMENT SPECIES
Matthew Grunstra* and O.W. Van Auken, University of Texas at San Antonio, San Antonio TX

9:40 S 49 RELATIONSHIP BETWEEN VEGETATIVE COVER AND DUNE STABILITY ON SOUTH PADRE ISLAND, TEXAS
Frank W. Judd*, Kenneth R. Summy, Robert I. Lonard, and Ruben A. Mazariegos, The University of Texas-Pan American, Edinburg, TX

10:00 Break – Setzer Center

10:30 GJ 50 RECYCLED/RENEWABLE ENERGY SOURCES
Vaibhavkumar Pandya, Lamar University, Beaumont, TX

10:50 CJ 51 PRELIMINARY ANALYSIS OF VOLATILE ORGANIC COMPOUNDS (VOCS) AND TRACE METALS PRESENT IN THE FRESNO COMMUNITY DRINKING WATER
Lindsey S. Scott*[1], Denae Ki[illegible]ard Thomas, Ph.D[3], and Lovell Jones, Ph.D[2] [1]NASA University Rese[illegible]ty, Houston TX, [2]UT MD Anderson Cancer Center CURE Summer Intern, Texas Southern University, Houston, TX, [3]UT MD Anderson Cancer Center, Center for Research on Minority Health, Houston, TX

NO ORAL PRESENTATION; SEE POSTER 41

11:10 S 52 VEGETATIVE CHANGE DETECTION ANALYSES FOR DUNE AREAS OF SOUTH PADRE ISLAND BASED ON THEMATIC MAPS DEVELOPED FROM AERIAL COLOR INFRARED PHOTOGRAPHS
Kenneth R. Summy*, Frank W. Judd, Robert I. Lonard, and Ruben A. Mazariegos, The University of Texas-Pan American, Edinburg, TX

11:30 GJ 53 USING GIS AND HYDROLOGICAL MODELS TO EVALUATE POTENTIAL ENVIRONMENTAL HEALTH RISKS IN SUPERFUND SITES, MISSION, TEXAS
H. Herrera 1, Dr. Y. Asim . 2, Dr. J. L. M. Cortez 2, Dr. R.A. Mazariegos, 2 The University of Texas-Pan American

11:50 Sectional Business Meeting

12:00 Lunch – Setzer Center Ballroom

1:15 TAS Business Meeting – Science Auditorium

1:45 Distinguished Texas Scientist Lecture – Science Auditorium

ENVIRONMENTAL SCIENCE POSTERS

P39 C EFFICACY OF SODIUM CHLORIDE CONCENTRATIONS ON THE BACTERIALOGICAL REMEDIATION OF AQUEOUS SUSPENSIONS OF PETROLEUM PRODUCTS
Tracie King, Justin Gates*, Gary Stanlake, and Richard Garner, Hardin-Simmons University, Abilene, TX

P40 CJ TRACE METAL ANALYSIS OF LAKE HOUSTON WATER USING INDUCTIVELY COUPLED MASS SPECTROMETER (ICP-MS)
Edidiong Obot*[1], Charmaine Little[1], Aref El-Demerdash[2], Renard Thomas[2], Bobby Wilson[3], [1]Space and Environmental Science Internship Program (SESIP), Texas Southern University, Houston, TX, [2]Environmental Research Technology Transfer Center (ERT2C), Texas Southern University, Houston, TX, [3]SESIP Program Director, Texas Southern University, Houston, TX

P41 CJ PRELIMINARY ANALYSIS OF VOLATILE ORGANIC COMPOUNDS (VOCS) AND TRACE METALS PRESENT IN THE FRESNO COMMUNITY DRINKING WATER
Lindsey S. Scott*[1], Denae King, Ph.D[2], Richard Hajek, Ph.D[2], Renard Thomas, Ph.D[3], and Lovell Jones, Ph.D[2], [1]NASA University Research Center, Texas Southern University, Houston TX, [2]UT MD Anderson Cancer Center CURE Summer Intern, Texas Southern University, Houston, TX, [3]UT MD Anderson Cancer Center, Center for Research on Minority Health, Houston, TX

FRESHWATER AND MARINE SCIENCE
Session I
Friday Morning, March 3 • SCIENCE AUDITORIUM

8:20	S	54	A COMPARISON OF POREWATER AMMONIUM LEVELS BETWEEN VEGETATED AND UNVEGETATED SEDIMENTS Ruben Trevino*, Thomas Whelan III and Hudson DeYoe. Center for Subtropical Studies and Chemistry/Biology Depts., University of Texas-Pan American, Edinburg,TX
8:40	G	55	BIOTIC DIVERSITY OF MID-SHELF BANK COMMUNITIES IN THE NORTHWESTERN GULF OF MEXICO Claudia Friess*, Richard T. Kraus, Jay R. Rooker, Texas A&M University at Galveston, Galveston, TX
9:00	GJ	56	APPLESNAIL (*POMACEA CANALICULATA*-COMPLEX) FEEDING SELECTIVITY ON WETLAND MACROPHYTES OF SOUTHEASTERN TEXAS Leah D. Cartwright*, Lyubov E. Burlakova, Alexander Y. Karatayev, and David N. Hollas, Stephen F. Austin State University, Nacogdoches, TX
9:20	C	57	MICROSTRUCTURE OF BEARDED SEAL (*ERIGNATHUS BARBATUS*) VIBRISSAE SUGGESTS ADAPTATIONS FOR BENTHIC FORAGING Heidi L. Amin* and Christopher D. Marshall, Texas A&M University at Galveston, Galveston, TX
9:40	S	58	FRESHWATER MUSSELS UNIONIDAE IN TEXAS: TRENDS IN DIVERSITY Lyubov E. Burlakova*, Alexander Y. Karatayev, and Daniel L. Bennett, Stephen F. Austin State University, Nacogdoches, TX
10:00			**Break – Setzer Center**
10:30	CJ	59	THE SNAIL OR THE EGG? EARLY LIFE HISTORY FACTORS CONTRIBUTE TO INVASIVE SUCCESS OF APPLESNAILS Matthew A. Barnes*, Southwestern University, Georgetown, TX, and Romi L. Burks, Southwestern University, Georgetown, TX
10:50	S	60	SPRING ECOSYSTEMS OF THE TEXAS HILL COUNTRY: ECOLOGICAL STRUCTURE, A CONSIDERATION OF THEIR IMPORTANCE, THREATS TO THEIR EXISTENCE, AND EFFORTS FOR THEIR CONSERVATION T.L. Arsuffi, Field Station, Texas Tech University, Junction, TX
11:10	S	61	BAHIA GRANDE RESTORATION: INTERIM SEDIMENT RESULTS, 2005 Joe C. Luna, Carlos Martinez, Thomas Whelan III* and Hudson DeYoe. Center for Subtropical Studies and Departments of Chemistry and Biology, University of Texas-Pan American, Edinburg, TX
11:30	CJ	62	THE REESTABLISHMENT OF FISH POPULATIONS IN THE BAHIA GRANDE Anthony Reisinger*, David Hicks, and Erika Blanco. The University of Texas at Brownsville, Brownsville, TX and E. Anthony Reisinger Jr, Texas Sea Grant
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

FRESHWATER AND MARINE SCIENCE
Session II
Friday Morning, March 3 • BIO 203

8:20	G	63	RESOLUTION OF *PERKINSUS MARINUS* CHROMOSOMES USING PULSED FIELD GRADIENT GEL ELECTROPHORESIS Elisa Moreno*, Michael Lehker, and David Hicks. The University of Texas at Brownsville, Brownsville, TX
8:40	S	64	POTENTIAL SPREAD AND ECOSYSTEM IMPACTS OF *LIMNOPERNA FORTUNEI* IN TEXAS Alexander Y. Karatayev*, Lyubov E. Burlakova, Stephen F. Austin State University, Nacogdoches, TX, Dianna K. Padilla, Stony Brook University, Stony Brook, NY, and Demetrio Boltovskoy, Universidad de Buenos Aires, Buenos Aires, Argentina
9:00	S	65	EFFECT OF SEDIMENT NUTRIENT ADDITIONS ON SEAGRASS GROWTH IN OLIGOTROPHIC AND EUTROPHIC AREAS OF THE LOWER LAGUNA MADRE, TEXAS Hudson DeYoe* and Joseph Kowalski, Center for Subtropical Studies and Biology Dept., University of Texas-Pan American, Edinburg, TX
9:20	GJ	66	MERCURY CONCENTRATIONS IN FISH FROM CADDO LAKE, TEXAS Matthew M. Chumchal (Zoology Department, University of Oklahoma), Ray W. Drenner (Biology Department, Texas Christian University), Brian Fry (Coastal Ecology Institute, Louisiana State University), D. J. Lutz-Carrillo (A.E. Wood Lab, Inland Fisheries, Texas Parks and Wildlife Department), K. David Hambright (Biological Station and Zoology Department, University of Oklahoma), William C. McClain (Biology Department, Texas Christian University) and Leo Newland (Biology Department, Texas Christian University)
9:40	CJ	67	DISTINCT PALETTES: FEEDING PREFERENCES BETWEEN NATIVE AND EXOTIC APPLESNAIL POPULATIONS Brandon B. Boland* and Romi L. Burks, Southwestern University, Georgetown, TX, Mariana Meerhoff, Claudia Fosalba, and Néstor Mazzeo, Departamento de Ecología, Facultad de Ciencias, Uruguay
10:00			**Break – Setzer Center**
10:30	GJ	68	ONTOGENOUS PREY SPECIFIC SELECTION AMONG YELLOW MUD TURTLES (*KINOSTERNON FLAVESCENS*) Jeff H. Bardwell* and Christopher M. Ritzi, Department of Biology, Sul Ross State University, Alpine, TX
10:50	GJ	69	BENTHIC COMMUNITY REDEVELOPMENT FOLLOWING RESTORATIONS AT BAHIA GRANDE David Hicks, Tamara Young*, and Javier Garcia. The University of Texas at Brownsville, Brownsville, TX
11:10	GJ	70	THE INFLUENCE OF PHYSICOCHEMICAL FACTORS AND WIND-INDUCED RESUSPENSION ON MICROALGAL AND ZOOPLANKTON COMMUNITY ASSEMBLAGES IN A SHALLOW COASTAL EMBAYMENT, SOUTH BAY, TEXAS Jennifer S. Stone, Texas A&M University, Galveston, TX
11:30	GJ	71	HABITAT USE OF THE TEXAS RIVER COOTER (*PSEUDEMYS TEXANA*) IN SPRING LAKE, HAYS COUNTY, TEXAS Linda C. Osborne*, Thomas R. Simpson, Francis L. Rose, Floyd Weckerly. Wildlife Ecology Program, Department of Biology, Texas State University-San Marcos, San Marcos, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

FRESHWATER AND MARINE SCIENCE POSTERS

P42 G LONG-TERM DYNAMICS OF UNIONID DIVERSITY IN THE NECHES RIVER BASIN, TEXAS
Daniel L. Bennett*, Lyubov E. Burlakova, Alexander Y. Karatayev, Stephen F. Austin State University, Nacogdoches, TX

P43 CJ BAHIA GRANDE RESTORATION: INTERIM WATER QUALITY REPORT, 2005
Erin Bieberbach*, Ruben Trevino, Antonio Villarreal, Hudson DeYoe and Thomas Whelan III. Center for Subtropical Studies and Biology/Chemistry Depts., University of Texas-Pan American, Edinburg,TX

P44 ? SOILS, HYDROLOGY, VEGETATIVE ECOLOGY, AND FLORISTICS OF NATURAL AND CONSTRUCTED WETLANDS ALONG THE LEON RIVER IN THE WEST CROSS TIMBERS, COMANCHE COUNTY, TEXAS
Jeff Brister* and Allan Nelson, Department of Biological Sciences, Tarleton State University, Stephenville, TX

P45 S DISTRIBUTION OF A DRAGONFLY AT ITS ALTITUDINAL LIMIT
Mark Gustafson, Texas Lutheran University, Seguin, TX

P46 CJ ECOLOGY OF THE MAYFLY *CAMPSURUS DECOLORATUS* IN LAKE MCQUEENEY, TEXAS
Hannah Johnson*, Dustin Wyatt, and Mark Gustafson, Texas Lutheran University, Seguin, TX

P47 ? INDUCTION AND ACTIVITY OF SUPEROXIDE DISMUTASE (SOD) ISOZYMES IN *AIPTASIA PALLIDA*
Thuy Le, Jessen Rajan*, and Joanne Romagni, University of St. Thomas, Dept. of Biology, Houston, TX

P48 CJ OCCURENCE OF MICROCYSTIN-LR AND ITS POTENTIAL EFFECT ON AQUATIC ORGANISMS IN TWO TEXAS RESEVOIRS
Ben C. Shin[1]*, Charles E. Stanley[2], Fabiola Urena-Boeck[2],[3] & Bryan W. Brooks[2],[3], [1]Department of Biology, [2]Center for Reservoir and Aquatic Systems Research, [3]Department of Environmental Studies, Baylor University, Waco, TX

P49 CJ A COMPARISON OF POREWATER AMMONIUM LEVELS BETWEEN VEGETATED AND UNVEGETATED SEDIMENTS
Ruben Trevino*, Thomas Whelan III and Hudson DeYoe. Center for Subtropical Studies and Chemistry/Biology Depts., University of Texas-Pan American, Edinburg,TX

GEOLOGY AND GEOGRAPHY
Session I
Friday Morning, March 3 • GEO 101

8:20 S 72 EVOLUTION OF GALVESTON ISLAND AND THE BOLIVAR PENINSULA, TEXAS
R. LaRell Nielson*, Joe McShane, Chris A. Barker, and Patricia S. Sharp, Department of Geology, Stephen F. Austin State University, Nacogdoches, TX

8:40 GJ 73 APOMORPHIC IDENTIFICATION OF FOSSILS AND THE IMPACT ON PALEOECOLOGIC INTERPRETATIONS
Christian O. George, Department of Geological Sciences, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

9:00 GJ 74 AN EXAMINATION OF THE ROLE OF CAVES AS REPOSITORIES OF UNIQUE PALEONTOLOGICAL DATA
Christopher N. Jass, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

9:20 CJ 75 GEOLOGICAL INTERPRETATIONS OF REMOTE SENSING IMAGES
Charlotte Kharas*, Istvan Csato, Collin County Community College, Plano, TX

9:40	S	76	STRUCTURE AND GEOLOGIC EVOLUTION OF EXTENSIONAL BASINS: SE IDAHO Joseph M. Kruger*, Department of Earth and Space Sciences, Lamar University, Beaumont, TX, and Martin L. Eversaul, Brian G. Hennings, Tracy J. Crane, Arron D. Pope, Department of Geosciences, Idaho State University, Pocatello, ID
10:00			**Break – Setzer Center**
11:10	S	77	ECOLOGICAL POSITION OF FOSSIL HOMINIDS FROM THE LATE QUATERNARY OF DIE KELDERS CAVE 1, SOUTH AFRICA Dennis R. Ruez, Jr., Department of Geology and Geography, Auburn University, Auburn, AL
11:30	S	78	SIGNIFICANCE OF FISH OTOLITHS FROM THE CERVESA LOCAL FAUNA FROM THE GATUN FORMATION (MIOCENE) OF PANAMA Gary L. Stringer*, Geosciences, The University of Louisiana at Monroe, Monroe, LA; R. B. Brown, Instituto Nacional de Antropologia E Historia, Chihuahua, MX; Dana Cope, Sociology and Anthropology, College of Charleston, Charleston, SC; and James Westgate, Earth & Space Science, Lamar University, Beaumont, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

GEOLOGY AND GEOGRAPHY
Session II
Friday Afternoon, March 3 • GEO 101

2:40	CJ	79	EVOLUTION AND DEVELOPMENT OF HYDROTHERMAL VENTS AT MID-OCEAN RIDGES Shane Mcgary* and Philip D. Rabinowitz, Dept. of Geology & Geophysics, Texas A&M University, College Station, TX
3:00	S	80	STRATIGRAPHY OF THE BURRO CANYON FORMATION AND INTERTONGUED DAKOTA SANDSTONE-MANCOS SHALE IN THE CHAMA BASIN, NORTH-CENTRAL NEW MEXICO Donald E. Owen, Angelique M. Forgas, Shawn A. Miller, Lamar University, and Donald E. Owen, Jr., Monsignor Kelly Catholic High School, Beaumont, TX
3:20	GJ	81	PRODUCTION AND USE OF LARGE-SCALE PANORAMIC PHOTOGRAPHY IN FIELD-BASED SCIENCES R.A. Ashmore, Department of Biological Sciences, Texas Tech University, Lubbock, TX
3:40	GJ	82	PRELIMINARY ANALYSIS OF HURRICANE RITA WITH RESPECT TO OTHER MAJOR HURRICANES THAT HAVE STRUCK THE GULF COAST ALONG THE TEXAS-LOUISIANA BORDER AND HOW THESE STORMS HAVE SHAPED THE GEOLOGY AND ECOLOGY OF THE REGION R.A. Ashmore, Department of Biological Sciences, Texas Tech University, Lubbock, T and D.E. Owen, Department of Earth and Space Sciences, Lamar University, Beaumont, TX
4:00			**Outstanding Texas Educator Lecture – Science Auditorium**
5:20			**All Section Chairs Meeting – Science Auditorium**

GEOLOGY AND GEOGRAPHY POSTERS

P50 G LATE-STAGE PYRITE FROM SOUTHERN ENDOCONTACT ZONE OF MAGNET COVE IGNEOUS COMPLEX, HOT SPRING COUNTY, ARKANSAS
Kevin R. Ausburn* and Volker W. Göbel, Department of Geology, Stephen F. Austin State University, Nacogdoches, TX

P51 S THE TAPHONOMY OF *ILYMATOGYRA ARIENTINA* IN THE BARTON CREEK WATERSHED: MAPPING THE ORIENTATIONS OF NEW DEPOSITIONAL BEDS
Tricia Jarrott, Kealing Magnet School and Christian George, The University of Texas at Austin, Austin, TX

P52 S THE TAPHONOMY OF *ILYMATOGYRA ARIENTINA* IN THE BARTON CREEK WATERSHED: MAPPING THE DISTAL LOCATIONS USING GIS
Lynn Kirby, , Marvelous Ikenehou, Rose Kent, Kealing Magnet School, Austin, Texas and Christian George, The University of Texas at Austin, Austin, TX

P53 S CHIHUAHUA, NORTHERN MEXICO AND MAGNET COVE, ARKANSAS CARBONATITES: A COMPARISON
Ravi C. Nandigam, Department of Chemistry and Environmental Sciences, University of Texas at Brownsville, Brownsville, TX

P54 S ONTOGENETIC CHANGE IN THE DENTITION OF A LATE LATE PLIOCENE COTTON RAT
Dennis R. Ruez, Jr., Department of Geology and Geography, Auburn University, Auburn, AL

P55 S FOLD CORRELATIONS SUGGEST THE MUSKHOG SPRING FAULT, BIG BEND NATIONAL PARK, IS A REACTIVATED LARAMIDE STRUCTURE
J.I. Satterfield*, Angelo State University, San Angelo, TX; R.A. Ashmore, Texas Tech University, Lubbock, TX; T.J. Courville, J.A. Maxwell, S.A. Miller, R.J. Stelly, and J.R. Turner, Lamar University, Beaumont, TX

P56 CJ HYDROTHERMAL VENTS AT MID-OCEAN RIDGES: A GLOBAL SYNTHESIS
Dax C. Soule*, Abdulgader Al Alli, Shane Mcgary, Chelsea Simmons, Timothy Mcgovern and Philip D. Rabinowitz, Dept. of Geology & Geophysics, Texas A&M University, College Station, TX

MATHEMATICS

Session I

Friday Morning, March 3 • GEO 205

10:30 S 83 SERVICE LEVEL NETWORK RELIABILITY MEASURE: AN EMPIRICAL BAYES APPROACH
Cheng C. Chen* and David Cecil, Mathematics Department, Texas A&M University-Kingsville, Kingsville, TX

10:50 S 84 BIAS REDUCTION IN KERNEL ESTIMATORS
E. D. McCune*, Department of Mathematics and Statistics, Stephen F. Austin State University, Nacogdoches, TX, and Sandra L. McCune, Department of Elementary Education, Stephen F. Austin State University, Nacogdoches, TX

11:10 S 85 THE HOMEOMORPHISM OF THE STONE-CECH AND WALLMAN COMPACTIFICATIONS OF NORMAL SPACES
Hueytzen J. Wu*, Texas A&M University, Kingsville, TX and Wan-Hong Wu, CTRC Institute for Drug Development, San Antonio, TX

11:50 **Sectional Business Meeting**

12:00 **Lunch – Setzer Center Ballroom**

1:15 **TAS Business Meeting – Science Auditorium**

1:45 **Distinguished Texas Scientist Lecture – Science Auditorium**

PHYSICS AND MATERIAL SCIENCE
Session I
Friday Morning, March 3 • GEO 205

8:40 CJ 86 QUANTUM PHENOMENA IN ATOMIC COLLISIONS BETWEEN NEON AND HELIUM ATOMS
Joseph Franklin Hunt*, and Cristian Bahrim, Department of Chemistry and Physics, Lamar University, Beaumont, TX

9:00 CJ 87 STELLAR EVOLUTION: THE ORIGIN AND FATE OF THE STARS AND OUR UNIVERSE
Jackie Seaman* and Cristian Bahrim, Department of Chemistry and Physics, Lamar University, Beaumont, TX

9:20 CJ 88 ADSORBATE EFFECTS ON THE H- IONS SURVIVAL NEAR Cu SURFACES
Jonathan Sterling* and Bogdana Bahrim, Department of Chemistry and Physics, Lamar University, Beaumont, TX

9:40 CJ 89 SPECTROSCOPIC ANALYZIS OF ATOMIC EMISSION SPECTRA
Joseph Young* and Cristian Bahrim, Department of Chemistry and Physics, Lamar University, Beaumont, TX

10:00 **Break – Setzer Center**

11:50 **Sectional Business Meeting**

12:00 **Lunch – Setzer Center Ballroom**

1:15 **TAS Business Meeting – Science Auditorium**

1:45 **Distinguished Texas Scientist Lecture – Science Auditorium**

PHYSICS AND MATERIAL SCIENCE POSTERS

P57 G DISALIGNMENT AND DISORIENTATION OF NEON ATOMS INDUCED BY HELIUM-NEON COLLISIONS
Vaibhav V. Khadilkar*, Department of Chemistry and Physics/Computer Science and Cristian Bahrim, Department of Chemistry and Physics, Lamar University, Beaumont, TX

SCIENCE EDUCATION
Session I
Friday Afternoon, March 3 • GEO 105

2:00 S 90 SCIENCE TEACHERS AS MENTORS IN A COLLEGE SCIENCE COURSE
Deborah Koeck and Sandra S. West

2:20 GJ 91 WATERSHED RESEARCH AND EDUCATION AT THE TEXAS TECH UNIVERSITY - JUNCTION OUTDOOR SCHOOL: CURING THE NATURE DEFICIT DISORDER FOR THE NEXT GENERATION OF TEXANS
Kaycie Sullivan, R. Hickerson and T.L. Arsuffi. Texas Tech University Center, Junction, TX

2:40 S 92 AN EXPLORATION OF THE EFFECTS OF ACTIVE LEARNING STRATEGIES ON LEARNER CHARACTERISTICS IN A HUMAN PHYSIOLOGY COURSE FOR NON-MAJORS
R. Russell Wilke* Angelo State University, Department of Biology, San Angelo, TX, and William J. Straits California State University – Long Beach, Department of Science Education, Long Beach, CA

3:00 G 93 NOT JUST A WALK IN THE WOODS: INFORMAL SCIENCE
Kiki Corry and Sandra S. West

3:20 S 94 GROUPS OF THE PERIODIC TABLE: AN INQUIRY APPROACH FOR MIDDLE SCHOOL SCIENCE STUDENTS
Lara M. Brown and Sandra S. West

4:00 **Outstanding Texas Educator Lecture – Science Auditorium**

5:20 **All Section Chairs Meeting – Science Auditorium**

SCIENCE EDUCATION POSTER

P58 C ACTION RESEARCH IN A COMPUTER-BASED GENETICS LABORATORY COURSE
Kiona Coleman*, R. Russell Wilke, Crosby W. Jones Jr., Angelo State University Department of Biology, San Angelo, TX

SYSTEMATICS AND EVOLUTIONARY BIOLOGY

Session I

Friday Morning, March 3 • GEO 105

8:40	S	95	TRADEOFFS ASSOCIATED WITH LEG REGENERATION IN STICK INSECTS (INSECTA: PHASMIDAE) Tara L. Maginnis, St. Edward's University, Austin, TX
9:00	S	96	A COMPARATIVE ANALYSIS OF DAWN CHORUS BEHAVIOR IN FIVE CHICKADEE SPECIES David E. Gammon, Biology Department, St. Edward's University, Austin, TX
9:20	GJ	97	INNER EAR ANATOMY OF THE GRAY SHORT-TAILED OPOSSUM: DIGITAL IMAGING OF A GROWTH SERIES Eric G. Ekdale, The University of Texas at Austin, Austin, TX
9:40	GJ	98	SEX-BIASED GENE EXPRESSION IN A ZW SEX-DETERMINATION SYSTEM John H. Malone[1]*, Doyle L. Hawkins, Jr. [2], and Pawel Michalak[1], [1]Department of Biology, The University of Texas-Arlington, Arlington, TX, [2]Department of Mathematics, The University of Texas-Arlington, Arlington, TX
10:00			**Break – Setzer Center**
10:30	S	99	A PRELIMINARY REVIEW OF THE LAND SNAIL FAUNA OF THE SIERRA MOJADA REGION OF WESTERN COAHUILA, MEXICO Ned E. Strenth*, Department of Biology, Angelo State University, San Angelo, TX, Alfonso Correo-Sandoval, Laboratorio de Zoologia, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México, and Lynn McCutchen, Department of Biology, Kilgore College, Kilgore, TX
10:50	GJ	100	GENETIC VARIATION IN THE BONNETED BAT: *EUMOPS GLAUCINUS* AND *EUMOPS FLORIDANUS* (CHIROPTERA: MOLOSSIDAE) Molly M. McDonough* and Loren K. Ammerman, Angelo State University, San Angelo, TX
11:10	GJ	101	VARIATION IN THE VERTEBRAL COLUMN AND TAIL SHIELD OF THE UROPELTIDAE (SERPENTES: ALETHINOPHIDIA) Jennifer C. Olori, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX
11:30	GJ	102	VOCALIZATIONS AND GROUP MOVEMENT OF MONK PARAKEETS (*MYIOPSITTA MONACHUS*) Elissa Wampler, St. Edward's University, Austin, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

SYSTEMATICS AND EVOLUTIONARY BIOLOGY POSTER

P59	CJ	BALD CYPRESS OF THE TEXAS HILL COUNTRY: TAXONOMICALLY UNIQUE? Brian Iken* and Dr. Deanna McCullough, University of Houston-Downtown

TERRESTRIAL ECOLOGY AND MANAGEMENT

Session I

Friday Morning, March 3 • BIO 106

8:20	S	103	THE RAPID DECLINE IN LEPIDOPTERA IN NORTHWESTERN WYOMING WILDERNESS AREAS FROM 2003-2005 Karolis Bagdonas, Sam Houston State University, Huntsville, TX
8:40	GJ	104	DO PHYSIOLOGICAL CHARACTERISTICS EXPLAIN THE INVASIVENESS OF *BOTHRIOCHLOA ISCHAEMUM*, KING RANCH BLUESTEM? Tamara S. Basham, The University of Texas at Austin, Plant Biology Graduate Program, Austin, TX
9:00	GJ	105	EXTRA-PAIR MATING TACTICS IN NORTHERN CARDINALS (*CARDINALIS CARDINALIS*): A TEST OF THE 'CONSTRAINED FEMALE HYPOTHESIS' Sheena K. Humbird* and Diane L.H. Neudorf, Sam Houston State University, Huntsville, TX
9:20	GJ	106	REASSESSING LIZARD COMMUNITY ASSEMBLAGES IN BIG BEND NATIONAL PARK Daniel J. Leavitt* and Christopher M. Ritzi, Department of Biology, Sul Ross State University, Alpine, TX
9:40	GJ	107	VEGETATIONAL CLASSIFICATION USING REMOTELY SENSED IMAGERY: SUPPORT FOR MANAGEMENT DECISIONS ON LYNDON B. JOHNSON NATIONAL GRASSLANDS, WISE COUNTY, TEXAS Caren McLemore*, University of North Texas, Denton, Texas and Brian Boe, University of North Texas, Denton, TX
10:00			**Break – Setzer Center**
10:30	G	108	CHANGES IN SMALL MAMMAL COMMUNITY COMPOSITION FOLLOWING PRESCRIBED FIRE MANAGEMENT IN A PONDEROSA PINE FOREST Timothy C. Mullet* and Christopher M. Ritzi, Sul Ross State University, Department of Biology, Alpine, TX
10:50	GJ	109	IMPACTS OF ANTHROPOGENIC SUPPRESSION AND FERTILIZATION ON MYCORRHIZAL ALLOCATION AND EFFECTIVENESS IN WESTERN GULF COAST GRASSLANDS Somereet Nijjer*, Rice University, Houston, TX, Evan Siemann, Rice University, Houston, TX, and William E. Rogers, Texas A&M University, College Station, TX
11:10	S	110	INTER-OBSERVER VARIATION IN DETECTION OF FROG CALLS DURING AUDITORY SURVEYS Benjamin A. Pierce*, Southwestern University, Georgetown, TX, and Kevin J. Gutzwiller, Baylor University, Waco, TX
11:30	S	111	EFFECTS OF INVASIVE EXOTIC PLANT SPECIES ON BIRD COMMUNITIES IN CENTRAL TEXAS PERIURBAN HABITATS Arlene Kalmbach*, Thomas R. Simpson, Floyd Weckerly, and John Baccus , Wildlife Ecology Program, Department of Biology, Texas State University-San Marcos, San Marcos, TX
11:50			**Sectional Business Meeting**
12:00			**Lunch – Setzer Center Ballroom**
1:15			**TAS Business Meeting – Science Auditorium**
1:45			**Distinguished Texas Scientist Lecture – Science Auditorium**

TERRESTRIAL ECOLOGY AND MANAGEMENT
Session II
Friday Afternoon, March 3 • BIO 106

2:40 S 112 INVASIVE PLANT SURVEY OF DYESS AIR FORCE BASE, TAYLOR COUNTY, TEXAS: PRELIMINARY FINDINGS FOR 2005
Herbert D. Grover*, Hardin-Simmons University, Abilene, TX, and Kim Walton, Natural Resources Manager, Dyess Air Force Base, Abilene, TX

3:00 GJ 113 CHANGES IN WETLAND VEGETATION AND EXOTIC SPECIES DISTRIBUTION IN CADDO LAKE, TEXAS
Christina Barlow* and James Van Kley, Stephen F. Austin State University, Nacogdoches, TX

3:20 G 114 COMMUNITY CHANGES ON TERRACES OF A SOUTH TEXAS RIVER
Janis K. Bush, Frederick A. Richter*, Department of Earth and Environmental Sciences, The University of Texas at San Antonio, San Antonio, TX, and Oscar W. Van Auken, Department of Biology, The University of Texas at San Antonio, San Antonio, TX

4:00 Outstanding Texas Educator Lecture – Science Auditorium

5:20 All Section Chairs Meeting – Science Auditorium

TERRESTRIAL ECOLOGY AND MANAGEMENT POSTERS

P60 S LAND-USE MAP OF JIM NED VALLEY, SOUTHERN TAYLOR COUNTY, TEXAS
Herbert D. Grover, Lauren Field*, Eric Hearn, Josh Bishop, Marilynn Angel, and Andrew Pilgrim, Department of Biology, Hardin-Simmons University, Abilene, TX

P61 C HABITAT USE BY SMALL MAMMALS AT CAMP MAXEY, LAMAR COUNTY, TEXAS
Dyana La Rosa*, James Van Kley and William B. Godwin, Stephen F. Austin State University, Nacogdoches, TX

P62 G DESCRIPTION OF POPULATIONS OF *POPULUS TREMULOIDES* (QUAKING ASPEN) IN THE DAVIS MOUNTAINS OF WESTERN TEXAS, USA
Frederick A. Richter*, Janis K. Bush, Department of Earth and Environmental Sciences, The University of Texas at San Antonio, San Antonio, TX, John Karges, The Nature Conservancy of Texas, Davis Mountains Preserve, Fort Davis, TX, and Oscar W. Van Auken, Department of Biology, The University of Texas at San Antonio, San Antonio, TX

P63 S A COPULATORY AID FOR VOLANT INSEMINATION IN BATS OF THE GENUS *LASIURUS*
Christopher M. Ritzi*, Department of Biology, Sul Ross State University, Alpine, TX

P64 G THE ALLELOPATHIC POTENTIAL OF *JUNIPERUS ASHEI*
Gwen P. Young*, The University of Texas at San Antonio, San Antonio, TX, and Janis K. Bush, The University of Texas at San Antonio, San Antonio, TX

THREATENED OR ENDANGERED SPECIES
Session I
Friday Morning, March 3 • BIO 102

8:40 S 115 FISHERY INVENTORY AND HABITAT ASSESSMENT OF SPRING LAKE AT AQUARENA CENTER
Raymond C. Mathews, Jr.* and Will Watson, Texas Water Development Board, Austin, TX

9:20 GJ 116 INITIAL CHARACTERIZATION OF GENETIC DIFFERENTIATION AMONG *GRAPTEMYS* SPP
Diana J. McHenry*, University of Missouri-Columbia, MO, Jim Godwin, Alabama Natural Heritage Program, Montgomery, AL, and Michael R. J. Forstner, Texas State University, San Marcos, TX

9:40 S 117 THE DEATH OF THE ENDANGERED SPECIES ACT?
Mike Robbins, Environmental Resources Management, Houston, TX

10:00 Break – Setzer Center

11:50 Sectional Business Meeting

12:00 Lunch – Setzer Center Ballroom

1:15 TAS Business Meeting – Science Auditorium

1:45 Distinguished Texas Scientist Lecture – Science Auditorium

THREATENED OR ENDANGERED SPECIES POSTER

P65 G DETECTION PROBABILITIES AND OCCUPANCY OF GOLDEN-CHEEKED WARBLERS AT THREE SITES IN THE BREEDING RANGE
Cyndee A. Watson* and Floyd W. Weckerly, Department of Biology, Texas State University, San Marcos, TX

ABSTRACTS

BIOLOGICAL SCIENCES

0 THE EFFECTS OF INTRACRANIAL AMPHETAMINE ON PACED MATING BEHAVIOR IN FEMALE RATS

Stephanie Troyer*, Russell J. Frohardt, Debra J. Hines, St. Edward's University, Austin, TX, and Fay A. Guarraci, Southwestern University, Georgetown, TX

The present study evaluated the effects of acute, intracranial administration of d-amphetamine (AMPH) on paced mating behavior and locomotor activity in ovariectomized female rats following estrogen and progesterone replacement. *Paced Mating Behavior* is a specific pattern of behavior exhibited by a sexually receptive female rat when presented with a sexually active male rat in a naturalistic and experimental setting (Erskine, 1989). The behavior consists of both proceptive (solicitous) and receptive (copulatory) behavior. Proceptive behavior includes hopping, darting, ear wiggling, and the pacing of the sexual stimulation received from the male rat (Beach, 1976). Receptive behavior is characterized by the distinctive lordosis posture, operationally defined as the dorsal flexion of the female rat's back in response to a mount by a male rat (Beach, 1976). Before each experiment, all rats were tested for baseline paced mating behavior and baseline locomotor activity. Each rat had 26-gauge-guide cannula implanted into each hemisphere and aimed at the nucleus accumbens (NAc) or the medial preoptic area of the hypothalamus (mPOA) for intracranial administration of AMPH or sterile saline. The rats were allowed to recover for 7 days before a final paced mating test and locomotion test, following the administration of either AMPH or saline.

In Experiment 1, female rats received an intracranial administration of AMPH (40 µg/µl) into the NAc shell at a rate of 0.1 µl/min for five minutes per side, while the control group received an equivalent infusion of saline. Infusion of AMPH into the NAc shell did not affect paced mating behavior, but did significantly increase locomotor activity compared to control rats. In Experiment 2, female rats received an intracranial administration of AMPH (10 µg/µl) into the mPOA at the rate of 0.1 µl/min, while a control group received an equivalent infusion of saline. These results indicated a significant increase of proceptive behavior relative to the control group, however, neither locomotor activity nor the pacing of sexual stimulation were significantly altered, Both the NAc and the mPOA have been shown to be important for paced mating behavior in female rats (e.g., Clark, Guarraci, & Megroz, 2003), however, administration of AMPH into these areas did not significantly alter paced mating behavior, as measured by contact return latency and percentage of exits.

1 MICRO CATFISH MICRO CATSCAN

Kerin M. Claeson*, The University of Texas at Austin, Austin TX, and John G. Lundberg, Department of Ichthyology, Academy of Natural Sciences, Philadelphia, PA

Computed tomography (CT) was developed in the mid 1970s and used to examine humans and other vertebrates in veterinary sciences. Microfocus CT, developed within the last decade, is similar to traditional CT scanning but allows for significantly greater resolution on small specimens. We present results from a study of the micro catfish *Sarcoglanis simplex* (Siluriformes:Trichomycteridae). The remarkably small size of this fish (<20mm, SL) and the sparse number of specimens raise difficulties for detailed examination of the skeletal anatomy in comparative morphological and phylogenetic research. Data were collected with the classical technique of clearing and staining (C&S) and the more contemporary approach of Microfocus CT. Results of this study demonstrate fundamental differences between these techniques, warranting discussion of the benefits of C&S and CT as separate entities and in combination. CT images are ready at once for illustration, are nondestructive, help to eliminate parallactic observations, and results are easy to distribute for study by others. C&S is inexpensive, cartilage can be counterstained, and improved digital imaging such as automontage for depth of field produces sharp illustrations. Additionally, when a small sample set is available, using both CT and C&S on the same specimen greatly reduces the need to dissect, disarticulate, and otherwise modify rare specimens.

2 MICROHABITAT USAGE AMONG JUVENILE AND ADULT *ELIMIA COMALENMSIS* (PLEUROCERIDAE) FROM COMAL SPRINGS, NEW BRAUNFELS, TX

Jeff A. Brooks*, University of Louisiana at Monroe, Monroe, LA, Russell L. Minton, Museum of Natural History, University of Louisiana at Monroe, Monroe, LA, Kathryn E. Perez, Institute for Science Learning, University of North Carolina at Chapel Hill and Duke University, Durham, NC, and Eugene D. Thibodeaux, University of Louisiana at Monroe, Monroe, LA

Members of the gastropod family Pleuroceridae represent one of the most imperiled groups of freshwater organisms in North America however, little information regarding life history exists for the group outside of the Mobile Basin and Atlantic slope. Previous studies of the Pleurocerid genus, *Elimia*, show that juvenile and adults will exploit different habitats in relation to flow with adults in low flow areas and juveniles in high flow areas. One particularly interesting and understudied *Elimia, Elimia comalensis* is restricted to the springs of the Edwards Plateau in central Texas with a distribution spanning several large river drainages. We examined microhabitat usage including flow, depth and vegetation cover among juvenile and adult *Elimia comalensis* from Comal Springs, New Braunfels, TX. The data will then be analyzed to determine if juveniles and adults exploit different habitats in a spring system.

3 CYPRESS CREEK HABITAT AND GROUNDWATER ASSESSMENT

J. Eric Dedden*, Glenn Longley, Edwards Aquifer Research and Data Center, Aquatic Resources Program, Texas State University, San Marcos, TX

Tributaries may serve as important refugia for recolonizing the main channel after disturbances (e.g., floods, droughts, pollution), and they are important habitats for early life stages of fish and invertebrates (Bruns et al. 1984; Rice et al. 2001). During March 2004 through March 2005, the relations among stream habitat, biota, and hydrologic conditions (surface and groundwater) were investigated in the spring-fed Cypress Creek, a tributary to the Blanco River near Wimberley, Texas. Macroinvertebrates, habitat, and fish assemblage were assessed at four sites along the tributary. Channel types were predominantly found to be low-gradient glides, pools, and runs with gravel, cobble, or bedrock streambeds, and a forest and scrub riparian zone. Along the stream margins, overhanging brush, undercut banks supported by roots, and downed trees create cover; within the channel, submerged aquatic vegetation provide the predominate cover. Temperature data indicate a relatively constant stream temperature of 20-21° Celsius, which presumably helps to provide suitable refugia for biota during summer drought periods. Fish-community composition was determined from samples collected at four sites along Cypress Creek. Classification of the fish into habitat-use groups and comparison to target fish communities developed for the Blanco River watershed are in progress. Groundwater data are being collected to construct potentiometric maps with which to delineate the primary directions of groundwater flow and assess the extent of surface water-groundwater interaction along Cypress Creek. Although observation wells are still being located and water levels continue to be monitored, a hydrologic gradient of 10-15 meters has been observed at several places within the study area. Prior to the present study, it had not been recognized that gradients of such magnitude existed over such areas of the watershed. During 2004 – 2005, streamflow data were collected at nine sites along a 5-mile reach of Cypress Creek. Streamflow records from the USGS gaging station at Jacob's Well (upstream limit of study area), as well as Flowtracker measurements at each of the nine sites, are being used to determine the seasonal patterns of streamflow gains and (or) losses within each reach. The fact that streamflow velocities dropped to zero at two of the nine sites during October 2005 indicates a need for future study to determine the minimum flow required to sustain this high quality ecosystem.

4 COMPARISON OF THE CATALYTIC ACTIVITIES OF THE WILD TYPE ENDOGLUCONASE FROM *PYROCOCCUS HORIKOSHII* AND ITS MUTANTS DEVELOPED BY COMPUTATIONAL APPROACH

Jorge Del Aguila*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX

Hyperthermophilic enzymes offer many advantages in industrial biotechnology and bioenergy. High temperatures result in low viscosity, high bioavailability, high catalytic rates, and low risk of microbial contamination. There are 45 known families of glycosyl hydrolases (GH) which can break cellulose. Many enzymes of the GH5 family are thermophilic and hyperthermophilic. A recently discovered member is ß-1,4 endoglucanase (EGPh) isolated from *Pyrococcus horikoshii*. Since EGPh is an attractive candidate for industrial use we propose to investigate the effect of site-directed mutants of this enzyme by determining their catalytical properties using avicel as a substrate. Specific sites for mutations will be suggested by computational analysis.

5 MOLECULAR CHARACTERIZATION OF BACTERIAL COMMUNITIES I OIL-CONTAMINATED SOILS OF EAST TEXAS
Alexander V. Fedotov*, Alexandra Martynova–Van Kley, Stephen F. Austin State University, Nacogdoches, TX

The goal of this project is to investigate the molecular microbial diversity of East Texas soil communities with different oil pollution histories and to identify the most abundant members of microbial populations. Soil samples were obtained from several oil-polluted sites in Kilgore, Rusk and Gregg counties of East Texas. Nearby uncontaminated locations with a similar hydrogeological regime were used as references to estimate the microbiological community present at the contaminated site before hydrocarbon exposure. PCR amplification of 16S rDNA was performed on the genomic DNA extracted from soil samples. Obtained PCR product was subjected to Denaturing Gradient Gel Electrophoresis (DGGE) and cluster analysis of community profiles was performed. Bands of interest were excised from the gel; extracted DNA was re-amplified and used for automated fluorescent DNA sequencing. Phylogenetic analysis of sequences from excised and re-amplified DNA fragments and sequences deposited in GenBank database at National Center for Biotechnological Information allowed identification of the predominant community members. The studies of spatial distribution of soil bacteria demonstrated the changes in diversity of populations of microbes at different depths within profile of oil-contaminated soil. Comparison of DGGE profiles of oil spill area with non-contaminated locations allowed reconstruction of the original bacterial diversity present at the site before soil contamination. Results of this study include data on richness of bacterial communities, crucial environmental factors influencing their diversity, and phylogenetic affiliation of their active members. Being an initial step of a project on construction of oil-degrading microbial consortia for soil clean-up, the study provides an insight into genetic diversity of indigenous soil bacteria.

6 PHYLOGENETIC ANALYSIS AND IDENTIFICATION OF SOUTHEASTERN USA EARTHWORMS USING 16S RDNA AND COI SEQUENCES.
Yulia Leonttieva*, Armen Nalian, Alexandra Martynova-VanKley, Stephen F. Austin State University, Nacogdoches, TX

Earthworms are important soil organisms that both produce humus and provide aeration. Despite their importance they are often difficult to identify to species using morphological features. Development of a genetic library would provide a more precise way of determining a species. In this research "nearly" 20 earthworm species from the southeastern USA, most belonging to the genus *Diplocardia*, were collected and identified by traditional morphological methods. 16S rDNA and COI sequences were determined for each and 34 sequences were submitted to the NCBI database. These sequences will enable rapid identification of Southeastern earthworms from the Genus *Diplocardia* in the future.

7 INVESTIGATION OF THE NUCLEAR IMPORT PATHWAY OF HUMAN IMMUNODEFICIENCY VIRUS TYPE 1 (HIV-1) INTEGRASE
Laura Martin*, Margaret Whitney, and Peter J. King. Department of Biology, St. Edward's University, Austin, TX

Productive infection of human immunodeficiency virus type 1 (HIV-1) in non-dividing cells requires active nuclear import of the viral pre-integration complex (PIC) prior to the integration of viral cDNA carried out by HIV integrase (IN). However, the viral and cellular proteins important for recognition of the PIC by the import machinery and the cellular nuclear import pathway utilized have yet to be elucidated. Various reports have demonstrated the importance of HIV IN itself for nuclear import of the PIC despite its lack of a canonical nuclear localization signal. In an effort to better understand the role of HIV IN in nuclear import, and to identify cellular proteins involved in the active import of HIV IN, we have constructed a green fluorescent protein (GFP):HIV IN fusion protein and expressed this fusion protein in the yeast *Saccharomyces cerevisiae*. We have demonstrated by epi-fluorescence microscopy that the GFP:HIV IN fusion protein is exclusively localized to the nucleus in contrast to the cytoplasmic localization observed with GFP alone. These results indicate that active nuclear import of HIV IN is occurring in yeast, as has been demonstrated in mammalian cells *in vitro*, and will allow further elucidation of the nuclear import pathway and cellular proteins involved utilizing the powerful genetic tools available for *Saccharomyces cerevisiae*.

8 A LABORATORY STUDY OF THE BEHAVIOR OF GRASS SHRIMP (*PALAEMONETES PUGIO*) IN RESPONSE TO PREDATORY KILLIFISH (*FUNDULUS GRANDIS*) AND NON-PREDATORY STRIPED MULLET (*MUGIL CEPHALUS*)
Richard Pollock* and Andrew C. Kasner, Department of Biology, Center for Coastal and Marine Studies, Lamar University, Beaumont, TX

In this laboratory study, several variables (no. shrimp grouping, no. groups, no. of shrimp moving) to measure the behavior of grass shrimp, *Palaemonetes pugio*, were observed in three treatments: in the presence of a predatory killifish *Fundulus*

grandis, in the presence of a non-predatory striped mullet, *Mugil cephalus*, and with no fish present. The results show grass shrimp behaved significantly different in the presence of a killifish, with increased grouping and reduced swimming compared to the other two treatments. Mullet caused less movement by shrimp but no difference in grouping behavior than when no fish was present. These results suggest that grass shrimp can discriminate between predatory and non-predatory fishes.

9 DIVERSITY OF ARBUSCULAR MYCORRHIZAL FUNGI IN EAST TEXAS HABITATS

Kevin Stroup*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX

Of the 250,000 known terrestrial plant species, nearly 90% have symbiotic relationships with Arbuscular Mycorrhizal Fungi (AMF) of the Phylum Glomeromycota (Helgason et al. 2003). Symbiotyc interactions take place at the root system of the host plant. AMF help plants to resist pathogen infection, tolerate drought and high soil salt levels, and they aid the plants in obtaining minerals. AMF also help cultivated plants to overcome transplantation shock. Species identification and estimation of diversity distribution using traditional a morphological approach is difficult and imprecise. DNA-based analysis holds promise as a fast and reliable method for species identification. DNA samples from roots of two widely-occurring native host plants, *Chasmanthium sessiliflorum* and *Callicarpa americana*, were collected from three different habitats. Using Glomeromycota specific primers, the 550 bp region of the 18S rDNA was amplified by PCR. More than 50 different clones from the six samples were sequenced and analyzed. As a result, a phylogenetic tree was developed reflecting relationships between them.

10 DEVELOPING A MODEL FOR MUCAB MUTAGENESIS: EXAMINATION OF POSTTRANSLATIONAL PATHWAYS FOR MUCA/MUCA' REGULATION IN *ESCHERICHIA COLI*

Ian R. Bothwell *and Martín Gonzalez. Department of Biology, Southwestern University, Georgetown, TX

The UmuDC proteins, responsible for translesion DNA synthesis in *Escherichia coli*, are the product of a complex series of transcriptional and posttranslational regulatory processes that are initiated by the presence of highly damaged DNA. Regulation of the UmuDC proteins has been extensively studied in *E. coli*; however, it has not been shown that UmuDC homologs adhere to the same model of regulation. Our study involves understanding the regulation of one set of proteins homologous to UmuDC: the MucAB proteins. The regulatory process of these proteins is of interest for two reasons: (1) the MucAB proteins are more mutagenic than the UmuDC proteins, and (2) the *muc*AB operon is found naturally on a plasmid, giving it a greater capacity to traverse between species. We have performed experiments to examine how these proteins are regulated. We show striking differences between UmuD/D' and MucA/A' posttranslational regulation.

11 STRESS PROTEINS IN CRAYFISH VENTRAL NERVE CORDS EXPOSED TO HIGH TEMPERATURE, SEVERANCE, ETHANOL AND UV EXPOSURE

Angela Nordin*, and Rebecca Sheller, Department of Biology, Southwestern University, Georgetown, TX

Stress proteins were identified in protein samples from crayfish ventral nerve cords after in *vivo* treatments of high temperature or ethanol, or an *in vitro* ultraviolet light exposure of the ventral nerve cord. Individual crayfish, acclimated at 22°C were subjected to high temperatures in a water bath, at 37°C (n=3) and at 40°C (n=2). The crayfish survived the 37°C treatment, but not the 40°C treatment, indicating that 37°C is near the upper limit for crayfish survival. Crayfish (n=2) were also subjected to 7% ethanol and survived the treatment. After the temperature or ethanol stress exposures, ventral nerve cords of the crayfish were dissected and analyzed. In the ultraviolet light exposure, the ventral nerve cord was first dissected and then subjected to a 30 minute, 900,000 Joule/cm^2 exposure at an ultraviolet light wavelength of 254nm. Dissected ventral nerve cords were separated into ganglia (cell body enriched tissue) and connectives (axon enriched tissue), prior to homogenization. Bradford Assays were performed to establish the amount of total protein in each sample and aliquots were run on 15% SDS PAGE gels. Commassie Blue stained proteins from control and treated ventral nerve cords appeared to be quite similar. Western Transfers were performed and the nitrocellulose blots were probed with mammalian heat shock and ubiquitin antibodies. The blots revealed inducible HSP 70 and constitutive HSC 70 proteins in control and stressed tissues. Ubiquitin was unreliably detected in some samples. The relatively high levels of stress protein in the crayfish nervous tissue may contribute to tissue survival after exposure to various harsh environmental insults.

12 CALORIC RESTRICTION AND INCREASED LONGEVITY OF *CAENORHABTIDIS ELEGANS* UNDER NORMAL AND STRESSFUL CONDITIONS

Fidlema A. O'Leary, Angela Lopez, Biology Department, St. Edward's University, Austin, TX

Caloric restriction has been identified as a factor in lengthening the lifespan of most organisms by slowing down metabolic processes (Hekimi and Lakowsski, 1998). Several studies have also suggested that extreme temperatures shorten the life of many organisms (Chang and Kenyon, 1993). The present study seeks to observe and measure the degree to which caloric restriction increases the life expectancy of *C. elegans* and investigate its power to over ride the reduction in longevity brought on by a stressful, high temperature environment. Nematodes were cultured on nematode growth medium (NGM), and fed different dilutions of *E-coli* (food). Nematode plates were incubated either at 25°C (normal conditions) or at 28°C (stressful, high temperature). The results indicate that caloric restriction does indeed have a substantial effect on longevity of *C. elegans* maintained at normal temperatures, (18 day *vs.* 13 day lifespan). However at higher temperatures, caloric restriction does not profoundly extend the life of *C. elegans* and is insufficient to overcome the adverse effects of temperature elevation. The ability of the stress response to influence and over-ride the response to caloric restrictions suggests an intersection of these regulatory pathways at the cellular and/or molecular levels, thus affecting the lifespan of *C. elegans*.

13 THE *PSEUDOMONAS AERUGINOSA* DNA-BINDING PROTEIN AMRZ CONTROLS TWITCHING MOTILITY AND BIOGENESIS OF TYPE IV PILI

Hernandez, Paulina*, Baynham, Patricia B., St. Edward's University, Austin, TX

Pseudomonas aeruginosa is an opportunistic pathogen that is commonly found in water and soil. In order to colonize surfaces with low water content, *P. aeruginosa* utilizes a flagella-independent form of locomotion called twitching motility, which is dependent upon the extension and retraction of type IV pili (tfp). AmrZ, previously identified as a DNA-binding protein required for transcription of the alginate biosynthetic operon, is also required for twitching motility. This regulation of twitching motility does not involve alginate production. Transmission electron microscopy analysis of an *amrZ* deletion strain failed to detect surface pili while the wild-type strain did posses these appendages. To examine expression and localization of PilA (the major pilin subunit) whole cell extracts and cell surface pilin preparations were analyzed by western blots. While the PilA levels present in whole cell extracts were similar for wild-type and *amrZ- P. aeruginosa*, the amount of PilA on the surface of the cells was drastically reduced in the *amrZ* mutant. These data show that AmrZ is required for the surface localization of tfp. There are eight operons in *P. aeruginosa* that are known to be necessary for tfp biogenesis. The promoter region of each of these operons was cloned, verified by sequence analysis, and tested for AmrZ binding via an electrophoretic mobility shift assay. The binding data will be positive if AmrZ directly regulates one of the known operons. However, it is possible that AmrZ regulates a gene(s) required for TM that has not yet been identified and/or that this regulation is indirect.

14 IDENTIFICATION OF GENES REGULATED BY THE AMRZ PROTEIN OF *PSEUDOMONAS AERUGINOSA*

Taggart T. Gauvain and Patricia Baynham, Department of Biology, St. Edward's University, Austin, TX

The opportunistic pathogen *Pseudomonas aeruginosa* expresses several characteristics that increase its virulence, including twitching motility and overproduction of the exopolysaccharide alginate. Twitching motility involves the flagella-independent movement across a solid surface while alginate overproduction affords protection from desiccation and the immune system. Both phenotypes are dependant on the AmrZ protein. This protein binds and activates the promoter of *algD*, the first gene in the biosynthetic pathway responsible for alginate production. The mechanism of AmrZ control of twitching motility is currently under investigation. In this study, genomic DNA was isolated from the PAO1 strain of *Pseudomonas aeruginosa* and subjected to a gSELEX (Systematic Evolution of Ligands by Exponential Enrichment) procedure to isolate gene fragments that were bound by AmrZ. Initial experiments isolated the AmrZ target at *algD* and so in the current study this sequence was deleted from the genome of the PAO1 strain used. DNA isolated via this technique was amplified using PCR and cloned into a pCR®4-TOPO plasmid vector and transformed into *E. coli* cells. Plasmids containing insert were then sequenced at The University of Texas at Austin DNA Core facility. One sequence that was not found in the *Pseudomonas aeruginosa* genome database has homology to the *seqA* gene in *E. coli*. The strain used in this study is not the same as the one used in the genome database and the significance of this gene is being analyzed. Further research will be needed to identify genes that are regulated by AmrZ.

15 UBIQUITIN AND HEAT SHOCK PROTEINS IN THE SEVERED VENTRAL NERVE CORD OF THE CRAYFISH, *PROCAMBARUS CLARKII*

Manjah Fernandez* and Rebecca Sheller, Southwestern University, Georgetown, TX

Ubiquitin is a highly conserved protein that may be involved in axonal degeneration processes of mammalian axons. We analyzed ubiquitin and other heat shock proteins in severed axons of the crayfish ventral nerve cord because this nervous system contains medial giant axons that can survive for months *in vivo* after they are severed from their cell bodies. Axons were severed for different lengths of time (5 hours, 1 day, 5 days, and 9 days) before dissection. Upon dissection, we observed a 2-3 mm gap between the rostral and caudal portions of the ventral nerve cord. Proteins from individual connectives (axon enriched samples) and ganglia (cell body enriched samples) surrounding the severance site were separated on SDS-PAGE gels, transferred to nitrocellulose and analyzed with mammalian antibodies. We confirmed that ubiquitin is present and detectable with a mammalian antibody in ventral nerve cords as well as samples of individual connectives and ganglia. We also confirmed that HSC70 and HSP 70 are abundant proteins in ventral nerve cord samples. These heat shock proteins may be involved in the survival of severed medial giant axons.

16 THE CLONING AND EXPRESSION OF *fimS*, A PUTATIVE SENSOR KINASE IN *PSEUDOMONAS AERUGINOSA*

Joseph Diaz*, April Sprinkle, Daniel J. Wozniak. Wake Forest University, Winston-Salem, NC, St. Edward's University, Austin, TX

Pseudomonas aeruginosa, a gram-negative aerobic rod-shaped bacterium, is responsible for greater than 95% of mortality of Cystic Fibrosis patients. Treatment of *P. aeruginosa* infections is difficult due to many virulence factors including twitching motility (TM), a solid surface translocation mediated by type-IV pili. Numerous data support the idea that TM is under the control of multiple two-component regulatory systems. AlgR, a response regulator of one two-component regulatory system has been identified as necessary for TM, however the corresponding sensor kinase has not yet been identified. It is hypothesized that FimS is the cognate sensor kinase interacting with AlgR to regulate TM. Although adjacent to AlgR in the genome, FimS has both histadine and asparagine residues which would make this an atypical sensor. The goal of this research was to clone and express *fimS* from *P. aeruginosa*. After purification, FimS may then be analyzed with regard to function as a kinase.

17 PATHOGEN INHIBITORY ACTIVITY OF INDIGENOUS *STREPTOMYCES* FROM LOWER RIO GRANDE VALLEY AGRICULTURAL SOILS

Atenea Garza, Christopher R. Little, and Anita Davelos Bains, Department of Biology, The University of Texas-Pan American, Edinburg, TX

The impact of soil microbial communities on plant health has been well documented. Soil symbionts and pathogen antagonists (microbes that inhibit plant pathogens) may improve plant health while disease caused by soil microbes can lead to reductions in crop yields and economic losses. Controlling pathogen activity via the use of natural antibiotic producing bacteria, in this case *Streptomyces*, is an ideal method for controlling economic losses in crops without the use of chemicals that can be harmful to humans due to long term exposure. There are a number of soil borne fungal pathogens affecting watermelon, cantaloupe and sorghum in the Lower Rio Grande Valley (LRGV) area. *Streptomyces* are well known antibiotic producing bacteria that appear to be promising candidates for biocontrol of many of these pathogens. In order to test the potential for biocontrol, twelve streptomycetes native to the LRGV were isolated from soil samples and their inhibitory activity was tested against six fungal pathogens: *Fusarium oxysporum f.s.p. lycopenrsiei, Didymella byroniae* (both cantaloupe and watermelon isolates), *Macrophomina phaseolina, Rizoctonia solanii, Sclerotium rolfsii* and *Aspergillus niger*. Standardized amounts of streptomycete isolates were inoculated in vitro and tested against each fungal pathogen. Each of these isolates expressed differences in their ability to inhibit pathogens. Three streptomycete isolates demonstrated broad based inhibition against other *Streptomyces* strains, yet when tested against fungal pathogens, they showed a narrow range of inhibitory activity. All streptomycete isolates tested were able to inhibit both *D. bryoniae* pathogens except for isolate WI2E #5 and 10 of the 11 'strep' isolates (including the three isolates with broad-based inhibitory abilities against other streptomycetes) could inhibit *F. oxysporum*. 4 isolates, WI1B #5, MA1-F4 #2, MA2-A4 #2, and WI24 #2, inhibited all 4 pathogens. It should be noted that none of these isolates belong to the group of isolates with broad-based inhibitory abilities. This indicates that broad inhibitory abilities against streptomycetes may not be indicative of antagonistic abilities towards fungal pathogens (i.e. biocontrol). A subset of streptomycete isolates were tested against the fungal pathogens *R. solani* and *S. rolfsii*. Only one isolate, WI1B #5, was able to inhibit the growth of *R. solani*. Data produced from protease activity tests indicate that protease activity is not an adequate indicator of antibiotic inhibition. The results obtained indicate a need for field based trails to investigate potential for effectiveness in disease control.

18 APPLESNAIL (*POMACEA CANALICULATA*-complex) POPULATION DYNAMICS AND CURRENT DISTRIBUTION IN UPPER TEXAS GULF COAST REGION

David N. Hollas*, Lyubov E. Burlakova, Alexander Y. Karatayev, Leah D. Cartwright, Stephen F. Austin State University, Nacogdoches, TX

The channeled applesnail (*Pomacea canaliculata*), an invasive species with a voracious appetite, has been a significant pest for rice growers in many countries in Southeast Asia. The first breeding population of *Pomacea canaliculata*-complex snails was found in the Rice Belt of the Texas Gulf Coast in 1989, and recently there have been increasing reports of established populations in the region. There is currently some concern about damage to native ecosystems and crops in Texas, given the history and aggressive spread of *P. canaliculata* and related species worldwide. A one-year study of these snails was conducted, including: current distribution, densities, and population dynamics. Methods included use of quadrat counts, timed searches, trapping, visual-spotting, and GPS mapping. Average snail densities were different among sampling sites, with a maximum recorded density of 44 snails/m^2 and biomass of 3.0 kg/m^2 found in ponds. Distribution studies on the upper Texas Gulf Coast included 314 sites, of which 44 were found to have *Pomacea canaliculata*-complex snails. The survey resulted in finding snail populations in 17 waterways and their tributaries, including the American Canal, Buffalo Bayou, Oyster Creek, Armand Bayou, Dickinson Bayou, Mustang Bayou, New Bayou, Bear Creek and Clear Creek (as of August 2005).

19 MOLECULAR DYNAMICS SIMULATIONS OF ENDOGLUCANASES FROM *PYROCOCCUS HORIKOSHII*

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Hyperthermostable endoglucanase from *Pyrococcus horikoshii* (EGPh) is expected to be a useful enzyme for cellulitic hydrolysis. The aim of this project is to identify specific residues that contribute to thermostability, pH tolerance, catalytic activity, and substrate specificity of EGPh by using Molecular Dynamics Simulations. A homology model of EGPh was constructed using the crystal structure of the endoglucanase from *Acidothermus cellulolyticus* (EGAc) since the primary structures of EGPh and EGAc share 45% sequence identity. The findings from these simulations will be used to suggest the specific residues for site-directed mutagenesis.

20 PURIFICATION AND CHARACTERIZATION OF AN ANTIHEMORRHAGIC FRACTION IN THE SERA OF THE VIRGINIA OPOSSUMS (*DIDELPHIS VIRGINIANA*)

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Snake venoms have an intricate mixture of proteins, most of which are toxicologically particular in their novel design. A notable type of protein found within some snake venoms are known as metalloproteinases. The hemorrhagic activity induced by the venom metalloproteinase(s) is due to the fact that they are zinc dependent enzymes that digest components of the extracellular matrix proteins. The Virginia opossum (*Didelphis virginiana*) sera have shown a high tolerance to hemorrhagic snake venoms. The biomedical value of this natural inhibitor can lead to the development of new therapeutics for an assortment of ailments and diseases involved with metalloproteinases. Isolation of the antihemorrhagic fraction from the opossum serum was acquired via anionic batch procedure methods (Sephadex A-50), followed by anionic then size exclusion high performance liquid chromatography (HPLC) purification. An antihemorrhagic assay was used to determine the specific activity of the antihemorrhagic fraction(s) after each step of purification (Batch and HPLC). Crude serum had a specific activity of 29 mm/µg. Initial fractionation of the crude serum via anionic batch procedure yielded 12 fractions of which three active fractions (fractions 7, 8, 9) each had a specific activity of 654 mm/µg. The three fractions were pooled and separated by anion exchange HPLC giving 8 fractions in which active fraction 5 had a specific activity of 1429 mm/µg. Fraction 5 was separated by size exclusion HPLC to give 4 fractions in which fraction 1 had a specific activity of 1475 mm/µg. SDS-PAGE revealed that the purified antihemorrhagic fraction 1 from size exclusion HPLC had a molecular weight of about 67 kDa.

21 USING GENETICS TO UNRAVEL ENVIRONMENTAL FACTORS CRITICAL FOR DETERMINING LONGEVITY

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Remarkable progress has been made in unraveling genetic factors important for regulating aging and longevity. Most studies have focused on performing longevity studies, where it is death itself that is used as a measure of aging. Since

these studies are carried out under extremely closely controlled conditions the artificial environment chosen may play a critical role in shaping longevity profiles. Two such factors: nutritional status (often referred to as caloric restriction) and colonization by microorganism have been demonstrated to have profound effects on longevity. A new longevity mutant *DJ817* has recently been identified which appears to extend longevity via a method of self-imposed caloric restriction. Interestingly, this mutant requires bacterial colonization in order to display its long-life phenotype. Molecular characterization of the locus reveals that the mutation affects a gene with homology to vertebrate proteins of unknown function. The unraveling of the method by which *DJ817* affects longevity may provide insight into how environmental factors affect longevity in *Drosophila* and potentially in vertebrates as well.

P1 EFFECT OF ANTHRAPYRAZOLES AP-10 AND AP-11 ON HUMAN MAMMARY (MCF-7) AND ENDOMETRIAL (HEC 1-A) ADENOCARCINOMA CELLS IN CULTURE

Carolina Boet and Maria E. Cuevas, Biology Department, Southwestern University, Georgetown, TX

Anthrapyrazoles (AP) are potent cytotoxic agents that intercalate with DNA, and are thus considered to be effective anticancer drugs. Derived from anthracyclines, these compounds were synthesized in an attempt to lower the high cardiotoxic side effects caused by their precursor. The objective of this study was to determine the cytotoxic effect of AP-10 and AP-11 on human HEC 1A (endometrial) and MCF-7 (breast) adenocarcinoma cell lines. Cell cultures were treated with different concentrations of AP- 10 and AP-11 (0.5-5uM) for one hour. Cells were allowed to recover for 48 hours in fresh media in the absence of compound, and cell viability was determined by trypan blue dye exclusion assays. The IC_{50} of AP-10 on HEC 1A and MCF-7 was determined to be 75nM and 0.35mM, respectively, whereas the IC_{50} of AP-11 on MCF-7 was found to be 0.42mM. We evaluated whether apoptosis was induced in cell cultures exposed to the predetermined IC_{50} of each compound. Western blot analysis showed Caspase 3 and 8 remained uncleaved in both cell lines, which suggested that activation of apoptosis did not occur in these cells. Using a microplate reader, an MTS assay was performed in order to supplement the dye exclusion data. The IC_{50} of AP-10 on HEC 1A and MCF-7 was determined to be 4mM and 1.5mM respectively, whereas the IC_{50} of AP-11 on HEC 1A and MCF-7 was found to be 7.65mM and 2.5mM respectively. Cell lines were treated with IC_{50} determined by MTS assay concentrations ranging from 0-20 mM as we thought the previously used cell treatment concentrations may have been too low to induce apoptosis. Analysis of DNA laddering, a hallmark of apoptosis, was consequently preformed. Gel electrophoresis showed no DNA fragmentation suggesting that cell death did not occur through apoptosis but through an alternate pathway.

P2 INVESTIGATING MUTANT Y451F IN GLUTAMATE RECEPTOR GLUR4 BINDING SITE USING VIBRATIONAL SPECTROSCOPY

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Glutamate receptors (GluR) are excitatory post-synaptic ligand-gated ion channels that promote fast synaptic communication between nerve cells in the central nervous system. Previous fluorescence studies on GluR4 subunit of AMPA subtype of GluR showed that the ligand glutamate interacts with tyrosine 451 in the ligand binding domain, and such interaction induces protein locking conformation. Fluorescence studies on mutant Y451F in GluR4 ligand binding domain indicated that glutamate binds less efficiently to mutant affecting glutamate docking conformation. We used Fourier Transform Infrared spectroscopy to characterize the unbound and the glutamate bound states of mutant Y451F in GluR4 subunit. We investigated the asymmetric vibrations of the 1C and 5C carboxylates of the ligand glutamate, and the SH stretching band of Cysteine 426 in the ligand binding domain, which are great markers for the interactions of the carboxylates and the α amine group of glutamate with the ligand binding domain. Comparison of the collected data for the mutant and wild type showed that the environment of 1C and 5C carboxylates of glutamate is similar in both wild type and mutant in the glutamate bound state, and that glutamate induces similar secondary structural changes in both mutant and wild type. The only difference observed between the two proteins was in the unbound state, which exhibited stronger interactions at the SH group in the mutant relative to wild type. These results suggested that the glutamate bound form of the mutant is similar in structure to wild type, and the local differences were observed in the two proteins' unbound state. Based on such results, we hypothesize that the lower binding affinity observed for the mutant is a result of the unbound state being more stable in the mutant relative to wild type.

P3 EFFECTS OF 4-OH TAMOXIFEN ON HEC 1B ENDOMETRIAL CANCER CELLS

Tracey Einem*, Carolina Boet, Dr. Maria Cuevas[1], Dr. Maha Zewail-Foote[2], Southwestern University, Georgetown, TX [1]Biology Department, [2]Chemistry Department

Tamoxifen, a well-known drug for breast cancer treatment, has been found to be an estrogen antagonist in the breast, but a partial estrogen agonist in the endometrium. In addition, tamoxifen metabolites have been shown to produce DNA adducts in a variety of tissues. In this study, we investigated the potential of 4-OH tamoxifen (4-OH TAM) to exert proliferative effects via an ER independent pathway. For this purpose, we used the ER negative endometrial cell line, HEC 1B and compared results with HEC 1A (ER positive) cells. We treated ER negative HEC 1B cells with different estrogen and 4-OH TAM concentrations ranging from 0-100mM and incubated at 37°C, 5% CO_2 atmosphere. Using a dye-exclusion assay and colorimetric method (MTS Assay) we observed that lower concentrations of 4-OH TAM had no effect on HEC 1B cell proliferation. However, at higher concentrations (10,100mM) cell proliferation was inhibited by almost 100% within 24 hours. When HEC 1B cells were treated with different doses of estrogen, we observed an initial proliferative response after 24 hours at low doses, followed by a partial inhibition of growth after 2 to 3 days. However, at the highest dose (100 mM), we observed a complete inhibition of cell proliferation. In contrast, estrogen receptor positive HEC 1A cells, were refractory to low dose estrogen but, like HEC1B cells, were completely growth inhibited by 100 mM estrogen. In order to determine if apoptosis is the underlying mechanism of cell death, we incubated HEC 1B cells with 10mM 4-OH TAM for 24 hours and assayed for DNA laddering and expression of pro-apoptotic proteins caspase 8 and cytochrome C. Preliminary data did not indicate involvement of an apoptotic pathway. These results suggest that 4-OH TAM is promoting cell death via necrosis.

P4 DEREGULATED EXPRESSION OF BRG1 AND E2F CELL CYCLE PROTEINS IN AN OVARIAN CANCER CELL LINE, PA-1

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Most cancers harbor defects in one of the G1/S (Rb pathway) cell cycle regulatory proteins, p16 or Rb. In stark contrast, 82% of ovarian cancers and 25% of breast cancers co-express p16 and Rb, thus appearing superficially not to have any Rb pathway deregulation. We previously showed, however, that infection of three p16+/Rb+ ovarian cancer cell lines with Ad-p16, an adenovirus that overexpresses functional p16, did not result in a G1 arrest, thus indicating existence of a defective Rb pathway in these cell lines. One of the p16-insensitive ovarian cancer cell lines, PA-1, showed an increase in hypophosphorylated (active) Rb following Ad-p16 infection, and the failure of active Rb to arrest cell growth suggested a defect in one of its downstream target proteins. We initially hypothesized that PA-1 may lack functional BRG1—the catalytic subunit of Swi/Snf chromatin remodeling complexes that aids Rb in suppressing the expression of genes that positively regulate the cell cycle. However, PCR and western blot analysis revealed both the presence of the BRG1 gene and overexpression of its protein product. We are currently analyzing the expression of E2F family members—transcription factors normally inhibited by active Rb and previously shown to be deregulated in some human cancers—in PA-1 cells. To-date, western blot analysis of E2F1 revealed that this protein was underexpressed relative to a non-tumor cell line, suggesting that it does not play a role in p16-insensitivity in the PA-1 cell line. Our presentation will include further data on the analysis of E2F3 expression.

P5 CHARACTERIZATION OF THE BACTERIA PRESENT IN LABORATORY STRAINS OF *DROSOPHILA*

Robyn Hall*, Christina Zellmer*, and Ted Brummel, Department of Biology Sam Houston State University, Huntsville, TX

The recent discovery that the longevity of *Drosophila* is positively affected by its commensal bacteria underscores the need to better understand the interactions between organisms and their microflora. We have identified mutants in which the elimination of commensal bacteria results in dramatically different phenotypes than those observed in wild type flies. In order to determine whether these differences reflect differential responses to the presence of symbiotic microorganisms or result from changes in the microflora present in these strains, we are carrying out an extensive characterization of the bacterial flora of *Drosophila* as a first step in addressing these important concerns. These results are presented in this poster.

P6 ASSESSMENT OF THE EFFICACY OF VARIOUS TECHNIQUES FOR SCREENING FOR WEST NILE VIRUS

Diana M. Hook* and Ted Brummel, Department of Biology Sam Houston State University, Huntsville, TX

West Nile virus is a flavivirus that can infect a wide range of animals including humans. The virus is vectored by *Culex pipiens* mosquitoes. West Nile Virus has quickly and vastly extended its geographic distribution, including several parts of the

United States, in just over a decade. Reliable detection of the presence of West Nile virus in its insect host has been a matter of interest and a method of obtaining accurate results in laboratory assays is still under investigation. Our laboratory experiments have focused on sensitive, cheap, and reliable methods of detecting West Nile virus that could be applied to the study of *Culex* mosquitoes of Southeast Texas. Our main focus has relied on the use of RT-PCR, though we are also testing antibody-based methods. Here we present the results of our studies.

P7 CARBONIC ANHYDRASE IN MOLTING CUTICLES OF THE SLIPPER LOBSTERS, *SCYLLARIDES LATUS*

Francis Horne. Biology Department, Texas State University, San Marcos, TX

The organic matrix of slipper lobsters, *Scyllarides latus*, serves as a site of ion concentration, crystal nucleation, crystal growth, and control of crystal morphology. Calcium and bicarbonate ions must be mobilized and deposited at the site of mineralization in a matter of hours. For this to occur : a) there must be an adequate supply of bicarbonate ions to provide carbonate ions, and b) there must be a means to remove protons. Non-enzymatic dehydration and hydration of carbon dioxide is a rather slow reaction, so an extracellular CA secreted along with matrix proteins might solve this dilemma. In this study cuticles (intermolt cuticle, new uncalcified cuticle, and old decalcified cuticle) were sectioned following standard histological techniques and treated with antibodies to bovine RBC CA II. Use of CA antibodies to localize the cuticle enzyme showed that only the highly calcified intermolt cuticles gave a strong positive reaction to the CA antibody. Neither the new forming cuticle or the old cuticle stained for CA antibodies. Apparently CA is secreted following molt since the new unmineralized cuticle does not stain for CA. Mineral and nutrient reabsorption prior to molt appears to remove any positive reaction to CA from the old cuticle. These data along with those showing weak reactions to CA in poorly mineralized cuticles suggest that extracellular CA may function along with intracellular CA in maintaining bicarbonate levels and/or removing protons.

P8 IT ISN'T EASY BEING GREEN: THE EFFECTS OF SIMULATED HERBIVORY AND WOUNDING ON THE GROWTH AND REPRODUCTION OF AN AMARANTHUS HYBRID

Sara Huie* and Daniel Taub, Southwestern University, Georgetown, TX

This study examines the effects of simulated herbivory and wounding on the growth and reproduction of an *Amaranthus hypochondriacus* X *A. cruentus* hybrid. Patterns of simulated herbivory include small and large perforations, leaf tip and base defoliation, and slicing. These treatments were performed at 2 levels of overall plant damage: 6% and 12%. Treatments were performed on the 4 youngest fully expanded leaves closest to the terminal inflorescences of 155 plants that were grown in the Southwestern University greenhouse. Variables related to plant fitness were compared among treatments, including plant and inflorescence heights, number of leaves and seeds produced, rate of leaf senescence, and plant biomass. Results for net leaf increase over time do not identify a pattern of defoliation or level of wounding that was more detrimental than any other treatment

P9 INVESTIGATION OF EXTRACTION PROCEDURES AND CHARACTERIZATION OF BACTERIALLY-PRODUCED BIOPOLYMERS

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Bacteria seldom exist as planktonic (free-floating) organisms. In most areas of the environment, such as soil, streams, oceans, and even in one's refrigerator, bacteria survive in biofilms. Biofilms consist of intricate structures with organizations of microbial microcolonies adhering to each other by exopolymers, which are made by the microbes and dispersed by aqueous channels or pathways. These exopolymers provide bacteria with safety from harsh and toxic conditions and a greater resistance to antibiotics. The most efficient method of exopolymer extraction from bacterial cells, the thermal properties of these exopolymers through the use of Differential Scanning Calorimetry (DSC), and effective techniques for creating exopolymer dry films for Dynamic Mechanical Analysis (DMA) flexibility studies were investigated. The data about the chemical composition and structure of the biofilm exopolymers may provide information for advances in antibiotic treatment of bacteria, toxic waste clean-up, and many other medical and biotechnological applications.

P10 COMPARISON OF POLLEN MORPHOLOGY OF *QUERCUS* L. SPECIES FROM DIFFERENT EAST TEXAS HABITATS
Oksana O. Matryniuk* and James E. VanKley, Stephen F. Austin State University, Nacogdoches, TX

The genus *Quercus* L. includes ca. 18 species native to the Pineywoods of far eastern Texas. While *Quercus* occurs in nearly all natural east Texas plant communities, many individual species occur under a narrow range of environmental conditions and are thus good indicators of habitat type. The current study describes a palynomorphological series of Texas *Quercus* species from the full range of local habitat types.

P11 PRESENCE OF PROTEIN 26 IN *ARTEMIA FRANCISCANA*
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Protein 26 (p26) is a small heat-shock/α-crystallin protein that can be found in the cysts of *Artemia franciscana*, otherwise known as brine shrimp. p26 is thought to act as a chaperone protein, assisting other proteins in proper folding so as to prevent the proteins from denaturing during extreme environmental conditions. p26 has been documented only in spawned cysts only. Its presence has never been studied in adults so the origin and timing of p26 synthesis are still unknown. This research attempts to clarify the point at which p26 is synthesized, whether it originates from nurse cells present in the mother's ovaries and then is loaded onto developing eggs or if it is synthesized by the developing eggs. We examined *Artemia* by using three types of assays for p26, the immunoblot, ELISA and PAGE followed by western blot. We found that our summer results were inconclusive. Test data showed that p26 was not only present in the encysted eggs or cysts but also in the larvae or nauplii and some adult males. In addition, we realized, later in the study, that the p26 antibody given to us was not pure.

P12 SMALL INTERFERENCE RNA (SIRNA)-MEDIATED SUPPRESSION OF OVEREXPRESSED CYCLIN E PROTEIN IN NIH-OVCAR-3 OVARIAN CANCER CELLS
Kristen Meerbrey* and Maria Todd, Department of Biology, Southwestern University, Georgetown, TX

Most human cancers have been found to have defects in key regulators of the cell cycle. The majority show loss of the retinoblastoma (RB) or p16 proteins and therefore, exhibit unregulated growth. However, we have previously shown that 82% of ovarian cancers coexpress RB and p16, which suggests that there are no G1/S transition defects in these cancers. Upon infection of the NIH-OVCAR-3 ($RB^+/p16^+$) ovarian cancer cell line with a recombinant adenovirus that over-expressed functional p16, we observed no difference in cell cycle distribution between uninfected and infected cells, indicating that the G1/S transition was indeed defective in these cells. Based on our previous work, we believe that the over-expression of cyclin E is responsible the p16 insensitivity found in NIH-OVCAR-3. In the current study, we used western blot analysis to confirm the over-expression of the 52 kdal wildtype form of cyclin E in addition to multiple low molecular weight (LMW) forms of the protein. In addition, we determined that the cyclin E protein in NIH-OVCAR-3 was degraded at the same rate as in a normal breast epithelial cell line, HBL-100. Finally, we have transiently transfected small interference RNA (siRNA) specific for cyclin E into NIH-OVCAR-3 cells in order to suppress its expression. Using this technique, we were able to inhibit wildtype expression by approximately 70% and completely inhibit LMW form expression. These data indicate that over-expression of cyclin E plays a major role in deregulation of the G1/S transition and suggest a possible means by which cyclin E expression may be down-regulated in cancer cells. We plan to access the effects of this inhibition on the growth and transformed properties of this ovarian cancer cell line.

P13 SENSITIVITY ASSAY INVOLVING VARIOUS TYPES OF BANDAGE TYPES TO MULTIPLE STRAINS OF COMMON MICROORGANISMS FOUND IN NECROTIC WOUNDS
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Necrotic wounds are a serious and challenging health concern. Numerous innovative approaches have dramatically improved patient outcome. Wound dressing containing a variety of antimicrobial agents are currently available and constitute an important component of most treatment strategies. While general evaluations of the effectiveness of these dressings exists, relatively few quantitative, side by side studies have been performed. Most of those studies that have attempt-

ed to provide such comparisons have been carried out in liquid cultures where bacteria grow in a planktonic state bearing little resemblance to the bacterial growth found in wounds. We propose to use a plate assay to establish the efficacy and range of action of a number of popularly used treatments on a number of rapidly growing, commonly found organisms: *Candida albicans*, *Pseudomonas aeruginosa*, *Enterococcus Faecalis*, and methicillin resistant *Staphylococcus aureus*. We have observed significant differences in the relative efficacy of the different treatments amongst these microorganisms. We propose that medical professionals, in order to maintain the most effective treatment, incorporate culturing of the organisms found in the necrotic wound, to determine which treatment eliminates the organism most effectively.

P14 EIMERIA SPECIES DETECTION AND IDENTIFICATION IN POULTRY

Andrew Syvyk*, Armen Nalian, Irina Teplova, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogoches, TX

Coccidiosis, caused by the protozoan Eimeria, is recognized as the parasitic disease that has the greatest economic impact on poultry production. The cost to the American broiler industry is approximately $700 million per year. Worldwide, the cost is over $1 billion per year. This project will develop a tool that will detect which species/strain of coccidioses-causing Eimeria is attacking the flock. Proven treatments can then be immediately applied. This will be accomplished by using PCR and amplifying a specific Eimeria marker gene from infected chicken samples. A technique called DGGE will then be employed to distinguish between the different species of coccidia. Using pure Eimeria cultures and samples from both infected and non-infected chickens, it will be possible to determine the conditions for DNA extraction and PCR, and verify that the marker gene of choice will differentiate between each of the Eimeria species.

P15 SALT TOLERANCE MECHANISMS OF PANICOID GRASSES

Sheeba Varughese, Dr. Emily Niemeyer and Dr. Max Taub, Southwestern University, Georgetown, TX

Soil salinity can negatively affect the growth and over all health of plants. While most are negatively affected by soil salinity, salt tolerance, however, varies from species to species. Studies in some grass subfamilies show a pattern of increased tolerance with higher concentrations of the osmoticant glycine betaine and lower concentrations of ions within their tissues. The salt tolerance mechanisms for the grass subfamily Panicoideae, however, have not been thoroughly examined. We monitored the growth of the newest leaf as well as leaf firing of 7 different species of Panicoid grasses and found that most of these species were negatively affected by soil salinity, although the degree of damage varied. One species, in fact, did significantly better with salt in the soil. Currently we are refining HPLC techniques to measure glycine betaine concentrations in plant samples to see whether a correlation between glycine betaine levels and salt tolerance exists for these grasses. Results thus far have shown that our method for glycine betaine detection was not distorted by the plant extracts themselves. Further experiments include measuring bioelectric activity of Zea mays as a measure of salt tolerance.

P16 THE DETECTION AND ISOLATION OF CELLULASES FROM LOCAL ENVIRONMENTS

Paul Whitehurst*, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacodoches, TX

We propose to undertake the detection and isolation of cellulases from local environments, particularly those where cellulose degradation occurs on a large scale (e.g. forests, lakes). Total genomic DNA from a microbial population in an environmental sample will be isolated and screened for cellulolytic enzymes using the technique of filter PCR (Kirchman, et al., 2001). This technique involves the filtration of a water sample through a series of polycarbonate membranes, in order to trap the bacterial fraction present in the sample. Sections cut from these filters are then subjected to PCR using a primer set designed to amplify a particular gene sequence. Originally, the technique was used in a study of bacterial diversity, using primers specific for a portion the 16S rRNA gene. In order to isolate the cellulases of a particular hydrolase family, the PCR of the filter sections will be performed using the appropriate degenerate primers.

P17 DETERMINATION OF THE LON RECOGNITION SITE ON THE UMUC PROTIEN IN *ESCERICHIA COLI*

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DNA damage producing single-stranded DNA cannot be traversed by DNA polymerase III. In order to continue replication the cell must use DNA polymerase V, an error-prone polymerase that can undergo trans-lesion synthesis. Since DNA pol V is error-prone it must be regulated to avoid excessive mutations. One form of regulation is protein degradation and one of

the components of DNA pol V, UmuC, is degraded readily by the Lon protease. To better understand the Lon-mediated degradation of UmuC we compared UmuC to a similar error-prone polymerase DinB. DinB and UmuC share significant amino acid sequence similarity and are both members of the Y superfamily of DNA polymerases. Intriguingly, DinB is considerably more stable *in vivo* than UmuC and also lacks a terminal carboxyl "tail" of amino acids found in UmuC, suggesting that this "tail" might contain the recognition site for Lon. We proceeded to create several plasmids which express increasing carboxyl-terminal deletions of the UmuC proteins. Our data strongly suggests that the carboxyl- terminus of the UmuC protein plays a key role in the Lon-mediated degradation of UmuC.

P18 MOLECULAR GENETIC ANALYSIS OF TWO LONG-LIVED MUTATIONS IN *DROSOPHILA MELANOGASTER*

W. Ryan Williamson* and Ted Brummel, Department of Biology Sam Houston State University, Huntsville, TX

Although the complete mechanism behind senescence remains unclear, genes are known to play a significant role. The importance of research on aging is rooted in the apparent inevitability of this phenomenon in most organisms, including humans. We have obtained two mutant lines of *Drosophila melanogaster* that live 40% longer than the wild type. One of these lines contains a point mutation in the P38b gene, a member of the MAP kinase gene family; the other has a P-element inserted into a putative olfactory gene. Currently, we are using RNA-Interference (RNA-I) to support a causal relationship between the mutations and the observed phenotype. Using a ubiquitous promoter to direct the expression of an RNA-I construct, the expression of the two genes in question will be downregulated allowing us to confirm the role of these genes in regulating longevity. Success in these studies will allow us to test the spatio-temporal requirements of these genes in regulating longevity.

BOTANY

22 THE DEVELOPMENT OF SPINES IN AFRICAN STAPELIADS

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Many botanists and succulent plant enthusiasts are familiar with the widely cultivated carrion flowers, *Stapelia gigantea* and *Orbea variegata*, but are unaware of the tremendous diversity in vegetative and floral morphology exhibited by the group to which these species belong. The stapeliads are an apparently monophyletic group classified in the tribe Ceropegieae of the milkweed subfamily (Asclepiadoideae) of the dogbane family (Apocynaceae). The group comprises approximately 30 genera and over 300 species native to the Old World and having their greatest diversity in Africa. The stapeliads are considered to be the most highly specialized members of the tribe and are mostly leafless stem succulents adapted to arid environments. The genus *Hoodia* consists of approximately 14 species native to southern and southwestern Africa that have tuberculate, often lignified, cylindrical stems that are provided with rigid or soft spines, giving the plants a distinctive cactus-like appearance. Anatomical observations on several species of the genus have found that the spines develop as outgrowths of the stem tubercles. Shortly after tubercle formation, a meristematic zone appears near the tubercle base. Periclinal divisions of the meristematic cells result in the development of a series of radially-elongate, thin-walled cells that differentiate into epidermal, cortical and vascular tissues. Eventually, the epidermal and cortical cells become sclerified to produce a more or less rigid spine. The general pattern of spine development in *Hoodia* appears to be similar to that described for several cactus species, but also exhibits some significant differences.

23 A FLORA OF THE DEAD HORSE MOUNTAINS, BIG BEND NATIONAL PARK, TEXAS

Joselyn Fenstermacher, Sul Ross State University, Alpine, TX

The Dead Horse Mountains of Big Bend National Park create a remote and forbidding viewscape on the west Texas park's eastern skyline. The range is a northern extension of the Mexican Sierra del Carmen, which is larger both in area and elevation. Situated towards the northern edge of the Chihuahuan Desert, the Dead Horse Mountains have a significant number of special plant species including rare, threatened, and endemic taxa. Unfortunately this area in its entirety is little known to botanical science, with no formal floristic studies of the National Park Service land on record. The main study objective is to document all vascular plants and their habitats within the range. Any lichens and bryophytes encountered are also being collected, with emphasis on documenting biological soil crust communities. With spring 2006 being the last collecting season, some important finds have already occurred including two potentially new species (*Senna* and *Sedum*), at least one

new U.S. record, *Seymeria falcata*, at least one range extension, *Haplophyton crooksii*, and the redocumentation of a rare Chihuahuan desert endemic *Andrachne arida*, 50 years after its last collection. General vegetation communities will be discussed as well as previous human use, fire history, and the historical botanical literature base.

24 VEGETATION AND STAND STRUCTURE OF A COLUMBIA BOTTOMLANDS FOREST REMNANT

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The Columbia Bottomlands encompasses the bottomland hardwood forests of the lower reaches of the Brazos, Colorado, and San Bernard Rivers. Comprising more than 283,000 ha at the beginning of the last century, these forests are now reduced to fragmented stands that are being destroyed or degraded through residential and commercial development, overgrazing, timbering, and exotic plant infestation. As the only forest expanses along the Texas Gulf Coast, the Columbia Bottomlands are considered nationally important as stopover and staging habitat for Nearctic-Neotropical migrant landbirds. To provide baseline information on vegetation composition and structure of these forest remnants, a floristic survey and quantitative study were conducted at the Dance Bayou Unit, a 263-ha satellite unit of the San Bernard National Wildlife Refuge. Collecting trips were supplemented with sampling of woody and herbaceous vegetation in twenty-five 250-m2 plots distributed across the major cover types. In total, surveys identified 356 species of vascular plants representing 83 families and 237 genera. Families containing the most species were Poaceae (54 spp.), Asteraceae (35 spp.), Cyperaceae (32 spp.), and Fabaceae (20 spp.). The largest genus was *Carex*, with 19 species. Non-native species accounted for 15% of all species. Across the entire forest tract, there were 3022 stems ha-1, of which 84% were in the understory (<7.5 cm dbh) and 9% in the subcanopy (7.5–20 cm dbh). Total basal area in the subcanopy and canopy was 33.2 m2 ha-1, of which 13% was in the subcanopy and 84% in the canopy (>20 cm dbh). Vegetation composition differed by microhabitat, and ordination analysis identified a well-defined association that fits within the *Acer rubrum - Fraxinus pennsylvanica* Seasonally Flooded Forest Alliance. Floristic and forest stand data can assist managers and conservationists in protection efforts for the Columbia Bottomlands.

25 GAS EXCHANGE OF THREE SEDGES AND A GRASS AT VARIOUS LIGHT LEVELS

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Grassland communities in central Texas have undergone significant change in the past 200+ years. Changes have resulted in a shift from grasslands to woodlands. As a result, light availability below the canopy has been reduced. The gas exchange responses of most of the plants in these communities are unknown. Species below the canopy may be shade tolerant species. Theory suggests that shade intolerant plants have high rates of maximum photosynthesis, dark respiration and light saturation, while shade tolerant plants have lower rates. Four herbaceous species were studied *Carex planostachys*, *C. perdentata* and *C. tetrastachya* all sedges, and *Aristida longiseta* a grass. Dark respiration (R_d), maximum photosynthetic rates (A_{max}) and light compensations points (C_i) varied significantly among different species ($P < 0.01$, $P < 0.05$ and $P < 0.01$ respectively). *Aristida longiseta* had the highest response values, R_d was -3.8 ± 0.5 µmol $CO_2 \cdot m^{-2} \cdot s^{-1}$, A_{max} was 13.1 ± 1.7 µmol $CO_2 \cdot m^{-2} \cdot s^{-1}$, C_i was calculated at 123 µmol$\cdot m^{-2} \cdot s^{-1}$and light saturation ($A_{sat}$) was ca. 1000 µmol$\cdot m^{-2} \cdot s^{-1}$. *Carex perdentata* generally had the lowest response values, R_d was -0.6 ± 0.3 µmol $CO_2 \cdot m^{-2} \cdot s^{-1}$, A_{max} was 7.3 ± 0.6 µmol $CO_2 \cdot m^{-2} \cdot s^{-1}$, C*i* was calculated at 5 µmol$\cdot m^{-2} \cdot s^{-1}$and light saturation was ca. 300 µmol$\cdot m^{-2} \cdot s^{-1}$. Results agree with current theory and suggest the *Carex* species are successful in reduced light environments while *Aristida longiseta* is a light obligate species.

26 ANTHERIDIOGEN SYSTEMS IN FERNS OF WALKER COUNTY, TEXAS

Joan E. N. Hudson, Department of Biological Sciences, Sam Houston State University, Huntsville, TX

Antheridiogens are hormones synthesized by fern gametophytes which cause premature formation of antheridia in young developing gametophytes. In some species, antheridiogens can also replace the light requirement for spore germination resulting in spore germination in darkness. The first antheridiogen system was described in *Pteridium aquilinum* in 1950. Since that time, several different genera of ferns have been shown to be sensitive to the *P. aquilinum* antheridiogen and antheridiogens have been biologically characterized in several different genera of ferns including both polypodiaceous and schizaeaceous ferns. In only two genera of schizaeaceous ferns, *Anemia* and *Lygodium*, have the antheridiogens been chemically characterized. Several ferns are native to Walker County in East Texas, representing several families. In addition

to *Pteridium aquilinum*, antheridiogen systems have been biologically detected in *Onoclea sensibilis Thelypteris kunthii, Thelypteris ovata* var. *lindheimeri* (planted as an ornamental), *Woodsia obtusa, Asplenium platyneuron*, and *Woodwardia areolata*. These ferns produce an antheridiogen which can be isolated from the culture media. The chemical structures of the antheridiogens are not known. Studies will continue involving the purification of antheridiogens from ferns of Walker County. Purification is the first step toward eventual chemical characterization of the antheridiogens.

P19 RECRUITMENT AND COMPOSITION OF MACROALGAL SPECIES ALONG THE ROCKY JETTIES OF PACKERY CHANNEL IN CORPUS CHRISTI, TEXAS

Ryan L. Fikes, Texas A&M University-Corpus Christi, Corpus Christi, TX

Benthic marine macroalgae play an important ecological role in coastal and estuarine ecosystems. Variations in abundance and diversity aid in the assessment of habitat function. Macroalgae on the rocky jetties of Port Aransas and Mansfield Pass, Texas have been previously characterized, but the new jetties of Packery Channel, located between, have not been studied. The purpose of this research is to monitor the initial recruitment of macroalgal species on the rocky jetties and assess seasonal variation in abundance and diversity of species. Recruitment was monitored by sampling the channel side of the south jetty. A 10cm^2 area was scraped and analyzed every two days for 52 days after initial rock placement. The channel and the gulf sides of the north and south jetties were examined in January 2006. Transects ran vertically at 10 locations, with quadrats (20 X 30cm) placed every 50cm. Species composition and biomass were determined for each sample. Data obtained from this study will assess the percent composition and biomass of the macroalgal community of the jetties. Future work includes seasonal variation data for the macroalgal community for the remainder of 2006. Belt transects, comprised of digital images taken every 5m, will also be used to analyze intertidal algal growth along the jetties for spring 2006.

P20 PHYSIOLOGICAL RESPONSES OF *JUNIPERUS ASHEI* SEEDLING TO SIMULATED DROUGHT

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Plants response to water stress is an important factor in determining plant abundance and distribution. The response of various *Juniperus* species to drought is an important research topic. Both photosynthesis and plant growth will change with water availability. In this study the response of *Juniperus ashei* seedlings to simulated drought was examined. The experiment was set up in a greenhouse. There were two experimental treatments, watered and un-watered, with 60 pots per treatment. *Juniperus ashei* photosynthetic rates (µmol/m^2/s), stomatal conductance rates (µmol/m^2/s), transpiration rates (µmol/m^2/s), water potential (Mpa) and soil moisture (%) were measured. After watering was halted, soil water content dropped quickly and was significantly different than the watered treatment within two weeks. At this time, the mean soil water content in the unwatered treatment was 46.7 % of the watered treatment at 12.8 % soil water content. However, the photosynthetic rates did not differ significantly from the watered treatment until week five of the experiment. In week five, photosynthetic rates in the unwatered treatment were 2.705µmol/m^2/s which was 42.8 % of the watered treatment. *Juniperus ashei* photosynthetic rates, stomatal conductance rates, transpiration rates and water potential appear to be out of phase from the soil moisture levels measured. The *J. ashei* seedlings can apparently control their stomata and therefore transpiration and photosynthesis during periods of water stress.

P21 SOILS, HYDROLOGY, VEGETATIVE ECOLOGY, AND FLORISTICS OF NATURAL AND CONSTRUCTED WETLANDS ALONG THE LEON RIVER IN THE WEST CROSS TIMBERS, COMANCHE COUNTY, TEXAS

Jeff Brister* and Allan Nelson, Department of Biological Sciences, Tarleton State University, Stephenville, TX

Two wetlands located along the Leon River in the West Cross Timbers, Comanche County, Texas were examined during this study. A wetland constructed during 1999 and a natural wetland established by beavers, were compared based upon soils, hydrology, and vegetative ecology. Comparative data was collected from transects along a baseline in each wetland for one year. Relative coverage, density, frequency, importance values and diversity were determined. In addition, a floral survey was conducted for two years. This data was examined to determine native versus introduced species, endemic species, threatened and endangered species, as well as range extensions and county records. Management strategies and resources for wetland restoration are also discussed.

P22 COMPARISON OF POLLEN MORPHOLOGY OF *QUERCUS* L. SPECIES FROM DIFFERENT EAST TEXAS HABITATS
Oksana O. Matryniuk* and James E. VanKley, Stephen F. Austin State University, Nacogdoches, TX

The genus *Quercus* L. includes ca. 18 species native to the Pineywoods of far eastern Texas. While *Quercus* occurs in nearly all natural east Texas plant communities, many individual species occur under a narrow range of environmental conditions and are thus good indicators of habitat type. The current study describes a palynomorphological series of Texas *Quercus* species from the full range of local habitat types.

CHEMISTRY

27 EXCITED STATE CHEMISTRY OF 3,4-DIHYDRONAPHTHALENE OXIDE
Benny E. Arney, Jr.*, Rick C. White, and Katherine White Stanfield, Sam Houston State University, Huntsville, TX

New studies into the photochemistry of 3,4-dihydronaphthalene oxide reject the accepted mechanistic model for the photochemistry of this system. New experimental and computational results will be shown and discussed.

28 SIMPLE PROTECTION OF CARBONYL COMPOUNDS VIA BISMUTH NITRATE CATALYZED REACTION
Clarissa Alvarez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

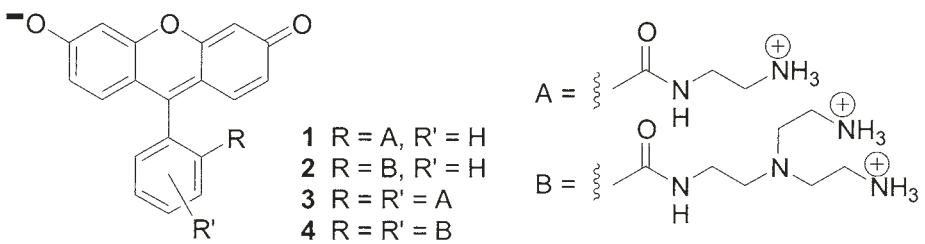
In spite of tremendous effort in devising protection of carbonyl groups, protection as 1-3-dioxalane remains the most practical choice. The most important shortcomings of the acid-induced methods are the long reaction time and conditions that require a high temperature and removing the water as an azeotrope with benzene and large excess amount of reagents. In this paper, we describe our study of the protection of carbonyl compounds as dioxalone using bismuth nitrate-catalyzed method at room temperature. In addition, useful chemoselectivty is also been achieved. The present method of protection of carbonyl compounds is very general, mild, cost-effective and convenient.

29 AN EXPEDITIOUS IODINE-INDUCED THREE COMPONENT REACTION
Isabella Garcia, Ramon Garza and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

Multi-component reaction is receiving much attention from the scientific community. In continuation of our current interest in the iodine-induced synthetic methods, we report here a three component reaction among aldehyde, ketones and carbamate toward the preparation of beta amino ketone derivatives in good yield. Although many other Lewis acids can be used for this purpose, the present method has advantages that include substrate generality and high yield. Considering the potential value of beta amino ketone for the synthesis of other biologically active compounds, this method may find application in organic chemistry.

30 DEVELOPING AN OPTICAL CHEMOSENSOR FOR PHOSPHATE ANIONS
Melissa Hill, St. Edward's University, Austin, TX

Nearly all aspects of cell life are regulated by reversible protein phosphorylation. The attachment and removal of a phosphate group from a protein can have profound effects on the protein's activities and properties. If an optical chemosensor can be constructed for detection of phosphate ions, we will have another tool with which to study cellular mechanics. Towards this end we have prepared a series of fluorescein derivatives (**1-4**) functionalized with polyamines *via* amide linkages. These are purified by semi-preparative HPLC, characterized by NMR and MS, and tested for phosphate activity using UV-vis absorbance and fluorescence emission spectroscopy.



31 SYNTHESIS OF ANTICANCER BETA LACTAMS THROUGH CYCLOADDITION REACTION

Jocabed Marquez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

Cycloaddition of imines with acid chloride in the presence of triethylamine is the best method for the synthesis of beta lactams. In general, this reaction can produce cis, trans or a mixture of cis-trans beta lactams depending upon the conditions of the experiments. Similar reaction with diaryl Schiff bases derived from polyaromatic amines surprisingly has produced trans beta lactams exclusively under standard conditions. Interestingly, some of these beta lactams have demonstrated impressive anticancer activity against various cancer cell lines in vitro. It has been observed that the anticancer activity depends on the nature of the group at C-3 and polyaromatic system at –N of the beta lactam ring.

32 INTEGRATING MOLECULAR MODELING INTO THE UNDERGRADUATE CHEMISTRY CURRICULUM

Thomas B. Malloy, Jr.*, Department of Chemistry, University of St. Thomas, Houston, TX, and Tung Tran, Department of Biology and Biochemistry, Rice University, Houston, TX

For the last several years, we have included molecular modeling in the undergraduate chemistry curriculum at the University of St. Thomas. This started as undergraduate research projects on specific molecular systems on which experimental work was underway at the time. Later, different students studied the conformations and energies involved in conformational inter-conversions in molecules where detailed experimental results were available for comparison. More extensive assignments were made in the physical chemistry laboratory course. As more user-friendly programs have become available, the use of modeling has been included in as part of the assignment in all the physical chemistry laboratory experiments. The next step, now underway, is to introduce the use of the modeling programs simultaneously into all the chemistry courses, beginning with general chemistry. Discussions of the pros and cons of this approach will be included.

33 LEAD CONTENT OF IMPORTED CANDIES AND THEIR WRAPPERS

Michael M. Looney, David A. Mauk*, and Miguel P. Puga, Chemistry Department, Schreiner University, Kerrville, TX

The dangers of ingesting lead, especially in childhood, are well documented. Some studies recently reported in the media have found a correlation between Mexican candies and cases of childhood lead poisoning. A few researchers have detected lead in some brands of imported Mexican candies sold in the United States. It has not been conclusively determined whether the lead contamination originates in the candy itself or the wrapper (Lynch R A, Boatright D T, Moss S K. Lead contaminated imported tamarind candy and children's blood lead levels. Pub Health Rep 115: 537-543, 2000). This ongoing project utilizes flame atomic absorption spectrophotometry to test several brands of candies, as well as their packaging material, for lead content.

34 AN INVESTIGATION OF THE CHEMICAL CONSTITUENTS OF VARIOUS BRANDS OF PERFUMES USING GAS CHROMATOGRAPHY AND MASS SPECTROMETRY

Dahlia I. Campbell, St. Edward's University, Austin, TX

This project is concerned with the analysis of various perfumes using Gas Chromatography/ Mass Spectrometry (GC/MS). A comparison of price and substance was performed to distinguish the perfumes. A temperature program to analyze each perfume was created and will be described. Once samples were run, the mass spectra of the peaks were analyzed for identification of different constituents. Verification was obtained by the analysis of pure samples of the suspected chemical constituents. The comparison was done using the spectra obtained from perfume samples against pure chemicals. The constituents in the perfume will be listed and the constituents of expensive perfumes will be compared to those of inexpensive perfumes.

35 THE HEAT OF COMBUSTION OF ORGANO-CLAYS

Alyx S. Frantzen, Stephen F. Austin State University, Nacogdoches, TX

Smectite clays have been modified using a series of tetraalkyl ammonium salts. These organo-clays were then subjected to combustion using bomb calorimetry. The results indicate a definite linear relationship between the heat of combustion of the guest molecule and the cation exchange capacity of the clay.

36 A CORRECTED VALUE FOR THE CEC OF THE STANDARD CLAY SCA-3
Alyx S. Frantzen, Stephen F. Austin State University, Nacogdoches, TX

The current accepted value for the cation exchange capacity, CEC, of the standard clay SCa-3, is 153 meq/100 g. (Mercier and Detellier, 1994) Intercalation of the porphyrin TMPyP into a series of clays with increasing CEC values and the subsequent determination of interlamellar distance indicated a discrepancy with the CEC value of SCa-3. A determination of the hydration energy of the same series of clays also indicated an inconsistency with the reported value of the CEC for SCa-3. As a result, a determination of the CEC of SCa-3 was performed using the ammonium exchange method of Busenberg and Clemency. (Busenberg and Clemency, 1973) The results of this procedure indicate a CEC value of 102±2 meq/100 g.

P23 BISMUTH NITRATE-INDUCED REACTION OF INDOLE WITH CARBONYL COMPOUNDS
Calista Aguilar, Jocabed Marquez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

Indole derivatives have found applications in the treatment of various types of medical disorders including cancer. In continuation of our research on the synthesis of medicinally challenging organic molecules, we report here a novel condensation reaction of indole with various carbonyl compounds using bismuth nitrate as catalyst. The effectiveness of other bismuth-derived salts is also tested. In most cases, bis-indole derivatives are the products. Many conventional Lewis acids produce products in low yield. The reaction also proceeds at room temperature under solvent less condition and therefore, may take an important role for the creation of environmentally benign chemistry.

P24 BISMUTH NITRATE-CATALYZED OXIDATION AND ACETYLATION OF BETA LACTAMS
Hector Aguilar, Karen Gomez and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

The role of beta-lactams as antibacterial agents is well known. The 3-substituted beta-lactams as medicinally important compounds or as the starting materials for the preparation of anti-infectious agents have been documented in several publications. Oxidation and acetylation of 3-hydroxy group in beta lactams would produce keto and acetate compounds. In this report, we describe a new bismuth nitrate-catalyzed oxidation and acetylation of the hydroxy group in the presence of acetic acid and acetic anhydride. This supports that minor change of conditions in the bismuth nitrate-catalyzed conditions can afford different useful products without using any sophisticated reagents.

P25 METHYLATED DERIVATIVES OF 3,4-DIHYDRONAPHTHALENE OXIDE: EFFECTS OF SUSTITUENTS ON PHOTOCHEMISTRY
Benny E. Arney, Jr., Rick C. White, Michelle Black*, and Katherine White Stanfield, Sam Houston State University, Huntsville, TX

The photochemistry of 1-methyl- and 2-methyl-3,4-dihydronaphthalene were examined. Comparison to the unsubstituted parent 3,4-dihydronaphthalene oxide will be shown as well further support for the intermediacy of conical intersections in this photosystem.

P26 A NEW APPLICATION OF THERMO-RESPONSIVE POLYMERS
Jason Bragdon,* Chunmei Li, Stephen F. Austin State University, Nacogdoches, TX

This research focuses on the synthesis and application of N-isoprolyacrylamide co-polymers that precipate from water upon being heated to different temperatures. These copolymers can be arranged in the order of precipitation temperature and used as a thermometer to test temperatures of solutions. These co-polymers also have possible uses in laser applications.

P27 ENANTIOMERIC SEPARATION USING MODIFIED SMECTITE CLAYS
Katie Clark, Stephen F. Austin State University, Nacogdoches, TX

After placing a smectite clay, Hectorite, under an intense pretreatment process that included the removal of carbonates and metals, it was exchanged with L-Cysteine, an amino acid, in order to produce an L-Cysteine exchanged clay. Engineering this clay allows it to be used in the separation of the enantiomers of Carnitine. The Carnitine mixture is composed of enantiomers that exhibit identical physical properties, yet strikingly different chemical and biological properties. Compounds with chiral centers, such as amino acids, can selectively attach to L- or D- molecules. Hydrolic properties were imparted to

the clay by creating a Sol-Gel; this modified the clay to adsorb selectively rather than non-specifically. By imposing these properties, the clay will lose its ability to adsorb racemers, and instead will adsorb only one enantiomer, effectively separating a racemic mixture. Chemically, the chiral center of the L-Cysteine clay recognized the subtle difference between the D- and L- isomers of Carnitine, and the racemic mixture was separated; this success was determined through the use of polarimetry.

P28 THE USE OF SOLUTION CALORIMETRY TO DETERMINE CLAY IDENTITY BASED UPON ENTHALPY OF HYDRATION OF EXCHANGEABLE CATIONS IN MONTMORILLONITES

Jason Cole* and Dr. Alyx Frantzen, Stephen F. Austin State University, Nacogdoches, TX

Smectite clays are composed of layers that consist of an octahedral aluminum/oxygen sheet sandwiched by two tetrahedral silicon/oxygen sheets. The layers carry a permanent negative charge due to isomorphic substitution that occurs during formation. The total number of charge sites per unit mass of clay is referred to as the cation exchange capacity or CEC of the clay. A solution calorimeter is used to determine the enthalpy of hydration of a series of standard smectite clays. Each clay is purified, pretreated, and exchanged with a cation such as sodium, potassium, magnesium, calcium, and aluminum. The results of this analysis provide information on the relationship of the cation exchange capacity and the enthalpy of hydration of the interlamellar cations. Theoretically, this relationship should be linear.

P29 WANDERING THE EXCITED STATE SURFACE OF BENZONORBORNADIENE ANALOGS

Benny E. Arney, Jr.*, Rick C. White, and Gydeon Gilzow, Sam Houston State University, Huntsville TX

Reexamination of the photolysis of 1,4-dihydro-1,4-epoxynaphthalene reveals previously unreported products and helps to clarify the evolution of the photochemistry of the benzonorbornadiene system. New experimental and computational results will be shown and discussed.

P30 PREDICTING BIOLOGICALLY IMPORTANT PROPERTIES USING SOLUBILITIES AND THE ABRAHAM GENERAL SOLVATION MODEL

Chelsea Givens*[a], Stephanie Keown[b], Dawn M. Stovall[b], Kaci R. Hoover[b], William E. Acree, Jr.[b] and Michael H. Abraham[c], [a]NASA University Research Center, Texas Southern University, Houston, TX, [b]Department of Chemistry, University of North Texas, Denton, TX, [c]Department of Chemistry, University College London, London

The Abraham General Salvation Model is used to calculate the numerical values of the solute descriptors for 4-chloro-3-nitrobenzoic, 2-chloro-5-nitrobenzoic acid, and ascorbic acid from experimental solubilities in organic solvents. The mathematical correlations take the form of

$$\log (C_S/C_W) = c + e\cdot E + s\cdot S + a\cdot A + b\cdot B + v\cdot V$$

$$\log (C_S/C_G) = c + e\cdot E + s\cdot S + a\cdot A + b\cdot B + l\cdot L$$

where C_S and C_W refer to the solute solubility in the organic solvent and water, respectively, C_G is a gas phase concentration; E is the solute excess molar refraction; V is McGowan volume of the solute; A and B are the measures of the solute hydrogen-bond acidity and hydrogen-bond basicity; S denotes the solute dipolarity/polarizability descriptor; L is the logarithm of the solute gas phase dimensionless Ostwald partition coefficient into hexadecane at 298 K. The remaining symbols in the above expressions are known solvent coefficients, which have been determined previously for a large number of gas/solvent and water /solvent systems. The Abraham General Salvation Model was then used to predict difficult to find biological properties by using easily determined chemical properties. Examples of the difficult to find biological properties were tissue/air partition coefficients, tissue/blood partition coefficients, and skin permeation. The easily determined chemical properties consisted of saturation solubilities, partition coefficients, and chromatographic retention times. The Abraham General Salvation Model was found to describe the experimental solubility data of 4-chloro-3-nitrobenzoic acid, 2-chloro-5-nitrobenzoic acid, and ascorbic acid to within overall standard deviations of 0.067, 0.113, and 0.110 log units, respectively.

P31 IMPROVEMENTS IN PROTEIN DIGESTION

Robert Holloway, Schreiner University, Kerrville, TX

The characterization of recombinant protein drugs is most often proteolytic mapping, mostly by HPLC, but often with other liquid separation modalities (CE). Tagging fragment peptides could lead to lower detection limits and uniform response factors, but specificity of tagging has been an insurmountable problem. We are investigating tagging in a novel way which would be specific if successful. Results of experiments with trypsin and a test polypeptide will be shown.

P32 HIGH EFFICIENCY MICELLAR CHROMATOGRAPHY OF HYDROPHOBIC ANALYTES ON POLY(DIMETHYLSILOXANE) MICROCHIPS

‡Gregory T. Roman, *Kevin McDaniel and ‡Christopher T. Culbertson, ‡ Kansas State University, Department of Chemistry, Manhattan, KS, Texas Southern University, Houston, TX

This paper describes a simple method for the effective and rapid separation of hydrophobic molecules on polydimethylsiloxane (PDMS) microfluidic devices using MEKC. For these separations the addition of SDS served two critical roles – it provided a dynamic surface coating on the channel wall surfaces and generated a pseudo-stationary chromatographic phase. The dynamic SDS coating generated an EOF of 7.1 x 10^{-4} cm^2/Vs (1.6% RSD, n = 5), and eliminated the absorption of rhodamine B into the bulk PDMS. High efficiency separations of rhodamine B, TAMRA (6-carboxytetramethylrhodamine, succinimidyl ester) labeled amino acids, BODIPY® FL CASE (N- (4,4-difluoro-5,7-dimethyl-4-bora-3a,4a-diaza-s-indacene-3-propionyl)cysteic acid, succinimidyl ester) labeled amino acids, and AlexaFluor® labeled *Escherichia coli* bacterial homogenate on PDMS chips were performed using this method. Separations of rhodamine B and TAMRA labeled AA's using 25 mM SDS, 20% ACN, and 10 mM sodium tetraborate generated efficiencies greater than 100,000 or 3.3 x 10^6 N/m in < 25 s with run-to-run migration time reproducibilities < 1% RSD over 3 hrs. The serpentine chips with 30 cm long separation channels were used to separate 17 BODIPY® labeled AA's yielding efficiencies of up to 837,000 or 3.0 x 10^6 N/m and homogenates of E. coli yielding ~ 30 resolved peaks with separations efficiencies of up to 600,000 or 2.4 x 10^6 N/m and run to run reproducibilities of < 1% RSD over 3 hrs.

P33 THE SYNTHESIS AND ANALYSIS OF MAGNETIC NANOPARTICLES

Apollonia McMillan*, Dr. Kelley Bradley[2], and Dr. Antony Jeeverajan, NASA University Research Center, Texas Southern University, Texas Southern University, Houston, Texas; Human Adaptation & Countermeasures, NASA-JSC, Houston, Texas

It's very difficult to study the effects of microgravity. The cost and time for doing so is tremendous. The synthesis of magnetite on the nanoscale has recently become a field of intense study. Because of their technological and fundamental importance, the development of uniform-sized particles is being pursued. The purpose of this experiment is to determine the best centrifuge conditions that will yield a high, even distribution of the smallest nanoparticles. The nanoparticles were synthesized from iron (II) and (III) chloride, and analyzed by using an Atomic Force Microscope. It was previously thought that the centrifugation process was for either too long or too fast; however, it was discovered that it is best to either centrifuge the particles faster or longer.

P34 ISOLATION AND STRUCTURAL MODIFICATION OF EUGENOL

Marcelliono Medina, Louis Canales and Bimal K. Banik*, Department of Chemistry, The University of Texas-Pan American, Edinburg, TX

Eugenol, a multi-functionalized biologically active constituent is present in high quantity in natural clove. Using simple stem distillation technique, eugenol has been isolated in our teaching laboratory. Several chemical transformations on eugenol are then performed to examine the feasibility of functional group inter conversion in an attempt to test the products against living organisms. For example nitration, epoxidation, protection and isomerization of eugenol have been performed under different conditions. Unlike existing knowledge, this study demonstrates useful reactivity and inertness of eugenol in specific occasions.

P35 SYNTHESIS OF MIXED-VALENT GOLD BROMIDE PEROVSKITES

D'Vesharronne J. Moore*, NASA University Research Center, Texas Southern University, Houston, TX, Dana E. Gheorghe, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX, Zhongjia Tang, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX, Arnold M. Guloy, University of Houston, Department of Chemistry, Center for Materials Chemistry, Houston, TX

We report the syntheses, crystal structures and optical band gaps of $Cs_2Au_2Br_{5.39}Cl_{0.61}$, a new mixed-valent gold bromide chloride doped compound, and $CsAuBr_{2.6}Cl_{1.4}$, a chloride-doped tetrabromoaurate. $Cs_2Au_2Br_{5.39}Cl_{0.61}$ was synthesized by high temperature solid state reactions between Au, AgBr and $CsAuBr_{2.6}Cl_{1.4}$ at 500°C. $CsAuBr_{2.6}Cl_{1.4}$ was crystallized from an acidic solution of CsBr, $HAuCl_4$ and HCl. The new mixed-valent gold (I/III) halide, $Cs_2Au_2Br_{5.39}Cl_{0.61}$, crystallizes in the tetragonal space group I 4/mmm, with *a* = 7.6733 (9) Å, *c* = 11.1575 (18) Å, Z=2, and exhibits a band gap of 1.27(4) eV. The new tetrahaloaurate, $CsAuBr_{2.6}Cl_{1.4}$, crystallizes in the monoclinic space group C 2/c, with *a* = 13.3682(22) Å, *b* = 6.3197(11) Å, *c* = 9.7977(17) Å, Z=4, and shows an optical band gap of 2.01 eV. The crystal structure of $Cs_2Au_2Br_{5.39}Cl_{0.61}$

features a perovskite-like structure that effectively results from the alternate arrangements of square planar $AuBr_4$ and linear $AuBr_{1.39}Cl_{0.61}$ units. Differences in its structure and properties with those of the parent compound, $Cs_2Au_2Br_6$, can be attributed to the effect of chlorine substitution. This is manifested in the slight decrease of the unit cell parameters and a slight increase of the band gap with the increasing electronegativity of the halogen.

P36 LEAD CONTAMINATION IN MEXICAN CANDIES AND THEIR WRAPPERS
Michael M. Looney, David A. Mauk, and Miguel Puga*, Chemistry Department, Schreiner University, Kerrville, TX

The dangers of ingesting lead, especially in childhood, are well documented. Some studies recently reported in the media have found a correlation between Mexican candies and cases of childhood lead poisoning. A few researchers have detected lead in some brands of imported Mexican candies sold in the United States. It has not been conclusively determined whether the lead contamination originates in the candy itself or the wrapper (Lynch RA, Boatright DT, Moss SK. Lead contaminated imported tamarind candy and children's blood lead levels. Pub Health Rep 115: 537-543, 2000). This ongoing project utilizes flame atomic absorption spectrophotometry to test several brands of candies, as well as their packaging material, for lead content.

COMPUTER SCIENCE

37 DEVELOPING A FUZZY LOGIC SYSTEM FOR DIAGNOSIS USING A COMPOSITE INDEX
John A. Ward* and Stephen A. Harrison, Brooke Army Medical Center, Fort Sam Houston, TX

At TAS05, we discussed developing a composite diagnostic index for non-alcoholic steatohepatitis (NASH) using liver function tests and demographic variables. Since then, we developed a fuzzy logic model to discriminate steatosis from NASH. Partial membership in low, medium and high input sets was derived from descriptive statistics of AST, age and AST/ALT ratio from 39 steatosis and 41 NASH patients. Partial membership in triage output sets was converted to a fuzzy centroid value. The centroid discriminated steatosis from NASH with a ROC curve area of 0.753 (95% CI: 0.645 to 0.860), whereas the individual risk factors had ROC curve areas ranging from 0.665 to 0.688. The performance of the fuzzy logic model is equivalent to that of a logistic regression model.

38 NAVIGATIONAL RESEARCH IN AUTONOMOUS ROBOTS
Rose Hogan*, Iris Beltran*, Xing Jin*, Bindiya Mansharamani*, CS Wired, Lamar University, Beaumont, TX

After developing a mobile robot capable of navigation and obstacle detections, it is the intent of this research team to develop a more efficient and intelligent means of implementing behaviors for robotic control. Using a layered architecture, the robot will employ a more sophisticated algorithm for determining its path(s) and obstacle avoidance behaviors. This research will focus only on the actual implementation and demonstration of this architecture and exclude the learning curves required for the individual sensors used.

39 ART GALLERY APPLICATION AT TEXAS STATE UNIVERSITY
Steven P. Bitner, Texas State University, San Marcos, TX

We have conducted a study of the advantages of various algorithms for the placement of guards in the art gallery problem. Comparisons were made between several methods of placement and the results were compared as they related to the Alkek Library at Texas State University, San Marcos. Research and comparison is still in progress.

40 THE BARRIERS ESL TEACHERS FACE WHEN USING CALL APPROACH IN SOUTH TEXAS
Shao-Chieh Lu, Texas A&M University-Kingsville, Kingsville, TX

This study investigated the barriers that influence English as second language (ESL) teachers' use of computers in their classrooms to teach L2 students. The participants in the study were sixty-seven ESL teachers who applied computer assisted language learning (CALL) in the classroom or computer lab in schools in Corpus Christi Independent School District (CCISD) and Kingsville Independent School District (KISD) in south Texas. The researcher conducted the survey study including participants' demographic data, twenty variables that might influence the use of CALL approach, and five open-ended questions. The reliability and validity of the questionnaire are verified and the exploratory factor analysis (EFA) is used to analyze the

survey data using SPSS 12.0 package. The qualitative portion of the survey data was also analyzed to cross the quantitative analysis results. The findings demonstrate three key barriers, technology skills, financial barriers, and acceptance of technology which impact ESL teachers who use CALL approach and may change their roles as they implement CALL programs. The potential impact of the findings which might help educators to better understand the impact of CALL coursework on the classroom computer is also discussed.

41 ATMOSPHERIC REFRACTION IN A GLOBAL ILLUMINATION ENGINE
Cameron Rivers, St. Edward's University, Austin, TX

Global illumination engines are programs that simulate the physical properties of light in order to synthesize photorealistic images. Current work being done attempts to increase the realism of the generated imagery in part by more accurately modeling the way light is transmitted through space. This project looked specifically at the effects rapid changes in temperature have on the movement of light and described an accurate model that could be incorporated into GI engines. The speed of light is dependent upon the density of the material through which it is moving and so changes when a light ray transitions between two materials. This phenomena occurs in the atmosphere as well, where pockets of cooler or hotter air change density and cause light rays to refract in different directions. By determining the influence of drastic temperature changes, light rays were refracted when entering influential volumes and accurately modeled naturally-occurring mirages.

CONSERVATION AND MANAGEMENT

42 ASPECTS OF THE LIFE HISTORY OF THE SAN FELIPE GAMBUSIA, *GAMBUSIA CLARKHUBBS*
Robert J. Edwards, Department of Biology, University of Texas-Pan American, Edinburg, TX, and Gary P. Garrett, HoH Fisheries Science Center, Texas Parks and Wildlife Department, Ingram, TX

Gambusia clarkhubbsi (San Felipe gambusia) is a newly described species from a spring-fed Rio Grande tributary in Del Rio, Texas. It is morphologically distinct from all other *Gambusia*, but most closely resembles *G. krumholzi*. The new species is a spring specialist, occurring in sympatry with *G. speciosa* in the headwaters of San Felipe Creek. Very little is known of the ecology of the new species. Since its discovery, we have undertaken experiments to determine habitat preferences, feeding habits, competitive interactions and reproductive strategies. Preliminary observations indicate that *G. clarkhubbsi* may be an ecological equivalent of the extinct *G. georgei* (San Marcos gambusia) in the San Marcos River, especially with respect to its use of habitats within San Felipe Creek.

43 COMPARISON OF FLIGHT HEIGHTS BEFORE AND AFTER THE ADDITION OF POWER LINE MARKERS AT A WATERBIRD COLONY IN SOUTHEAST TEXAS
Colt Westbrook* and Andrew C. Kasner, Department of Biology, Center for Coastal and Marine Studies, Lamar University, Beaumont, TX

A waterbird colony in Port Arthur, Jefferson County, Texas was observed to determine if the addition of power line markers (flappers) would directly influence flight heights of birds entering and leaving the colony. Flight heights were measured before flappers were installed in Summer 2004 and after flappers were installed in Summer 2005. A total of nine species were observed, and flight heights were significantly higher for all species after flappers were installed. Average flight heights were 2m-5m higher after flappers were installed. These results suggest that flappers are a viable method to encourage avoidance of power lines by making them more visible to birds.

P37 GREEN BUILDINGS TO THE RESCUE – USING CLEAN, RENEWABLE ENERGY
Seri, Sirisha, Boddu, Akshitha, Dr. Enno Koehn, Lamar University

Renewable energy uses energy sources that are continually replenished by nature—the sun, the wind, the water, and the earth can heat the planet. Green design concepts developed by the United States Green Building Council promote the use of clean, free solar energy. Solar technologies tap directly into the infinite power of the sun and use that energy to produce heat, light, and power. For example, solar homes work even in cold, snowy Buffalo. But what about using solar energy in commercial or institutional buildings? At first, it might seem difficult to accomplish but, it can be done. In fact, there are a

number of possibilities such as: Day lighting: Good designs avoid direct sun and glare. The light is bounced, diffused and brought into the interior of buildings. Passive solar space heating: This may be defined as using sunlight for heating without the use of special collectors or mechanical fans or pumps. Photovoltaic (PV) electricity generation: Real life energy production from PV is a function of location, time of year, time of day, weather conditions, and panel tilt angle. Green power: This power comes from newly developed wind power, biomass, PV, or landfill gas generating capacity. Green buildings are frugal on the use of water. This makes sense because in many areas of the globe water is in short supply. Also, domestic tap water contains embodied energy (the energy required to purify it before use, pump it, and treat it after use) and this can be saved through water conservation. Rainwater may be collected from roofs and used for local irrigation purposes. It may also be utilized to grow planted "green roofs" which have recreational, wildlife habitat, educational, and roof shading benefits.

P38 INITIAL CHARACTERIZATION OF A REPRODUCTIVE CHEMICAL SIGNAL IN THE RED-EARED SLIDER TURTLE (*TRACHEMYS SCRIPT*A)

Corrina D. Fox*, Diana K. Comuzzie and Robert Holloway, Schreiner University, Kerrville, TX

In an earlier study (Black and Comuzzie, 2002) we concluded that there appeared to be a chemical signal used by male red-eared slider turtles to detect females. In that study we analyzed data from farm-reared turtles housed in laboratory conditions. We believe the chemical signal to be part of a communication system that allows males to determine which females are receptive to mating, and which are not. We have yet to fully characterize this chemical signal. In the present study, we report on the construction of a large outdoor enclosure, designed to provide a naturalistic environment, with true diurnal and seasonal cycling. We believe the natural setting is critical to producing normal reproductive behavior. We describe the initial characterization of the chemical signal by electrophoresis and column separation, with samples obtained during early reproductive and non-reproductive periods, for five adult, wild-caught turtles: two males and three females.

ENVIRONMENTAL SCIENCE

44 CHANGES IN VEGETATION COMPOSITION IN CONSTRUCTED WET PONDS IN CENTRAL TEXAS

Margaret M. Russell* and David E. Lemke, Department of Biology, Texas State University, San Marcos, TX

Constructed wetponds, built to tr eat run off from developed properties, are retention systems with permanent water levels and vegetated benches. The design criteria established for wetponds by the City of Austin require a minimum number of species in set percentages in four categories from a designated plant list and provide a formula to determine precise plant numbers to be installed. This study was undertaken to document the persistence of planted species in constructed wetponds, to evaluate vegetation patterns, and to quantify changes in community composition over time. Ponds with different construction dates were surveyed using a non-random, line transect intercept sampling approach. Random sampling plots were established in the band of vegetation along the pond perimeter for species stem counts. Data from the plots and line intercept transects were used to establish importance values for each species based on relative frequency, dominance and density, and compared with the projected importance values of species in the original plantings.

45 ACRYLAMIDE IN CARBOHYDRATE-RICH PROCESSED FOODS

Mohamed H. EL-Saeid*, Plant Protection Dept., Faculty of Food and Agric, King Saud Univ. Riyadh, KSA, and John B. Sapp, Chemistry Department, Texas Southern Univ., Houston, TX

In the past several years, Acrylamide (AA) is known for its potential health hazards. Furthermore the concentration of AA within carbohydrate-rich fried and baked foods has become of great interest due to acrylamide's classification as a cancer suspect agent, Recently AA was found in starch containing heated foods in high concentrations, which lead to the assumption that a cancer risk could be associated with the uptake of foods containing high amounts of AA. Current methodologies for the extraction and detection and quantification of acrylamide within fried and baked Carbohydrate rich foods such as French fries, potato chips, biscuits and cereals require extensive sample preparation and derivatives need to be formed for retention and detection. In this study, a mixed mode Discovery MCAX SPE-C18 SPE phase and Accelerated Solvent Extraction (ASE) are employed for the extraction of AA from fried French fries, potato chips, Potato Crisps, Cereal, Baby Cereal, Crackers, Cookies, Biscuits, Donuts and Soft Brides collected from Houston, TX; Cairo, Egypt; and Riyadh, KSA local markets. Also, this study focuses on the analysis of AA using HPLC/MS-MS in the same foods potentially containing this

substance, which is formed from natural ingredients such as Carbohydrates and Amino Acids. The Maine of the highest concentrations were found in French fries, potato chips, potato crisps and donuts with concentrations of above 1300, 1540 and 1430 ng/g in above three areas respectively. Other food groups contained lower amounts: cookies and biscuits of 87 ng/g; crisp bread with a median of 63 ng/g; breakfast cereals with a median of 95 ng/g; popcorn and rice products with a median of 87 ng/g; potato chips with a median of 158 ng/g and coffee with a median of 174 ng/g.

46 GROWTH OF TWO SUNFLOWERS AND TWO GRASSES AT INCREASING SOIL LEAD LEVELS

Andrea Anderson*, Department of Earth and Environmental Science, and O.W. Van Auken, Department of Biology, University of Texas at San Antonio, San Antonio, TX

Two sunflowers (*Helianthus annuus* and *H. paradoxus*) and two grasses (*Vetiveria zizanioides* and *Cynodon dactylon*) were grown separately in sand with complete supplemental nutrients and various concentrations of lead nitrate. Lead nitrate at concentrations of 0, 200, 400, 800 and 1200 mg Pb kg-1 soil was added to five replicates of each species. Plants were grown in a greenhouse for 12 weeks and watered as needed with deionized water. At harvest, plants were carefully separated into belowground and aboveground parts and oven-dried at 90°C to constant mass. For the statistical analysis, separate two-way ANOVAs were conducted followed by Tukey's multiple comparison test for total, aboveground and belowground dry mass of the sunflowers and of the grasses. The factors for the ANOVA were species and amount of lead nitrate added and the interaction was included in the model. The treatment level was a significant factor for all dry mass parameters ($p < 0.0001$). For the treatment in which no lead nitrate was added, total dry mass for both of the sunflowers was 4.41 g ± 1.09 (shoot:root ratio = 3.37) and this decreased gradually to 0.15 g ± 0.40 (shoot:root ratio = 1.79:1) for the treatment with 1200 mg Pb kg-1 soil. Regression analysis for both sunflowers together revealed an inverse relationship between treatment level and total dry mass (R2= 0.93, $p < 0.01$, y = - 0.003x + 3.66). The interaction of species and level of lead nitrate was significant for aboveground dry mass ($p < 0.05$). *Helianthus paradoxus* aboveground dry mass decreased 88% from 0 to 1200 Pb kg-1 soil while *H. annuus* aboveground dry mass decreased 83% from 0 to 400 Pb kg-1 soil. There were two surviving *H. annuus* plants at 800 mg Pb kg-1 soil and no survivors at 1200 mg Pb kg-1 soil. Overall, *H. paradoxus* had three times as many individual surviving plants in all treatments compared to *H. annuus*. Only total and root dry mass were significant in the model for the grass species ($p < 0.01$ and $p < 0.0001$, respectively). *Cynodon dactylon* produced 11.79 g total dry mass ± 3.42 (shoot:root ratio =0.82:1) at the end of 12 weeks while *Vetiveria zizanioides* had 6.43 g ± 5.94 (shoot:root ratio = 1.74:1). Neither the Pb treatment nor the interaction of the species X level of Pb was significant for the grasses.

47 VOLATILE ORGANIC COMPOUND DETERMINATION OF THE SEABROOK AIR MONITORING PROJECT

Latrice B. Babin, Siobhan L. Tarver, Gabriel Kristano, Felicia L. Conley, Renard L. Thomas, and Bobby L. Wilson, NASA University Research Center for Biotechnology & Environmental Health, Texas Southern University, Houston, TX

Seabrook, Texas, located in the southeast fringes of the fourth largest metropolis of the United States, is surrounded by an industrial complex of petrochemical plants, chemical plants, refineries, hazardous materials storage facilities and the intertwining of pipelines. This city's location provides a unique situation for examining the potential exposure of large and varied mixtures of volatile organic compounds (VOC) emissions into the neighboring residential communities.

The close proximity of residential communities to industrial complexes and their emission sources provides an opportunity to (1) provide baseline data characterizing ambient air quality, (2) establish VOC spatial and temporal profiles for industrial based residential neighborhoods, and (3) assess the potential risk of human exposure to VOCs.

The study area involved nine square miles of the Seabrook, Texas, and the surrounding area with five continuous monitoring stations for sampling VOCs. The population of the sampling areas contains many industrial companies, residential communities, warehouses, schools, and hospitals. The continuous monitoring sites provided a look at the background VOC characteristics that normally exist in the Seabrook area in the vicinity of the major petrochemical industry as well as incidents of elevated VOC occurrences. The areas isolated for sampling are identified as Sand Bar, Bayou Forest, Mighty Redwood, Elmgrove Park Lane, and Rocky Hollow.

Sampling operations was performed by volunteers that live in the Seabrook area. Samples were collected as 72 and 168 hours time-weighted averaged samples (6 liter and 15 liter canisters respectively). The Agilent 6890 GC/MS instruments

with 5973 mass detector equipped with an Entech Autosampler and 7100 Preconcentrator were used to analyze the samples.

Preliminary data collected is presently undergoing review and QAQC for accuracy and completeness.

48 INVESTIGATION OF *JUNIPERUS* WOODLAND REPLACEMENT SPECIES

Matthew Grunstra* and O.W. Van Auken, University of Texas at San Antonio, San Antonio, TX

Over the past 100 to 150 years, the distribution and land area coverage of many *Juniperus* species has increased from their respective historical locations into areas that were once considered grasslands. It is estimated that *Juniperus ashei* now covers approximately 200,000 ha in southern Oklahoma and 3.5 million ha in Texas. *Juniperus* is typically considered a pioneer or early succession woody species in the eastern United States. In the mountain elevations of the western states, *Juniperus* co-occurs with *Pinus* to form piñion-juniper woodlands. However, little is known about the replacement dynamics associated with *J. ashei* in the former grasslands of south central Texas. Past studies have concentrated on the progression from grassland to *J. ashei* woodlands but have not stated anything about possible future community development. This study will investigate the woody species present in the understory of a *J. ashei* woodland located on the south central Edwards plateau and estimate their population density.

49 RELATIONSHIP BETWEEN VEGETATIVE COVER AND DUNE STABILITY ON SOUTH PADRE ISLAND, TEXAS

Frank W. Judd*, Kenneth R. Summy, Robert I. Lonard, and Ruben A. Mazariegos, The University of Texas-Pan American, Edinburg, TX

The relationship between vegetative cover and dune stability on South Padre Island were studied from February 2004 through May 2005 at three sites: 1) a relatively undisturbed area within a dune protection zone, 2) a moderately disturbed area where vegetation was sparse, and 3) a severely disturbed area which was essentially devoid of vegetation. Species richness and vegetative cover were greatest in the dune protection zone (41 species, cover = 56.7%), markedly lower in the moderately disturbed site (15 species, cover = 17.01%), and least in the severely disturbed area (4 species, cover = 0.36%). Measurements of elevation change along three transects within each of the sites showed that mean absolute (unsigned) elevation change was lowest at the undisturbed site (23.5 cm), significantly greater at the moderately disturbed area (46.1 cm) and greatest at the area that was essentially devoid of vegetation (101.5 cm). Movement of the primary dune crest was 1.0 m West at the dune protection area, 4.0 m East at the moderately disturbed site and 15.7 m West at the severely disturbed site. Clearly, dunes are more stable where vegetative cover is greater, but even sparse cover conveys marked stability compared to barren dunes.

50 RECYCLED/RENEWABLE ENERGY SOURCES

Vaibhavkumar Pandya, Lamar University, Beaumont, TX

As demand for electricity increases with the global population and the economy, it can be seen that source reduction and recycling are vital for future development. The efficient generation of energy from waste-to-energy processes could result in savings of Municipal Solid Waste (MSW). In the traditional sense, renewable sources of energy are those that nature can re-grow, such as wood, crops, LFG (Land Fill Gas) and plants (biomass). Other sources of energy are available through the Earth's unique physical geography such as wind, water, geothermal systems and solar radiation. Green power is defined as processes that reduce or eliminate carbon dioxide, sulfur dioxide, carbon monoxide, particulate matter, oxides of nitrogen and nuclear waste, which pollute the air in addition to other gases which cause global warming. For instance, the re-use of waste water and storm water (water recycling) is an example of green energy and also new sources of cooling water. The goal is to reduce waste and encourage more efficient use of both energy and materials. The six R's for generating green power are: Reduce, Reuse, Recycle, Remanufacture, Redesign and Rethink. As an example, industrial plants that promote "green twinning" offer waste recycling by employing the waste stream from one company as an input stream to another. Also, in conventional electricity generating plants, two-thirds of the energy is lost. By recycling of this waste heat, it may be put to use for heating office buildings, warming greenhouses and driving additional industrial processes. It is essential that the energy recovery options must be carefully examined in each situation and, wherever feasible, incorporated in the over-all scheme of waste management for a facility. For example, it is estimated that a potential for generating at least 1000 MW of power from urban/ municipal wastes and about 700 MW from industrial wastes, in the United States. This potential is

likely to increase with further economic development. The use of wind as an energy source has its roots in antiquity. At one time, wind was the major source of power for pumping water, grinding grain and transporting goods by sailing ships. Present day applications of wind power include pumping water and the generation of electricity. Also hydropower is considered a renewable energy as the water cycle is an endless and constantly recharging system. Hydropower uses water as fuel, which will not be reduced or consumed during the process. Solar energy is also finding its way into homes, transportation and power plants. Thus solar energy is recognized as a very viable and dependable resource in the future. Bio energy ranks second (to hydropower) in renewable U.S. primary energy production and accounts for 3% of the primary energy production in the United States. Hydrogen is the third most abundant element on the earth's surface, which can be used as an advance renewable source of energy. Although it is desirable to minimize the amount of waste during production and distribution of goods, it is believed that the global community will continue to produce a stream of new waste. If this waste is not recycled it will adversely affect the global environmental system. As a result, recycled and renewable energy sources are in demand for generation of green power.

51 PRELIMINARY ANALYSIS OF VOLATILE ORGANIC COMPOUNDS (VOCS) AND TRACE METALS PRESENT IN THE FRESNO COMMUNITY DRINKING WATER

NO ORAL PRESENTATION; SEE POSTER 41

Lindsey S. Scott*[1], Denae King, Ph.D[2], s, Ph.D[3], and Lovell Jones, Ph.D[2]
[1]NASA University Research Center, Tex [2]UT MD Anderson Cancer Center CURE Summer Intern, Texas Southern University, Houston, TX, [2]UT MD Anderson Cancer Center, Center for Research on Minority Health, Houston, TX

A safe drinking water supply is a high priority issue for safeguarding the health and well being of humans (Leeuwen 2000). Fresno is a small unincorporated community with a racial/ethnic makeup of 50% Hispanic/Latino, 27% African American, and 22% White Non Hispanic. Preliminary data from key informants and focus groups suggest residential concerns with the quality of their drinking water. In order to address the concerns of the residents, an environmental justice study was put into action through community based participatory research. The purpose of this study was to determine if the Fresno Community residents are at risk of exposure to Volatile Organic Compounds (VOCs) and trace metals through the utilization of their drinking water. Samples were collected from 10 residents in the Fresno community: 5 residents whose source of water was a private well, and 5 residents whose source of water was the Municipal Utility District (MUD) system. Each sample was obtained from the residents' kitchen faucet according to EPA Method 524.2 for VOCs and 200.8 for trace metals. Gas Chromatography-Mass Spectrometry and Inductively Coupled Plasma-Mass Spectrometry were used to analyze the VOCs and trace metals, respectively. VOCs bromochloronitromethane, tribromomethane, and methylene chloride, disinfection by-products (DBPs) were detected in the drinking water at unacceptable levels from MUD System Sources. Specifically, methylene chloride exceeded the EPA's Maximum Contaminant Level (MCL) in three of the MUD System Sources. VOCs were not detected in the drinking water of residents who had private wells. The trace metals detected in the drinking water did not exceed the MCLs set by the EPA.

52 VEGETATIVE CHANGE DETECTION ANALYSES FOR DUNE AREAS OF SOUTH PADRE ISLAND BASED ON THEMATIC MAPS DEVELOPED FROM AERIAL COLOR INFRARED PHOTOGRAPHS

Kenneth R. Summy*, Frank W. Judd, Robert I. Lonard, and Ruben A. Mazariegos, The University of Texas-Pan American, Edinburg, TX

Thematic vegetation maps developed from large-scale (1:5000) aerial color infrared (CIR) photographs were used to evaluate temporal changes in vegetative cover within selected dune areas of South Padre Island, Texas. Estimates of *total vegetative cover* (the aggregate of live vegetation and dead stalks and residue) obtained from vegetation maps were consistent with estimates obtained using the line intercept method. Comparison of thematic maps for selected time intervals revealed 1) seasonal "changes" in vegetative cover which appear to be manifestations of reduced growth or leaf loss during the fall-winter period (i.e., the *winter brownout* effect) followed by a resumption of growth during the spring-summer period, and 2) *bona fide* contractions and expansions of existing stands of native vegetation. Both methods suggested that native vegetative cover occurring within three dune areas remained at relatively constant levels during a 2-year period (2004-2005), and that the major losses of vegetation were the direct result of human perturbations, particularly destruction of vegetation caused by road maintenance operations.

53 USING GIS AND HYDROLOGICAL MODELS TO EVALUATE POTENTIAL ENVIRONMENTAL HEALTH RISKS IN SUPERFUND SITES, MISSION, TEXAS

H. Herrera 1, Dr. Y. Asim . 2, Dr. J. L. M. Cortez 2, Dr. R.A. Mazariegos, 2 The University of Texas-Pan American

This project is in its preliminary stages. The study area is located in the town of Mission, Hidalgo County, of south Texas. The Hayes Sammons and Former Pesticide Mixing Plant are two areas that are a quarter of a mile away from each other and were categorized by the U.S. Environmental Protection Agency (USEPA) and the Texas Commission of Environmental Quality (TCEQ) as Texas Superfund Sites in 1987. Published results of soil testing and continuing field work have indicated potentially dangerous levels of pesticides such as Arsenic, DDT, Chlordane, Toxaphene, Dieldrin, DDD and others toxic compounds. Concentrations of all these chemicals exceed the Maximum Contaminant Levels (MCL) of the USEPA. Results of initial remediation efforts already completed indicate that one of the sites may not be completely free of the chemical exposure which took place over forty years of industrial use. Hence, if the contaminants have traveled in a solid or liquid state, the potential health risks to the surrounding area may be considerable requiring substantial further scientific study. This project seeks to apply new and existing information to generate thematic maps of soil, geology, surface water and groundwater, chemical concentration levels, air and biota to asses the potential environmental risks in the study area and impacts on the surrounding community.

P39 EFFICACY OF SODIUM CHLORIDE CONCENTRATIONS ON THE BACTERIALOGICAL REMEDIATION OF AQUEOUS SUSPENSIONS OF PETROLEUM PRODUCTS

Tracie King, Justin Gates*, Gary Stanlake, and Richard Garner, Hardin-Simmons University, Abilene, TX

The effects of various mass percentages of sodium chloride on the ability of Pseudomonas aeruginosa to remediate diesel have been investigated. The percentages studied were zero through four, six and nine percent by mass. Investigations have been conducted by means of plate growth, optical density and gas chromatography Significant differences were observed in both growth and viability as well as petroleum remediation, particularly at salt concentrations greater than three percent.

P40 TRACE METAL ANALYSIS OF LAKE HOUSTON WATER USING INDUCTIVELY COUPLED MASS SPECTROMETER (ICP-MS)

Edidiong Obot*[1], Charmaine Little[1], Aref El-Demerdash[2], Renard Thomas[2], Bobby Wilson[3], [1]Space and Environmental Science Internship Program (SESIP), Texas Southern University, Houston, TX, [2]Environmental Research Technology Transfer Center (ERT2C), Texas Southern University, Houston, TX, [3]SESIP Program Director, Texas Southern University, Houston, TX

During the summer months of 2005, sampling cruises have been carried out on Lake Houston to assess trace metal distribution in the lake. Lake Houston is surrounded by a rapidly growing population density. Most of the lake's catchment area is drained by San Jacinto River. Identification and quantification of trace metals in Lake Houston, as well as the fate of those trace metals in that ecosystem, are important environmental scientific issues. Eighteen elements, including Cr, Co, Ni, Cu, Zn, Cd, Pb (trace metals) and Al, Ba, Ca, Fe, K, Mg, Mn, Na, P, S, Sr (major metals), were determined in several locations on the lake. For each of the water samples, the total fractions have been analyzed by Inductively Coupled Plasma Mass Spectrometer (ICP-MS). The data for the samples collected in the Northern and Eastern parts of the lake, especially at the inflow of San Jacinto River, metal concentrations were compared to measurement near the outflow points. Analysis of the data revealed that high levels of Aluminum, Vanadium, Strontium, Manganese, Iron, and Barium are present in Lake Houston water samples. When we compared the concentration of each element to that of the EPA guidelines, we concluded that concentrations of some trace metals did not conform to the EPA guidelines. In summary, we were able to use the ICP-MS to properly determine the concentration of trace metals in Lake Houston’s water samples

P41 PRELIMINARY ANALYSIS OF VOLATILE ORGANIC COMPOUNDS (VOCS) AND TRACE METALS PRESENT IN THE FRESNO COMMUNITY DRINKING WATER

Lindsey S. Scott*[1], Denae King, Ph.D[2], Richard Hajek, Ph.D[2], Renard Thomas, Ph.D[3], and Lovell Jones, Ph.D[2], [1]NASA University Research Center, Texas Southern University, Houston TX, [2]UT MD Anderson Cancer Center CURE Summer Intern, Texas Southern University, Houston, TX, [2]UT MD Anderson Cancer Center, Center for Research on Minority Health, Houston, TX

A safe drinking water supply is a high priority issue for safeguarding the health and well being of humans (Leeuwen 2000). Fresno is a small unincorporated community with a racial/ethnic makeup of 50% Hispanic/Latino, 27% African American, and 22% White Non Hispanic. Preliminary data from key informants and focus groups suggest residential concerns with the

quality of their drinking water. In order to address the concerns of the residents, an environmental justice study was put into action through community based participatory research. The purpose of this study was to determine if the Fresno Community residents are at risk of exposure to Volatile Organic Compounds (VOCs) and trace metals through the utilization of their drinking water. Samples were collected from 10 residents in the Fresno community: 5 residents whose source of water was a private well, and 5 residents whose source of water was the Municipal Utility District (MUD) system. Each sample was obtained from the residents' kitchen faucet according to EPA Method 524.2 for VOCs and 200.8 for trace metals. Gas Chromatography-Mass Spectrometry and Inductively Coupled Plasma-Mass Spectrometry were used to analyze the VOCs and trace metals, respectively. VOCs bromochloronitromethane, tribromomethane, and methylene chloride, disinfection by-products (DBPs) were detected in the drinking water at unacceptable levels from MUD System Sources. Specifically, methylene chloride exceeded the EPA's Maximum Contaminant Level (MCL) in three of the MUD System Sources. VOCs were not detected in the drinking water of residents who had private wells. The trace metals detected in the drinking water did not exceed the MCLs set by the EPA.

FRESHWATER AND MARINE SCIENCE

54 A COMPARISON OF POREWATER AMMONIUM LEVELS BETWEEN VEGETATED AND UNVEGETATED SEDIMENTS

Ruben Trevino*, Thomas Whelan III and Hudson DeYoe. Center for Subtropical Studies and Chemistry/Biology Depts., University of Texas-Pan American, Edinburg, TX

Purpose of this study was to compare ammonium levels in the sediment pore water between a seagrass (*Thalassia testudinum*) bed and an adjacent unvegetated zone. Pore water samples were collected at both sites in summer and fall 2005 (80 samples were collected on 4 trips) and analyzed on-site using field analysis kit (Hach®) and in the lab using the phenol-alcohol method. The lab analysis gave consistently higher ammonium values than the field kit. In all collections, ammonium concentration was significantly higher in bare zones compared to seagrass beds ($p=0.05$), however, there was considerable within site variability. When attempting to compare porewater ammonium levels, samples should be consistently collected in or out of seagrass beds.

55 BIOTIC DIVERSITY OF MID-SHELF BANK COMMUNITIES IN THE NORTHWESTERN GULF OF MEXICO

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Hard banks in the northwestern Gulf of Mexico support diverse fish and coral communities, and, several of these banks have recently been designated as habitat areas of particular concern (HAPCs) by the Gulf of Mexico Fishery Management Council. Here, we present preliminary results from an ongoing study aimed at characterizing and monitoring benthic habitat and reef fish assemblages at one of these areas, Sonnier Bank. We conducted photographic surveys of the benthos on two primary peaks using SCUBA and determined the percent coverage of coral, sponge, and macroalgae with image analysis. We also surveyed ichthyofauna with SCUBA and ROV (remotely operated vehicle). Our assessment of benthic communities was similar to a previous characterization of the area as a *Millepora*-sponge community by Rezak et al. (1985). The dominant coral species in our assessment was *Millepora alcicornis* with up to 70 percent coverage (per m^2), while the dominant sponges were *Neofibularia nolitangere, Ircinia strobilina*, and *Agelas clathrodes* with up to 50, 15, and 12 percent coverage (per m^3), respectively. Preliminary tallies from both SCUBA and ROV surveys have revealed a total of 45 fish species at Sonnier Bank compared to at least 88 fish species reported previously. At depths where visual surveys were conducted (<31m), there were higher abundances of groupers, grunts and snappers in the intermediate range (24-28m). Additional video analysis should reveal more species and allow us to evaluate the efficacy of our ROV approach by quantifying associations between species richness and elapsed time.

56 APPLESNAIL (*POMACEA CANALICULATA*-COMPLEX) FEEDING SELECTIVITY ON WETLAND MACROPHYTES OF SOUTHEASTERN TEXAS

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Channeled-type applesnails (*Pomacea canaliculata*-complex) are aquatic invasive macrophytophagous snails native to South America that have the potential to harm aquatic ecosystems and agricultural crops at some introduction sites in the USA.

These snails are currently found in six counties in southeastern Texas (Harris, Chambers, Brazoria, Galveston, Fort Bend, and Waller). Restoring wetlands in the Gulf Coast region of Texas prompted immediate concern regarding the feeding habits of this voracious aquatic pest. The extent of snail plant consumption of wetland macrophyte species, and the feeding activity of 4 different size groups (0-20, 21-40, 41-60, and 61-80 mm) were monitored in the laboratory at Stephen F. Austin State University. Wetland macrophytes tested were: *Canna glauca, Ceratophyllum demersum, Hymenocalis liriosme, Panicum hemitomon Pontedaria cordata, Ruppia maritima, Sagittaria graminea, Sagittaria lancifolia, Scirpus californicus, Scirpus maritimus, Spartina alterniflora, Thalia dealbata,* and *Typha latifolia*. Plant consumption by snails was different among the tested plant species.

57 MICROSTRUCTURE OF BEARDED SEAL (*ERIGNATHUS BARBATUS*) VIBRISSAE SUGGESTS ADAPTATIONS FOR BENTHIC FORAGING
Heidi L. Amin* and Christopher D. Marshall; Texas A&M University at Galveston, Galveston, TX

Vibrissal follicle-sinus complexes (F-SCs), or whiskers, are common mammalian sensory receptors. The aim of this study was to determine if whiskers of bearded seals exhibit adaptations for benthic foraging. This was accomplished by investigating the distribution of their mystacial F-SCs, microstructure of F-SCs, and the number of myelinated axons/F-SC. Sections of vibrissal F-SCs were stained, and myelinated axons were counted under a light microscope. Bearded seals had the largest number of mystacial F-SCs of any phocid. Whiskers were arranged anteriorly on a flattened rostrum, an unusual condition for seals. Bearded seal F-SCs had a divergent microstructure compared to terrestrial mammals, which was considered an aquatic adaptation. The mean number of myelinated axons per F-SC (1,314) was the highest of any mammal measured to date. The combination of the distribution of F-SCs, increased number of F-SCs, and the greater number of myelinated axons/F-SC are likely adaptations to a benthic foraging niche.

58 FRESHWATER MUSSELS UNIONIDAE IN TEXAS: TRENDS IN DIVERSITY
Lyubov E. Burlakova*, Alexander Y. Karatayev, and Daniel L. Bennett, Stephen F. Austin State University, Nacogdoches, TX

The family Unionidae is one of the most rapidly declining faunal groups in North America, with 70% of species considered endangered, threatened, or of special concern. We re-examined 30 Texas waterbodies surveyed by the Texas Parks and Wildlife Department in 1970s and later to assess the changes in unionid diversity. We found that Sabine and Neches Rivers, B.A. Steinhagen Reservoir on Neches River, Village Creek in Big Thicket National Preserve, and Sanders Creek in East Texas still maintain high diversity of unionids. Species of concern including *Fusconaia askewi* and *F. lananensis, Pleurobema riddelli, Lampsilis satura* and *Potamilus amphichaenus* are present in several East Texas rivers and creeks. Living specimens of rare, endemic *Quadrula aurea*, *Q. petrina*, and *Lampsilis bracteata* were found in Central Texas rivers. However some of these rare mussels were not longer found in several creeks in Central Texas that suffered from droughts and dewatering or scouring floods. Several large reservoirs surveyed had drought- and drawdown-related low waters in recent years that caused reductions in mussel abundance and diversity.

59 THE SNAIL OR THE EGG? EARLY LIFE HISTORY FACTORS CONTRIBUTE TO INVASIVE SUCCESS OF APPLESNAILS
Matthew A. Barnes*, Southwestern University, Georgetown, TX, and Romi L. Burks, Southwestern University, Georgetown, TX

The exotic freshwater applesnail *Pomacea "canaliculata"* recently invaded the US. High fecundity and wide environmental tolerances provide ecological advantages to this and other aquatic invasive species. Egg clutch survival and subsequent hatchling growth represent the first steps toward establishing a viable population capable of producing negative ecological and economic impacts. We explored the egg-to-hatchling transition by 1) documenting hatching timing and efficiency under varied ecological conditions; 2) exploring size of emerging hatchlings; and 3) tracking individual hatchling growth under multiple stressors. By measuring emerging hatchlings, we established that an operculum width of approximately 1.1mm acts as a threshold size which triggers hatching. Additional time to hatch did not lead to larger hatchlings. In early trials, we found that a high proportion of the eggs in a clutch hatched successfully, despite the result that eggs deposited over fish-cued water exhibited significantly delayed hatching times. Despite similar initial sizes, hatchlings exhibited different growth patterns when presented with fish cues or when grown in fresh or salt water (6 ppt). Later trials failed to replicate significant hatchling delay, possibly due to overlap in the timing of original clutch deposition. Current experiments focus on resolving this discrepancy. Overall, our work on early life stages of *P. "canaliculata"* may lend insight into what makes a successful invasive species, especially in aquatic systems.

60 SPRING ECOSYSTEMS OF THE TEXAS HILL COUNTRY: ECOLOGICAL STRUCTURE, A CONSIDERATION OF THEIR IMPORTANCE, THREATS TO THEIR EXISTENCE, AND EFFORTS FOR THEIR CONSERVATION

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The Texas Hill Country (THC) in central Texas is characterized by large number of springs fed by the Edwards Aquifer and consists of all or parts of 23 counties and boasts at least 126 notable springs (Brune 1981). These springs are an important natural resource in a semiarid region and form the headwaters of many rivers (Colorado, Nueces, Frio, Guadalupe, Blanco, San Marcos, and Llano). From a biodiversity perspective, springs in Texas are biologically unique and are home to numerous species of endemic flora and fauna. Here, I compare and contrast similarities and differences in the physical, chemical and ecological characteristics of 15 THC springs. The springs are thermally constant, clear and are chemically characterized by high alkalinities because of the limestone geomorphology of the region. Community and trophic structure among springs varies along a continuum of autotrophic to heterotrophic, depending on flow volume and whether they emerge in closed or open canopy locations. A significant component of the flora and fauna of urban springs is comprised of exotic species. During this century, larger springs have suffered declines in flow and thousands of small springs have ceased flowing due to declining water levels. Threats to spring ecosystems are mining of aquifers associated with human population growth, agricultural practices, urbanization, pollution, exotic species and climate change. The most serious is depletion of groundwater; at least 65 of the 281 major and historical springs in Texas no longer flow. Protection of springs can involve public education, water conservation, groundwater districts, water plans and alternate water supplies, lawsuits and land/watershed management programs.

61 BAHIA GRANDE RESTORATION: INTERIM SEDIMENT RESULTS, 2005

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As part of the Bahia Grande restoration monitoring effort, replicate sediment cores were collected at 5 unique and different locations inside the basin at 2 sampling intervals during November and August 2005. The sampling will continue quarterly for the next 2 years. One of the primary objectives of our study is to determine sediment characteristics most suitable for seagrass establishment and subsequent ecosystem development. The geochemical and sedimentological model for the restoration of the Bahia Grande basin is a hypersaline setting somewhere between to South Bay and San Martin Lake (Lower Laguna Madre). Generally the basin contains a layer of clay-silt sized material that is most likely wind blown "dust" that has collected and remobilized in the basin for the last 65 years during a period of dry conditions. This "dust" layer demonstrates expansion features, following salt water hydration, that creates an extremely soft layer 3-6 cm deep. Sample analysis for grain size, carbonate/organic carbon and metals are currently underway. However results to date, from the upper 10 cm of core samples, indicate a clay/slit component (from less than 63 to greater than 0.5 mm) makes up over 75% of the grain size of the upper Bahia Grande sediment. In addition, carbonate (as $CaCO_3$) ranges from 10 to 18% by weight and is somewhat variable between cores collected at the same location. Organic carbon is generally less than 1% as measured by the Wakley-Black method. Metals are currently being analyzed by atomic absorption spectroscopy and include Na, K, Ca, Mg, Fe, Mn, Zn, Cu, Pb, and As. Results from the metals analysis are pending.

62 THE REESTABLISHMENT OF FISH POPULATIONS IN THE BAHIA GRANDE

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On July 16, 2005, the Bahia Grande, a 2,600 hectare basin, was reconnected to the lower Laguna Madre by way of a 4.5 m wide pilot channel extending from the Brownsville Ship Channel. This event marked the first permanent flooding of the Bahia Grande in over 70 years. A monitoring program was established to gauge the ecological health of specific habitats and communities during and after channel completion. The reestablishment of the nektonic community is being monitored quarterly and monthly utilizing bag seine and gill net sampling, respectively. Bag seine sampling is conducted at nine randomly selected edge-of-the-bay locations. Three randomly placed 61 m experimental gill nets of varying mesh sizes are utilized to target larger fish species. In less than two months following the opening of the pilot channel, six fish species have been documented, predominately the omnivorous sheepshead minnow (*Cyprinodon variegatus*).

63 RESOLUTION OF *PERKINSUS MARINUS* CHROMOSOMES USING PULSED FIELD GRADIENT GEL ELECTROPHORESIS

Elisa Moreno*, Michael Lehker, and David Hicks. The University of Texas at Brownsville, Brownsville, TX

Perkinsus marinus, a protozoan parasite of the Eastern Oyster, *Crassostrea virgnica* is a well studied organism with a complex life cycle and elusive virulence factors. It has caused widespread destruction of natural and man-made oyster beds along the Eastern and Gulf coasts of the United States. Since its initial discovery in the late 1940's many studies have been published concerning this pathogen but none describing its chromosome number and size. The electrophoretic karyotype of *P. marinus* was determined using pulsed field gradient gel electrophoresis (PFGE). *Perkinsus marinus* isolates from different geographical areas along the U.S. coastline were also obtained to determine if the observed karyotype was conserved.

64 POTENTIAL SPREAD AND ECOSYSTEM IMPACTS OF *LIMNOPERNA FORTUNEI* IN TEXAS

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Although the zebra mussels (*Dreissena polymorpha*) have the potential to colonize Texas, their spread will be limited because of high summer temperatures, and low pH and calcium concentrations found in many waterbodies. However, Texas freshwaters may be a perfect environment for another invasive bivalve, the golden mussel (*Limnoperna fortunei*). *Limnoperna fortunei* has a very similar life history and ecosystem impacts as *D. polymorpha*, and environmental limits similar to *Corbicula fluminea*. Therefore, to predict the potential spread and ecosystem impacts of the golden mussel we can use data on two other exotic bivalves for which we have more extensive data. The spread of *Corbicula* in Texas was very fast. Within 20 years of its initial discovery in 1958 *C. fluminea* spread to all major drainage basins in Texas, and by 2004 was documented in 180 counties. In the near future *Corbicula* may colonize most second order or greater streams and all but the smallest impoundments in Texas. We predict that the spread of *Limnoperna* across Texas may be even more impressive. Both *D. polymorpha* and *L. fortunei* attain extremely high densities, physically changing the substrate, and because they are such effective suspension feeders they greatly enhance benthic-pelagic coupling and act as powerful ecosystem engineers. We predict that the introduction of *Limnoperna* may have large effects on the species composition, density, and biomass of native benthic invertebrates. In addition it will cause increases in water transparency, macrophyte overgrowth, abundance of bentivorous fish, and decreases in the densities of phytoplankton and zooplankton, total phosphorous, and suspended matter. One of the most obvious negative effects of this invader will be on native unionids that already considered the most endangered freshwater group in Texas.

65 EFFECT OF SEDIMENT NUTRIENT ADDITIONS ON SEAGRASS GROWTH IN OLIGOTROPHIC AND EUTROPHIC AREAS OF THE LOWER LAGUNA MADRE, TEXAS

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In order to determine if sediment nutrients limit the growth of *Thalassia testudinum* (turtle grass) at eutrophic and oligotrophic sites in the Lower Laguna Madre, sediment nutrient additions (N, P, N+P, Cont) were made in July 2004 and March 2005. Seagrass response was monitored by measuring leaf growth rates and tissue N levels in August 2004 and May 2005. No response to nutrient addition was seen in August 2004 at either site. By May 2005 at the oligotrophic site, leaf growth rate was higher in the N+P treatment compared to other treatments but the difference was not significant ($p=0.12$). At this site, tissue N was significantly higher in the N+P treatment compared to the others ($p=0.006$). In contrast to the current study, a previous study in the same area concluded that N was limiting.

66 MERCURY CONCENTRATIONS IN FISH FROM CADDO LAKE, TEXAS

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We compared mercury concentrations in largemouth bass (*Micropterus salmoides*) to mercury concentrations in other game fish from Caddo Lake, Texas and determined how habitat type, trophic position, growth rate, and genetics were related to mercury concentration in largemouth bass. Largemouth bass and freshwater drum (*Aplodinotus grunniens*) had the

highest concentrations of mercury and white bass (*Morone chrysops*) and channel catfish (*Ictalurus punctatus*) had lower concentrations of mercury. Largemouth bass from different habitats exhibited different mercury – total length relationships with individuals from shallow, vegetation-dominated habitats having higher concentrations of mercury than individuals from open-lake habitats. The trophic position of largemouth bass (measured with ^{15}N) was not statistically different between the two habitat types. Growth rate of largemouth bass was higher in the open-lake habitats than the shallow, vegetation-dominated habitats. Largemouth bass did not exhibit significant population genetic substructure between the two habitats. Largemouth bass growth rates between the two habitats were not related to differential occurrence of Florida subspecies largemouth bass (*Micropterus salmoides floridanus*). We suggest that when a lake may be contaminated with mercury, game fish in the lake should be collected from multiple habitats when assigning fish consumption advisories.

67 DISTINCT PALETTES: FEEDING PREFERENCES BETWEEN NATIVE AND EXOTIC APPLESNAIL POPULATIONS

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Depending on their resource consumption, large benthic invertebrates may disproportionately impact aquatic habitats. For example, populations of *Pomacea 'canaliculata'* (genetics under review), have spread beyond their native South American habitat to the US and pose a serious threat to aquatic vegetation and agriculture. However, other native applesnail populations, i.e. those that function more as grazers than consumers, exist under our ecological radar and pose little threat. Our work investigates what factors affect applesnail resource consumption by examining feeding discrepancies between exotic (Armand Bayou, Texas) and native (Uruguay) populations. To test how predators influenced feeding, we presented exotic *Pomacea* with a choice of resources (lettuce, *Lactuca sativa longifolia*, or Eurasian watermilfoil, *Myriophyllum spicatum*) along with either fish cues, crushed conspecific cues, or both. We found that fish cues slightly increased consumption, while conspecific cues resulted in the reverse trend. In contrast, fish cues did not affect consumption by native snails, perhaps due to abundant avian predation in natural habitats. To examine the influence of plant structure, we presented 2 forms (whole versus reconstituted) of 3 plants (lettuce, *Myriophyllum*, and water hyacinth, *Eichhornia crassipes*) to adult and juvenile applesnails. The exotic population exhibits a slight preference for whole resources, while our native population demonstrates slight preferences for the reconstituted plants. However, both populations failed to substantially consume *E. crassipes* in either form. Chemical defense extracts derived from either *M. spicatum* or *E. crassipes* also deterred feeding in both populations. Overall, the exotic, invasive population shows little evidence of discrimination in plant preference and avidly consumes whole plant tissue, while the native population seems more adept at grazing reconstituted plants. These distinct palettes that suggest contrasting ecological roles of consumption versus grazing may indicate which types of habitats could be more susceptible to applesnail invasion.

68 ONTOGENOUS PREY SPECIFIC SELECTION AMONG YELLOW MUD TURTLES (*KINOSTERNON FLAVESCENS*)

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The Yellow Mud Turtle (*Kinosternon flavescens*) is a small terrapin common throughout most of its range in the southwestern United States, and feeds on benthic crustacea and molluscs. Comprehensive diet studies of *K. flavescens* are singularly lacking in scientific literature while research regarding the affects of ontogeny on diet selection are prevalent for other aquatic vertebrate predators. This study proposes to assess the summer diet of a population of *K. flavescens* within the Elephant Mountain Wildlife Management Area, Brewster Co., Texas, and quantitatively analyze the affect of ontogeny upon dietary shifts within a sample of 51 individuals. To achieve these goals, turtles were captured, measured, weighed, and isolated for a period of days to collect fecal samples. Fecal samples were suspended in 70% ethanol, dissected, and their dietary contents identified and volumetrically measured by family taxa. Each family was compared independently against turtle size to gauge the ontogenous affect upon prey selection.

69 BENTHIC COMMUNITY REDEVELOPMENT FOLLOWING RESTORATIONS AT BAHIA GRANDE

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On July 16, 2005, the Bahia Grande was reconnected to the lower Laguna Madre by way of a 15 foot wide pilot channel extending from the Brownsville Ship Channel. This event marked the first permanent flooding of the Bahia Grande in over 70 years. A monitoring program was established to gauge the ecological health of specific habitats and communities both during and after project completion. The redevelopment of the benthic community is being monitored by quarterly sampling of sediments at 24 randomly selected stations distributed across the basin. Invertebrates are identified and

enumerated from four replicate core samples collected at each station. In less than two months following the opening of the pilot channel, Bahia Grande has filled to its margins with some areas > 0.5 m in depth. Benthic habitats were quickly colonized by lush growths of blue-green algae. The first macroinvertebrate colonizers of flooded sediments were surface deposit feeding nerid and spionid polychaete worms.

70 THE INFLUENCE OF PHYSICOCHEMICAL FACTORS AND WIND-INDUCED RESUSPENSION ON MICROALGAL AND ZOOPLANKTON COMMUNITY ASSEMBLAGES IN A SHALLOW COASTAL EMBAYMENT, SOUTH BAY, TEXAS
Jennifer S. Stone, Texas A&M University, Galveston, TX

Plankton communities are important members of the food web in coastal systems and are regulated by top-down and bottom-up controls. This study examined the influence of bottom-up controls, the physicochemical factors, on the microalgal and zooplankton community assemblages in South Bay, Texas. Both phytoplankton and microphytobenthic photopigments were ascertained by HPLC to determine the relative abundances of major algal classes. Zooplankton were identified to the lowest possible taxon and enumerated. No spatial trends were observed for the physicochemical factors. The northern bay sections exhibited higher phytoplankton and microphytobenthic diatom biomass, and higher copepod and brachyuran zoea larval abundances, probably due to their proximity to the bay inlet. The southern bay sections experienced higher cyanobacterial, euglenophyte and chlorophyte biomass, and higher total zooplankton, nauplii, gastropod veliger, and polychaete larval abundances. Sampling the inaccessible areas of the bay in the future may reveal that spatial variability among the physicochemical factors does exist and could be influencing the spatial distribution of plankton observed in this study. Temporal variation for the physicochemical factors followed a typical seasonal distribution for subtropical climates. Phytoplankton biomass peaked in February, August, and October but these peaks were not significantly different from the other months sampled. Microphytobenthic biomass reached a maximum during the summer months, while diatom biomass also peaked in February. Zooplankton abundances were generally higher in late summer, but nauplii and polychaete larvae experienced an additional peak in February. The seasonal variability among the physicochemical factors influenced seasonal changes in the plankton communities. The relationships between wind speed, turbidity and the microalgal pigments were assessed to determine if wind-induced resuspension influenced the location of the major algal classes within the water column compared to the sediments. Wind speed and turbidity exhibited a direct relationship with each other, albeit insignificantly. Some of the phytoplankton and microphytobenthos were considered tychopelagic because wind-induced resuspension was shown to affect their biomass in the water column compared to the sediments. The physicochemical factors exhibited bottom-up control of plankton community dynamics in this study, but whether this control is the dominant force influencing their distribution should be the focus of future studies.

71 HABITAT USE OF THE TEXAS RIVER COOTER (*PSEUDEMYS TEXANA*) IN SPRING LAKE, HAYS COUNTY, TEXAS
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Little information is available in the literature reporting underwater habitat use by freshwater turtles. Most investigators have focused on terrestrial and water surface habitat associations. Therefore, a major component of the habitat remains an unknown for these animals. We studied underwater habitat use by the Texas river cooter (*Pseudemys texana*) in Spring Lake, Hays County, Texas. The lake is composed of a lotic spring-fed portion (main lake) and a lentic slough. The spring-fed portion has a constant temperature (22 + 2° C) and a vigorous flow (average annual flow = 166.0 cfs). Hour-long dives were conducted in the main lake approximately twice per week for a year in order to detect variations in seasonal habitat use. Data recorded for each observed individual included its sex, behavior, habitat, and depth within the water column. The number of *P. texana* observed was higher in the winter and spring, with the greatest numbers occurring January through March. Turtles were found more often in shallow water (less than 1 m) during the summer and fall, with an increase in use of the 1-3 m and > 3 m depths during the winter and spring months. Other results included differences in depth and habitat use by sex.

P42 LONG-TERM DYNAMICS OF UNIONID DIVERSITY IN THE NECHES RIVER BASIN, TEXAS
Daniel L. Bennett*, Lyubov E. Burlakova, Alexander Y. Karatayev, Stephen F. Austin State University, Nacogdoches, TX

East Texas and especially the Neches River basin have one of the richest assemblages of unionid species in Texas. To assess the current status and long-term dynamics of unionid diversity we analyzed data on Neches River basin, including the

Neches and Angelina rivers, Attoyac Bayou, Sandy, Lanana and Village creeks, and B.A. Steinhagen Reservoir. We found that many of the waterbodies surveyed still maintain high unionid diversity, including rare endemic species. The most diverse unionid communities were found in Village Creek, the Neches River, and B.A. Steinhagen Reservoir. The highest density of unionids was found in Village Creek (in the Big Thicket National Preserve), where the community was dominated by *Fusconaia askewi*, and *Quadrula mortoni*. However, in several waterbodies, unionid diversity dramatically declined due to habitat destruction, and especially canalization.

P43 BAHIA GRANDE RESTORATION: INTERIM WATER QUALITY REPORT, 2005

Erin Bieberbach*, Ruben Trevino, Antonio Villarreal, Hudson DeYoe and Thomas Whelan III. Center for Subtropical Studies and Biology/Chemistry Depts., University of Texas-Pan American, Edinburg,TX.

The Bahia Grande is a 6,500-acre basin located within the Laguna Atascosa National Wildlife Refuge in southern Cameron County, Texas. This area is part of the Bahia Grande Restoration Project, which is a US Fish and Wildlife Service effort to restore the Bahia Grande to pre-1930s condition by re-establishing tidal exchange with marine waters of the Brownsville Ship Channel. One objective of our study is to monitor basin water quality changes quarterly during restoration. Field data (temperature, salinity, conductivity, pH, depth) was collected and sampling occurred in August 2005, one month after the resumption of tidal exchange and in November 2005. During each trip, water samples were collected at 9 sites in the basin and were analyzed for water column chlorophyll *a*, nitrate-nitrite, soluble phosphate, ammonium and total suspended solids. Sediment samples were collected and analyzed for benthic microalgal chlorophyll *a* levels. Notable was the initially high salinity levels in August average 51.5 ppt (SD=23.5, range 22 to 99) which declined slightly by November to 47.1 ppt (SD=1.8, range 43 to 49). Average basin water depth increased from 0.22m in August to 0.48m in November. Water column nutrient levels were generally low through this period.

P44 SOILS, HYDROLOGY, VEGETATIVE ECOLOGY, AND FLORISTICS OF NATURAL AND CONSTRUCTED WETLANDS ALONG THE LEON RIVER IN THE WEST CROSS TIMBERS, COMANCHE COUNTY, TEXAS

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Two wetlands located along the Leon River in the West Cross Timbers, Comanche County, Texas were examined during this study. A wetland constructed during 1999 and a natural wetland established by beavers, were compared based upon soils, hydrology, and vegetative ecology. Comparative data was collected from transects along a baseline in each wetland for one year. Relative coverage, density, frequency, importance values and diversity were determined. In addition, a floral survey was conducted for two years. This data was examined to determine native versus introduced species, endemic species, threatened and endangered species, as well as range extensions and county records. Management strategies and resources for wetland restoration are also discussed.

P45 DISTRIBUTION OF A DRAGONFLY AT ITS ALTITUDINAL LIMIT

Mark Gustafson, Texas Lutheran University, Seguin, TX

The abundance and diversity of dragonflies declines with increasing altitude and latitude, but a few species are found at high altitudes and latitudes. *Ophiogomphus severus* (Odonata: Gomphidae) occurs as larvae in streams throughout the mountainous regions of the western United States. I sampled 44 sites in sub-alpine streams of central Idaho to determine the distribution of larvae relative to altitude (1900-2700 m above sea level). Thermistor-type loggers were used to measure summertime water temperatures at the same sites. *O. severus* was the only dragonfly larva present and was found only in a few streams that had been warmed by lake outflow. These results suggest that water temperature, rather than air temperature, is the primary factor determining the altitudinal limit of this species.

P46 ECOLOGY OF THE MAYFLY *CAMPSURUS DECOLORATUS* IN LAKE MCQUEENEY, TEXAS

Hannah Johnson*, Dustin Wyatt, and Mark Gustafson, Texas Lutheran University, Seguin, TX

Campsurus decoloratus (Ephemeroptera: Polymitarcyidae) is a burrowing mayfly that has been recorded at <10 sites in the United States (all in Texas). We collected larval mayflies from the sediments of Lake McQueeney in south-central Texas during 2005. Lake McQueeney is a 160-ha shallow reservoir on the Guadalupe River. Most of the lake bottom consists of fine

sediments. Larvae of *Campsurus decoloratus* as well as the burrowing mayfly *Hexagenia* (Ephemeroptera: Ephemeridae) were common throughout the lake. Measurements of head width suggest that the population in this lake has one generation per year.

P47 INDUCTION AND ACTIVITY OF SUPEROXIDE DISMUTASE (SOD) ISOZYMES IN *AIPTASIA PALLIDA*

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There are a variety of enzymes that act as defense chemicals under stress conditions. One of these is superoxide dismutase (SOD). The role of SOD is to scavenge free radicals, including singlet oxygen and superoxide radicals, to prevent eventual peroxidation of membranes and cell death. In this study, we have documented the induction and activity of SOD isozymes in the symbiotic anemone, *Aiptasia pallida*, under chronic and acute stress. Our objective was to determine the advantages of the symbiotic relationship under common environmental stresses. We have documented the responses of symbiotic anemones, aposymbiotic anemones and isolated algae (*Symbiodinium* sp) to both chronic and acute salinity and temperature stresses. We have determined that there is one constitutive isozyme in the anemone *A. pallida*. For the two induced isozymes we observed, it would appear that a minimum of 48 hours is needed for biosynthesis. Pseudo-2-D gels revealed a detailed look at the isozymes. Using Western blotting, we were also able to determine where the isozymes were produced. In quantifying SOD activity, we found that aposymbiotic anemones have a significant increase over controls and symbiotic anemones. Isolated algae exhibited no change under stress conditions. Since sea anemones are a model system for coral, which have the same symbiotic relationship with algae, better understanding of stress response mechanisms of anemones may give us greater comprehension of the causes of coral bleaching in order to devise suitable solutions.

P48 OCCURENCE OF MICROCYSTIN-LR AND ITS POTENTIAL EFFECT ON AQUATIC ORGANISMS IN TWO TEXAS RESEVOIRS

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Blooms of various toxic algae species have contaminated municipal drinking water reservoirs at the global scale. Of particular concerns in freshwater systems are cyanobacteria, which are known to toxins that have caused adverse effects or even death in animals. The objective of this project is to characterize the occurrence of microcystin-LR in two Texas reservoirs, Lake Waco and Lake Conroe, and to utilize a common bioassay to assess ambient water quality of the impoundments. Both reservoirs were sampled in summer 2005 at three sites each: two sites in transition zones and one main lake stations. To assess ambient water quality of the impoundments, general water chemistry analysis was performed for each reservoir sample. In addition, 21 d Daphnia magna chronic toxicity bioassays were performed for each field sample. At the end of the study period, survival, growth and reproduction responses were statistically evaluated for each lake water sample. An Enzyme-Linked ImmunoSorbent Assay was used for quantitative detection of microcystin-LR in surface water samples. Results indicated that main lake samples from Lakes Conroe and Waco and the North Bosque transition zone in Lake Waco displayed ambient toxicity to D. magna. In addition, samples from both reservoirs contained microcystin-LR, including several samples that exceeded the World Health Organization guidelines of 1.0 µg/L.

P49 A COMPARISON OF POREWATER AMMONIUM LEVELS BETWEEN VEGETATED AND UNVEGETATED SEDIMENTS

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Purpose of this study was to compare ammonium levels in the sediment pore water between a seagrass (*Thalassia testudinum*) bed and an adjacent unvegetated zone. Pore water samples were collected at both sites in summer and fall 2005 (80 samples were collected on 4 trips) and analyzed on-site using field analysis kit (Hach®) and in the lab using the phenol-alcohol method. The lab analysis gave consistently higher ammonium values than the field kit. In all collections, ammonium concentration was significantly higher in bare zones compared to seagrass beds ($p=0.05$), however, there was considerable within site variability. When attempting to compare porewater ammonium levels, samples should be consistently collected in or out of seagrass beds.

GEOLOGY AND GEOGRAPHY

72 EVOLUTION OF GALVESTON ISLAND AND THE BOLIVAR PENINSULA, TEXAS

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The morphology and stratigraphic framework of Galveston Island and Bolivar Peninsula suggest that these features originally formed at a time of lower sea level as strand plains associated with a postulated wave-dominated delta produced by a combination of the Trinity and San Jacinto rivers. This postulated delta was probably similar to today's wave-dominated Brazos and Sabine deltas which are on trend with Galveston Island and Bolivar Peninsula. As sea level rose during the Holocene, the Trinity/San Jacinto delta and surrounding areas were modified by the transgressing sea, long-shore currents, tides, subsidence and compaction of earlier fluvial and deltaic sediments under the present bays. This combination of factors modified the former strand plains of the earlier delta into Galveston Island on the west and Bolivar Peninsula on the east. As sea level rose, lagoons and shallow marshes behind the strand plain flooded and formed East and West Galveston bays. This flooding moved the location of the Trinity and San Jacinto River deltas from the coast to their present location in Trinity and Galveston bays. Separated into two deltas and isolated from the present coast, they became tide-dominated deltas as opposed to the postulated wave-dominated delta they formed when joined during the lower sea level stand. Since sea level rose, both Galveston Island and Bolivar Peninsula have migrated and will continue to migrate landward.

73 APOMORPHIC IDENTIFICATION OF FOSSILS AND THE IMPACT ON PALEOECOLOGIC INTERPRETATIONS

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For years, paleoecologists have drawn conclusions about paleoclimate by inferring the climatic tolerances of extant species and applying them to fossil specimens of the same species. These studies assume both that species level identifications are possible and that climatic tolerances of the organisms have not changed. The identification of fossil taxa is often facilitated by comparing specimens to living species that are found near the fossil site. This is potentially problematic because it would eliminate the possibility that a large shift in the geographic range of a species has occurred. In most cases, identifications are based on overall similarity rather than on apomorphic characters that can be evaluated phylogenetically. I chose North American shrews to address these potential problems of identification of fossil specimens, because shrews are commonly used in paleoecologic reconstructions. I identified apomorphic characters by converting dichotomous keys and other published descriptions of shrew species to coded phylogenetic characters. My focus was on cranial and dental characters. I scored these characters for a broad sample of North American shrews from mammalogy collections in an effort to identify apomorphic characters, understand the nature and quality of the characters, and to determine their power for taxonomic resolution. I analyzed the characters in two ways. First, I ran a phylogenetic analysis with multiple specimens for each species. I recovered several monophyletic species in this analysis, including *Blarina hylophaga, Blarina carolinensis,* and *Cryptotis goldmani. Blarina brevicauda, Cryptotis parva* and *Cryptotis magna* were paraphyletic when a strict consensus of most parsimonious trees was used. For the second analysis, I mapped the characters onto a previously published consensus tree based on molecular and morphologic characters. From this analysis, I identified some apomorphic characters, but most taxa were not supported by unambiguous apomorphies. The traditional characters used to identify fossil shrews do not appear to be effective for most species. New characters and quantitative characters may yield additional apomorphies that would help resolve the paraphyletic taxa and more confidently identify fossil taxa.

74 AN EXAMINATION OF THE ROLE OF CAVES AS REPOSITORIES OF UNIQUE PALEONTOLOGICAL DATA

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The record of late Pleistocene fossil-bearing cave deposits encompasses many geographic regions, including areas that are not characterized by major karst topography. In some cases, caves are the primary source of paleontological data for a given geographic region (e.g., the Great Basin). Because caves are widespread and occur in many elevational and habitat gradients in the United States, it is reasonable to hypothesize that they may preserve relatively unique aspects of the fossil record. Specifically, I was interested in evaluating how important cave deposits are in preserving records of taxa that inhabit areas that are not conducive to fossil preservation (e.g., species inhabiting higher elevations). In order to test the hypothesis that caves provide unique contributions to the fossil record and to evaluate possible bias in species representa-

tion from cave deposits, I calculated percentage values of species representation from cave deposits for the late Pleistocene based on the FAUNMAP database. Each individual species was evaluated in relation to the overall late Pleistocene record and at the clade-level in an attempt to separate broad patterns of preservation from those unique to individual taxa. Twenty-five of 146 species considered in this study had calculated values that I considered high relative to the overall fossil record. Of these, 14 species were recognized only from cave deposits, suggesting that cave deposits do make unique contributions to the fossil record.

75 GEOLOGICAL INTERPRETATIONS OF REMOTE SENSING IMAGES

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The goal of our study was to identify structural features and build a tectonic model by interpreting and analyzing Landsat TM images in an oil exploration area, Hadramaut region in the Arabian Peninsula. Our methods included combination of seven bands of different wavelengths in RGB colors, ratioing between bands and combining landsat images with three-dimensional display of digital elevation models (DEM). The tectonic model deduced from our observations includes a major half-graben setting south of a plateau area that developed in an extensional stress field. The half-graben is divided by three pairs of normal faults that have opposite polarities. Two of these faults join together and form a triple junction in the vicinity of a salt diapir exposed to the surface. The tectonic model is supported by subsurface seismic data.

76 STRUCTURE AND GEOLOGIC EVOLUTION OF EXTENSIONAL BASINS: SE IDAHO

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Geologic mapping, gravity data, seismic data, and well control are combined to develop a detailed picture of the structure, stratigraphy and evolution of Marsh Valley, northern Cache Valley, and surrounding basins in the transition between the Basin and Range province and the Rocky Mountains. Gravity maps and 2 1/2 D forward gravity models constrained by the other data indicate two distinct phases of extension in the study area: Phase 1 (about 10 - 5 MA) and Phase 2 (about 4 - 2 MA). Phase 1 normal faulting and deposition of the late Miocene to Pliocene Salt Lake Formation was probably controlled by the underlying, west-dipping Bannock detachment fault system. The upper plate of the Bannock detachment remained relatively intact during the early stages of extension, allowing coarse grained deposits to be overlain by extensive lacustrine deposits. Later extension of the upper plate was not concentrated at the breakaway zone, but was distributed throughout the plate, breaking it into numerous, mostly east to northeast-tilted half grabens that resulted in deposition within more isolated subbasins. Phase 2 faults reactivated or cut Phase 1 faults, causing widening and large scale subsidence of Marsh Valley towards the south, and separation of Marsh Valley from northern Cache Valley due to uplift of Oxford Ridge. Phase 2 faults, when combined with Phase 1 faults, created several grabens within Marsh Valley and accommodation zones between Marsh Valley and northern Cache Valley.

77 ECOLOGICAL POSITION OF FOSSIL HOMINIDS FROM THE LATE QUATERNARY OF DIE KELDERS CAVE 1, SOUTH AFRICA

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The hominid fossils of Die Kelders Cave 1, South Africa, are of great interest to paleoanthropologists because they occur in discrete stratigraphic intervals and include the transition into anatomically modern humans. Moreover, the deposits contain several hundred thousand identified mammalian fossils that yield insights to the interaction of fossil hominids and their environments. The entire mammalian fauna from Die Kelders Cave 1 was analyzed to determine whether the ecological position of fossil hominids shifted with the derived behavioral change associated with the transition into anatomically modern humans. In this study, body mass was used as a proxy for ecological change; body-masses of mammals in an ecosystem are distributed discontinuously in clumps (Holling's textural discontinuity hypothesis), rather than spread evenly. The gaps between body mass clusters were calculated using a split moving-window analysis. The body-mass clusters for the Die Kelders Cave 1 faunas changed in number, boundary values, and taxonomic composition. However, the positions of the fossil hominids were static, consistently occurring near the upper boundary of a cluster. Modern herptiles, birds, and mammals which fall on the edges of these clusters have been suggested as more subject to extirpation. If similar conclusions are applicable to Die Kelders Cave 1, southern African hominids may have evolved into anatomically modern humans in response to this ecological stress

78 SIGNIFICANCE OF FISH OTOLITHS FROM THE CERVESA LOCAL FAUNA FROM THE GATUN FORMATION (MIOCENE) OF PANAMA
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Preliminary field surveys conducted in the Miocene Gatun Formation in the Panama Canal Basin in the summer of 2004 yielded shark and fish skeletal remains (primarily teeth) and well-preserved fish otoliths at a locality between Colon and Sabanitas. The locality appears to be in the Lower Gatun Formation and dates at approximately 9.5 Ma. Systematic surface collecting at the site produced approximately 50 otoliths and indicated the high potential for additional specimens with bulk sampling. Subsequent bulk sampling was completed in 2005 and resulted in over 1200 otoliths being obtained from the washed residue. The assemblage, referred to as the Cervesa local fauna, has a diverse, marine teleostean fauna represented by fish otoliths. The fishes include abundant shallow water forms such as gobiids, bothids, haemulids, engraulids, and sciaenids such as *Equetus* and *Cynoscion*. The Cervesa local fauna is considered highly significant for several reasons. The large number of otolith specimens will permit detailed studies of the systematics and evolution of actinopterygians prior to the Miocene constriction of the Caribbean-Pacific seaway and the Pliocene emergence of the Isthmus of Panama. Analysis of otoliths from the Gatun Formation in conjunction with the Panama Paleontology Project utilized specimens from twelve different localities. The Cervesa local fauna represents a large number of otolith specimens from a single locality, which will allow the determination of paleoenvironmental parameters more accurately and with greater specificity.

79 EVOLUTION AND DEVELOPMENTOF HYDROTHERMAL VENTS AT MID-OCEAN RIDGES
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Hydrothermal vent systems provide us with a unique window into a variety of geological, geophysical, chemical, and biological processes that occur at mid ocean ridge spreading centers. The early research in hydrothermal vent systems tended to focus on the static features of these systems; the structures of the mounds and spires, the mineralogy of the structures and the chemistry of the effluent, and the bizarre flora and fauna found nowhere else. As more of these systems were discovered globally, the differences between them started to be examined in more detail. This is leading to a deeper appreciation of the dynamic features of these vent systems. This paper focuses on the dependence of these systems on spatial variables such as the relevance of nearby fault systems for the conduction of heat flow as well as the evolutionary changes that occur as the system moves through time, such as the development of mound structures.

80 STRATIGRAPHY OF THE BURRO CANYON FORMATION AND INTERTONGUED DAKOTA SANDSTONE-MANCOS SHALE IN THE CHAMA BASIN, NORTH-CENTRAL NEW MEXICO
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The Burro Canyon Formation (Lower Cretaceous) and the Dakota Sandstone (Upper Cretaceous: Cenomanian), which contains two tongues of the Mancos Shale, are present throughout the Chama Basin. The Burro Canyon Formation consists of pebbly sandstones with some light-green mudstone lenses deposited in an easterly flowing braided-stream system. The Dakota-Mancos section is divided into 7 marine members in the Chama Basin, in contrast to the San Juan Basin to the west, where some nonmarine units are present. The entire stratigraphic section thins southward across the Chama Basin, but this is most notable in the thinning of the Clay Mesa Shale Tongue of the Mancos and the Paguate Sandstone Tongue of the Dakota. Prominent sequence-bounding unconformities, K1 and K2, bound the Burro Canyon Formation. A correlative conformity equivalent to the K3 sequence-bounding unconformity occurs at the base of the Cubero Sandstone Tongue of the Dakota. A possible sequence boundary occurs at the base of the marine Las Jollas bed, a local sandstone lens that occurs in the southern Chama Basin at the stratigraphic position of the upper Twowells Sandstone Tongue of the Dakota. The database for this research consists of 13 surface measured sections and wireline logs of 46 wells and is part of a much larger regional study than includes the San Juan Basin to the west.

81 PRODUCTION AND USE OF LARGE-SCALE PANORAMIC PHOTOGRAPHY IN FIELD-BASED SCIENCES

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Panoramic photography has been used as a method of landscape documentation since the mid-nineteenth century. Until the recent development of professional and prosumer quality digital cameras, professional quality panoramic photographs could only be produced using expensive, high-end, specialty film-based cameras. With the increasingly lower costs of high-end digital cameras and professional photo editing software, researchers can now produce large scale (up to 4.5 m X 8 m and larger, depending on the horizontal and vertical view angles and resolution of the image) panoramic images of field localities cheaply and easily. Production of a panoramic image beings with a study of the locality to determine the best angle of view and lighting conditions of the subject. A series of overlapping (at least 30% or more) photographs of the subject are taken with the aid of a tripod such that the entire view is recorded. Overlapping the shots helps to ensure proper stitching and color balance of the merged, final image. Individual photographs can be shot in landscape or portrait formats. Horizontal and vertical panoramic photographs can be shot using this method. To produce a panoramic photograph where both the vertical and horizontal field of views are enlarged, a series of overlapping panoramic photographs must be shot. Each of the overlapping panoramic photographs are stitched together individually before stitching together the overlapping panoramic photographs to produce the final image. Off-the-shelf computer programs, such as PanaVue ImageAssembler Professional and Adobe Photoshop, greatly assist with stitching and color correcting the image to produce a professional quality panoramic photograph that can then be annotated for presentation and publication.

82 PRELIMINARY ANALYSIS OF HURRICANE RITA WITH RESPECT TO OTHER MAJOR HURRICANES THAT HAVE STRUCK THE GULF COAST ALONG THE TEXAS-LOUISIANA BORDER AND HOW THESE STORMS HAVE SHAPED THE GEOLOGY AND ECOLOGY OF THE REGION

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Hurricane Rita was the first major hurricane (category 3 or greater) to strike the Gulf Coast along the Texas-Louisiana Border since Hurricane Audrey in 1957. Studies concerning how Rita affected the geology, biology, and human development of this section of the Gulf Coast will take years to complete. What is available now for discussion is a visual analysis of the affected area before and after Rita, how Rita's damage to the coast compares to damage caused by Audrey, and how major hurricanes have shaped the coastal geology and ecology of the area. A comparison and contrast of Rita with all recorded major hurricanes that have made landfall between Vermillion Bay, Louisiana and Freeport, Texas has been made so as to place Rita in a proper historical perspective.

P50 LATE-STAGE PYRITE FROM SOUTHERN ENDOCONTACT ZONE OF MAGNET COVE IGNEOUS COMPLEX, HOT SPRING COUNTY, ARKANSAS

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Magnet Cove Igneous Complex (MCIC) represents a subvulcanic association of differentiated alkali-magmatic rocks including jacupirangite, ijolites, feldspathoidal syenites, calciocarbonatite, phonolites, and other dike rocks atop a much larger, not exposed pluton. Mineralogy and petrography of MCIC rocks made it famous among the bodies defining the Mid-Cretaceous alkali-magmatic province of Arkansas. Hydrothermal alteration areas are widespread throughout the MCIC. They are characterized by Ti-oxides, molybdenite, ubiquitous pyrite, and feldspars. In the southern endocontact zone of the MCIC, pyrite occurs mostly as cubes (<4cm dia.) in several magmatic and hydrothermal rocks. Characteristic are abundant inclusions of rutile/brookite, sphalerite, chalcopyrite, pyrrhotite, galena, and silicates in most pyrites based on ore microscopic and SEM/EDS examinations. They document late-stage, hydrothermal phase chemistry and activity, and compare well with pyrite from the Cove Creek location studied earlier (Vance & Göbel, 2005).

P51 THE TAPHONOMY OF *ILYMATOGYRA ARIENTINA* IN THE BARTON CREEK WATERSHED: MAPPING THE ORIENTATIONS OF NEW DEPOSITIONAL BEDS

Tricia Jarrott, Kealing Magnet School and Christian George, The University of Texas at Austin, Austin, TX

The extreme grade of the watershed of Barton Creek as it approaches the Colorado River increases exposure of the Washita Group and the erosion of *Ilymatogyra arietina* fossils. After the fossils have weathered out they congregate and form new

deposits. These new depositional formations were mapped with GPS and then analyzed using GIS. Data was taken both prior to and post a major rain event.

P52 THE TAPHONOMY OF *ILYMATOGYRA ARIENTINA* IN THE BARTON CREEK WATERSHED: MAPPING THE DISTAL LOCATIONS USING GIS

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The Del Rio Formation has fossilerfous beds of *Ilymatogyra arietina* in the Washita Group that is exposed in Central Texas. Barton Creek cuts through one of these beds about 3.5 miles from where Barton Creek feeds into the Colorado River. GIS instruments were used to get locations of where fossils were found in relationship to the original site of erosion. Data was taken several times, both prior to and post a major rain event to compare results.

P53 CHIHUAHUA, NORTHERN MEXICO AND MAGNET COVE, ARKANSAS CARBONATITES: A COMPARISON

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Chihuahua and Magnet Cove carbonatite complexes occur in alkali provinces of Chihuahua, northern Mexico and Hot Springs County, Arkansas, USA respectively. Chihuahua carbonatite was emplaced, in multiple pulses, mainly into the Cretaceous and Tertiary felsic igneous rocks as a stock, breccia, and dikes whereas Magnet Cove carbonatite (MAC) complex intruded Paleozoic sedimentary rocks of Ouachita mountains as a ring-dike complex. Silica-saturated igneous rocks such as rhyolite ignimbrite, rhyolite, latite, porphyritic granite are associated with the Chihuahua carbonatite while nepheline-normative silica-undersaturated rocks such as ijolite and phonolite are common in the MAC complex. Xenoliths and roof pendants of host rocks were found in both the complexes. Largest outcrops of carbonatite found at these complexes measure 900-m in diameter in CHIC complex, and 2.3 km in length and about 600-m in width in the MAC complex. Carbonatite exhibits phaneritic texture at both the complexes. Silicate phases are absent in Chihuahua carbonatite while Magnet Cove carbonatite contains biotite, monticellite as major minerals in addition to calcite, and garnet as one of the accessory minerals. Three types of carbonatites, namely calico-, magnesio- and ferrocarbonatite, were identified at CHIC complex based on their major element abundances. Chihuahua carbonatites are associated with anomalous concentrations of LREE. Lanthanum concentrations range from 160 to 1540 ppm in calciocarbonatites and from 145 to more than 10000 ppm in ferrocarbonatites. Cerium concentrations range from 170 to 1740 ppm in calciocarbonatites and from 170 to more than 10000 ppm in ferrocarbonatites. Concentrations of REE, strontium, niobium and uranium in CHIC complex carbonatites and available field evidence suggest a differentiation trend. 40Ar/39Ar dates for pre- and post- carbonatite volcanic units in CHIC complex are 37.00±0.19 Ma and 35.61 ± 0.54 Ma respectively, constraining the time of carbonatite emplcament to Priabonian Age. Magnet Cove carbonatite was emplaced during Cenomanian Age. Continental crust of North American craton altered the isotopic signature of the CHIC complex melts during the ascent. Crustal involvement during the ascent of melts is precluded for Magnet Cove carbonatites. A characteristic change in the igneous style, and in the composition of volcanism post- 46 Ma in New Mexico, West Texas and in Chihuahua occurred due to the transition in stress regime, from Laramide crustal shortening to extension. The location of CHIC complex spatially and temporally is closely associated with the region affected by this transition. The genesis of the carbonatite melts and the subsequent emplacement of Chihuahua carbonatite must be one of the manifestations of the inception of the extension in the study region. Tectonic regime that controlled the emplacement of MC complex is not well understood.

P54 ONTOGENETIC CHANGE IN THE DENTITION OF A LATE LATE PLIOCENE COTTON RAT

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Fossil mammals are routinely identified by the occlusal patterns of their teeth, however, the variation of these patterns is seldom documented. Detailed descriptions of the qualitative and quantitative ranges of morphological features through ontogeny is especially lacking, even though it may aid in understanding species boundaries in fossil taxa and in relating evolutionary transitions. Large samples of *Sigmodon curtisi* from the late Pliocene of Florida show little change in the occlusal lengths of the lower dentition, and no correspondence between the ontogenetic age and the number of roots on the first lower molar (m1). Qualitative changes through ontogeny, however, were pronounced. The anteroconid is the last feature on the m1 to obtain the mature wear pattern. Subsequently, the second and third lower molars develop an enamel pit from the constriction of the second buccal reentrant angle by the anterior cingulum. With further wear, the lingual reentrant angles become constricted in all lower molars, and eventually are completely worn away.

P55 FOLD CORRELATIONS SUGGEST THE MUSKHOG SPRING FAULT, BIG BEND NATIONAL PARK, IS A REACTIVATED LARAMIDE STRUCTURE

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Structural analysis of well-exposed map-scale folds in Sierra del Carmen, Big Bend National Park reveals they formed in the same Laramide deformation phase, correlate with outcrop-scale folds, and are locally overprinted by outcrop-scale, second-phase folds caused by late Cenozoic high-angle faults. Lamar field camp students described folds no older than Cretaceous at Persimmon Gap, around Dog Canyon, and in Javelina Draw near Muskhog Spring. All three areas contain a single phase of map- and outcrop-scale Laramide folds. They are concentric folds, have ~N10W- N15E striking, steeply dipping axial planes, subhorizontal fold axes, rounded hinges, 90-120° interlimb angles, and lack axial-planar cleavage. A second phase of outcrop-scale folds only found within meters of late Cenozoic high-angle faults have various axial plane and fold axis orientations and more open interlimb angles. Folds in the Muskhog Spring area are similar to Laramide folds elsewhere, but are only found adjacent to the Muskhog Spring fault. The Muskhog Spring fault (R.A. Maxwell and others, 1967) cross-cuts Quaternary alluvium and the Tertiary McKinney Hills laccolith and displays ~650 m of apparent normal slip (Mustafa, 1988). Map relations and our fold correlations suggest the Muskhog Spring fault was a Laramide reverse fault reactivated during Basin and Range transtension.

P56 HYDROTHERMAL VENTS AT MID-OCEAN RIDGES: A GLOBAL SYNTHESIS

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We compiled available geological/geophysical data (topography, seismics, gravity, magnetics, heat flow, temperature) on a global scale relating to hydrothermal vent systems situated on mid-ocean ridges. These measurements have been taken on surface oceanographic ships, on submersibles, and by deepocean drilling with ODP. Hot water circulating through the crust by convection leaches minerals from the basaltic rocks and deposits them at the sea floor as chimney structures called smokers. The sulfide minerals present in the effluent are dependent on the temperature of the circulating fluids, eg, at high temperatures (~350°C) iron and magnesium sulfides and sulfates are observed. On fast spreading ridges such as the East Pacific Rise, we typically observe that the hydrothermal vent in situated directly above the axis of the mid-ocean ridge. On slow spreading ridges such as the TAG region of the Mid-Atlantic ridge at 26°N, the hydrothermal vent is typically off-set somewhat from the axis of the mid-ocean ridge, and is associated with the convergence of heat source and tectonic features.

MATHEMATICS

83 SERVICE LEVEL NETWORK RELIABILITY MEASURE: AN EMPIRICAL BAYES APPROACH

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In order to stimulate competition with Japan, Europe, and Korea in the fields of broadband and wireless technology, the US federal government issued the Telecom Act of 1996 which aims at encouraging competition and stimulating new technology implementation by opening up local access monopolies and deregulate local telecommunication services. This triggered massive optical fiber over-deployment in the US, created massive dot.com and E-commerce start-up, and exponential growth of Internet traffic.

Due to this explosive IP traffic growth over the past five years, carrying real-time voice and video traffic over Internet (VOIP) over the non-real-time "best effort" IPv4 network becomes the most pressing need for the telecommunication industry. This poses a great challenge for telecom network carriers, and is further complicated by the stringent reliability/availability requirements (.99999) of traditional voice networks. The traditional hardware-based network reliability measure would not provide the same reliability measure for QoS sensitive services. A new network reliability measurement based on QoS requirements for different services is needed. The key to resolving the challenge is to accurately estimate traffic flow in a network so that a network with optimized capacity can be designed. An Empirical Bayes estimation procedure to estimate live traffic during run-time was developed. The "asymptotic" behavior (property) of the Empirical Bayes estimator was also obtained. The resulting estimator will be applied to live traffic measurements and serve as input to Internet network design and network reliability engineering.

84 BIAS REDUCTION IN KERNEL ESTIMATORS

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New estimators are obtained by applying bias reduction techniques to kernel estimators. Asymptotic properties of the new estimators are determined and presented.

85 THE HOMEOMORPHISM OF THE STONE-CECH AND WALLMAN COMPACTIFICATIONS OF NORMAL SPACES

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Let X be a normal space. By using the collections of all basic open filters induced by the collection of all bounded real-valued continuous functions on X and all open filters induced by all closed ultra-filters on X, the Stone Cech and the Wallman compactifications of X can be obtained by the open filter process. It can be further shown that each basic open filter induced by the collection of all bounded real-valued continuous functions on X is exactly identical to an open filter induced by a closed ultra-filter on X and each open filter induced by a closed ultra-filter on X is exactly identical to a basic open filter induced by the collection of all bounded real-valued functions on X. Thus, the Stone Cech and Wallman compactifications of normal space spaces are the same in topological sense.

PHYSICS AND MATERIAL SCIENCE

86 QUANTUM PHENOMENA IN ATOMIC COLLISIONS BETWEEN NEON AND HELIUM ATOMS

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This project analyzes the possibility that two rare gas atoms can form a molecule during a collision. Using a model potential for the electrostatic interaction between He(1s2) and Ne*(2p53p) atoms developed by Bahrim C. et al. (Physical Review A56, 1305, (1997)), which also includes a Pauli repulsive potential, we generate several bonding potential wells characteristic for stable molecules. This suggests that a temporary HeNe* molecule could be formed. For testing this hypothesis, we search for modes of vibration within several electronic potential wells. Our model uses a Morse potential that best fits the electronic potential wells. In order to identify experimentally transitions between the modes of vibration predicted by our theory, a laser spectroscopy technique is proposed. We also predict the abundance of Neon atoms on certain excited states after collision and absorption of infrared radiation. Another part of this project analyzes an interference effect between collisional channels which was identified in previous quantum mechanical calculations (see Physical Review A56, 1305, (1997)) for the transition probabilities of excitation/de-excitation of the Neon atoms induced by collisions with Helium ground-state atoms. An oscillatory pattern was already observed in the quantum probability. In this paper, the quantum oscillations are explained based on a semi-classical model which incorporates the wave-like nature of atoms and uses an analogy with the interference of light waves. This model explains qualitatively well the oscillations observed in the quantum probability for certain transitions.

87 STELLAR EVOLUTION: THE ORIGIN AND FATE OF THE STARS AND OUR UNIVERSE

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This project presents an analysis of the stellar evolution with emphasis on the processes that occur within a star during the many stages of its lifetime. Based on several benchmark books such as *The Universe in a Nutshell* by Steven Hawkings and *The First Three Minutes of Our Universe* by Steven Weinberg, as well as of several other sources, we discuss models and theories that explain the birth, the evolution and the fate of the stars, including the black hole theory as being the ultimate stage in the life of a star. By adopting a critical judgment over a few selected scientific models available today and using a logical deductive reasoning, we attempt to answer certain open questions regarding the dynamics and evolution of stars (i.e. the stellar evolution is governed by the imbalance between the forces of gravity and the radiation pressure exerted from the core toward the surface of the stars). This study was part of an Honors Contract for a Modern Physics course and requires a good knowledge of the theory of relativity and the photon theory of light. Despite its complexity, the subject is not bound to the realm of scientists, but it can be embraced by a general audience formed by people from various disciplines.

88 ADSORBATE EFFECTS ON THE H- IONS SURVIVAL NEAR Cu SURFACES

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Electron charge transfer during the interaction between an atomic projectile and a metal surface is of both fundamental and practical interest. The most efficient type of charge transfer is one-electron transfer between energetically degenerate electronic levels of the atom and the solid, also called resonant charge transfer (RCT). The RCT process involving negative ions is very sensitive to the geometry of collision, and crystallographic band structure of the metal. In particular, it has been recently shown that a band gap in the direction normal to the surface, such as the L-gap in the Cu(111) surface, forbids electrons with energies in a certain range to be transferred into the metal along the surface normal, thus strongly reducing the electron transfer. The RCT process is also strongly influenced by impurities adsorbed on the surface. The adsorbates presence on a surface with a band gap, like copper, should play a major role in the electron dynamics. In this work we investigate the impact of both adsorbates and surface band gap on the survival probability of H- ions during collisions with a clean/adsorbate covered copper surface. In particular, we discuss major differences between the Cu(111) and Cu(100) surfaces. The presence of adsorbate layers on a surface can induce two types of effects: (1) a non-local effect in which a macroscopic variation of the surface work function can be measured and (2) a local effect related to the strong local perturbation of the space surrounding the adsorbate atoms. Thus, the energy levels and widths of a projectile interacting with the surface will be drastically perturbed if the projectile approaches close to an adsorbate atom. Consequently, the RCT process and the projectile survival will be strongly affected. These findings should have a direct and strong impact on the experimentally measured ion fractions in scattering/sputtering experiments. We investigate the RCT process by using a wave-packet propagation (WPP) technique. This technique is a very powerful tool for surfaces, and is perfectly suited to treat adsorbate-covered surfaces where non-adiabatic effects are brought into discussion.

89 SPECTROSCOPIC ANALYZIS OF ATOMIC EMISSION SPECTRA

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The purpose of this project is to study the radiation emitted by various atoms in a gaseous discharge cell at high temperature and low density. Using a computer-based spectrophotometer, which we constructed, along with a diffraction grating we are able to measure the wavelengths of the atomic emission spectrum. The goal is to identify impurities in a known source of light (i.e. discharge cell of oxygen) by using spectroscopic data tables. This is one of the most accurate non-destructive methods used for the characterization of the composition of materials. The technique is used in industry and for astronomical measurements. We also identify the dipole allowed transitions based on concepts of quantum mechanics (selection rules) and statistical physics (the Boltzman distribution of atoms at thermal equilibrium on the excited states) and we calculate the transition probabilities and lifetimes of atomic states using a fitting procedure of the Lorentzian profile of an emission line where the width of an emission line is inverse proportional with the lifetime of the upper state involved in the transition. Observing the pressure broadening effect and understanding the influence of pressure broadening and Doppler broadening on the shape of the emission lines in an optically thick medium was understood. The representation of the photon as a short duration wavetrain is also investigated.

P57 DISALIGNMENT AND DISORIENTATION OF NEON ATOMS INDUCED BY HELIUM-NEON COLLISIONS

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Based on a quantum mechanical model for the atomic collisions and interactions between He($1s^2$) and Ne*($2p_i$) atoms on the $2p^5 3p$ electronic configuration, we analyze the origin of the disalignment and the disorientation of the Ne*($2p_i$) atoms in a discharge cell at thermal equilibrium. Our studies reveal that the disalignment of atoms at large temperatures (77-600 Kelvin) is mainly due to a strong repulsive interaction which is dominant for intermediate internuclear distances (3.1 - 4.8 x 10^{-10} m) between the Helium and Neon atoms. For low temperatures (17-77 Kelvin), we have observed that the long-range Coulomb attraction between two polarizable atoms is responsible for both depolarization effects. The comparison between our quantum calculations and the state-of-the-art experiments realized recently at Kyoto University leads to a new theoretical model for the He-Ne interactions at large internuclear distances. This study includes an important computational component which requires advanced numerical codes. Thus, we have created and ensemble numerical programs for: (1) the interpolation of cross sections with a spline function, (2) the integration over a Maxwell-Boltmann distribution, and (3) we have studied the convergence of the probability for disalignment and disorientation of atoms for a large range of temperatures (17-600 Kelvin) and collision energies (0.01-500 meV).

SCIENCE EDUCATION

90 SCIENCE TEACHERS AS MENTORS IN A COLLEGE SCIENCE COURSE
Deborah Koeck and Sandra S. West

Physics First in Middle School Science Teacher Preparation.
A Middle School Science Teacher Education Module based on the idea of Physics First was developed to teach middle school science preservice or inservice teachers. This Module is designed to provide teachers with the science content, skills, and understanding to effectively teach middle school science courses. It is specifically intended for teachers who have a limited background in the sciences (Physics, Chemistry, Earth, Space, and Life). The Module is based on the following ideas: National Science Standards, Scientific Inquiry, Systems, Physics First, Integration of the Sciences, Science for All and Mentoring. The Module contains 120 hours of college science instruction. Using a modified 5E lesson plan format, the sciences were integrated as the courses move from Systems/Systems Thinking and Analyzing, Physics, Chemistry, Earth Science, Space Science, and finally to Life Science. The Module was designed around concepts in the *Benchmarks for Science Literacy*, the *National Science Education Standard* and the *Texas Essential Knowledge and Skills*. Ideas for teaching struggling learners are used and discussed. A unit on Mentoring novice science teachers is included. Funded by the state of Texas to improve middle school science teacher knowledge and skills, the draft Module that contains lesson plans, Power Point files and lab set-up pictures can be found at www.bio.txstate.edu/%7escied/MS_Science. Statistically significant increases in content aquisition were found in preservice and inservice participants.

91 WATERSHED RESEARCH AND EDUCATION AT THE TEXAS TECH UNIVERSITY - JUNCTION OUTDOOR SCHOOL: CURING THE NATURE DEFICIT DISORDER FOR THE NEXT GENERATION OF TEXANS
Kaycie Sullivan, R. Hickerson and T.L. Arsuffi, Texas Tech University Center, Junction, TX

Water, the environment and natural resources are critical issues for present and future generations of Texans, especially with a projected doubling in population over the next 50 years. An ecologically literate public with knowledge and sense of a water and land ethic will be needed to make informed decisions on a variety of issues as resources become limited. Yet, 85% of all Texans live in urban areas and the next generation of children have increasingly little contact with nature. The disconnect between children and nature has important ramifications. The Outdoor School (OS) at Texas Tech University in Junction is devoted to creating innovative educational experiences that immerse learners into authentic, real-world, hands-on activities that stimulate imagination and understanding of difficult abstract concepts associated with science, ecology, natural history, astronomy, math leadership and team building. The units taught are aligned with the Texas Essential Knowledge and Skills (TEKS). TTU-Junction has 400 acres of natural resources (wildlife, Llano River, brush land) equipment and classrooms to make field-based learning effective. Since its inception in 2003, the OS has hosted 33 school districts and 3100 5th graders. A new unit planned for OS focuses on watersheds and involves constructing 12'X12' watersheds from local topographic maps. The scale model watersheds allow multidisciplinary instruction and will be used to show management tools needed to mitigate the impacts of development: watershed planning, land conservation, aquatic buffers, erosion control, storm water treatment practices and watershed stewardship. By constructing replicate watersheds and manipulating land use patterns (impervious cover, riparian buffers etc.) students can also conduct experiments, collect data and learn proper use of the scientific method, hypothesis testing, replication, graphical analysis and statistics.

92 AN EXPLORATION OF THE EFFECTS OF ACTIVE LEARNING STRATEGIES ON LEARNER CHARACTERISTICS IN A HUMAN PHYSIOLOGY COURSE FOR NON-MAJORS
R. Russell Wilke* Angelo State University, Department of Biology, San Angelo, TX, and William J. Straits California State University – Long Beach, Department of Science Education, Long Beach, CA

A continuum-based, active learning model was implemented in a human physiology course for non-majors in a small west-Texas university. A quasi-experimental, Solomon-4 Group design was undertaken on 180 students to explore which learner characteristics (students' gender, classification, major, grade point average, ACT and SAT scores, motivation, and self-efficacy) contribute to its successful implementation. Treatment groups were taught using the model, controls using didactic lecture methods. Students were administered a comprehensive physiology content exam and sections of the Motivated Strategies for Learning Questionnaire. Factorial and modified regression analyses of the aptitude by treatment interaction determined that while females performed better overall on the comprehensive physiology content exam than

males, there were no significant differences in achievement between females in the treatment and control groups. Males in the treatment group performed significantly better than males in the control group. No significant interactions were found for the other learner characteristics.

93 NOT JUST A WALK IN THE WOODS: INFORMAL SCIENCE
Kiki Corry and Sandra S. West

Formal and informal teaching converge as the bus unloads. Students' sense of adventure, teachers' curriculum requirements, and volunteer trail guides' passion for the preserve merge to create a unique learning experience. Whether they are high school students discussing population dynamics, or first graders naming shapes and colors, they come away with a deeper understanding and appreciation of the science in informal science settings. Many of the science content TEKS and certainly most of the process TEKS can be learned in such interesting settings. And, as importantly, the research supports the use of informal science settings as an effective way to improve student achievement and TAKS scores.

94 GROUPS OF THE PERIODIC TABLE: AN INQUIRY APPROACH FOR MIDDLE SCHOOL SCIENCE STUDENTS
Lara M. Brown and Sandra S. West

In a review of many of the leading textbooks, lab manuals, textbook ancillaries and the internet did not reveal any lesson that focuses on teaching the groups of the periodic table despite the recommendations from the *National Science Education Standards* and *AAAS Benchmarks for Science Literacy* and many state science requirements. Indeed, many college students, as well as high school students, are unaware of "bigger picture" of the Periodic Table. A modified 5E Inquiry lesson plan, based on the assumption that students had a general idea of elements, began with two groups (metals and non-metals), then moved to three groups (metals, metalloids, and non-metals), and finally added noble gases and a history of the development of the Periodic Table. The lesson includes both the lesson plan and a Power Point file that is posted on www.bio.txstate.edu/%7escied/MS_Science in the Chemistry unit.

P58 ACTION RESEARCH IN A COMPUTER-BASED GENETICS LABORATORY COURSE
Kiona Coleman*, R. Russell Wilke, Crosby W. Jones Jr., Angelo State University Department of Biology, San Angelo, TX

An action research** study was conducted on a junior level, college genetics course (n=92) for biology majors at a small regional university in west-central Texas. The study was conducted to determine whether or not students concurrently enrolled in an optional computer-based genetics lab had higher achievement in lecture than those taking the lecture section only. In addition a variety of learner characteristics were examined for those students enrolled in the lab including major, classification, and sex to determine what relationship if any they had with lecture achievement. Students' final overall grades and demographic data were recorded and analyzed with appropriate statistical methods and software (SYSTAT). Analysis of variance determined there was no difference in lecture achievement in those students enrolled in the lab versus those who were not. Regression analyses determined a positive correlation between those taking the optional lab and their overall genetics lecture grade. Results of the learner characteristics will also be presented. ** Action research is inquiry or research in the context of focused efforts to improve the quality and efficiency of instruction and the performance of students.

SYSTEMATICS AND EVOLUTIONARY BIOLOGY

95 TRADEOFFS ASSOCIATED WITH LEG REGENERATION IN STICK INSECTS (INSECTA: PHASMIDAE)
Tara L. Maginnis, St. Edward's University, Austin, TX

Phasmids are unusual among insects in that they regularly shed and regenerate legs lost to fouled molts or predation attempts. I show how this process has profound consequences for these animals, and that the *nature* of leg regeneration tradeoffs differs among morphologies. In a wingless species, leg regeneration reduced fecundity. In a winged species, leg regeneration has no effect on fecundity. Instead, leg regeneration stunted wing growth and hindered flight performance. Furthermore, rates of leg regeneration are common in natural settings (~25% of animals), suggesting stick insects regularly experience these biologically relevant tradeoffs. Explicit consideration of the integrated nature of animal phenotypes, in this case the non-independence of developing traits such as legs and fecundity or legs and wings, can be used to explain evolutionary patterns in phasmids, and again reveals the cryptic role developmental process can have on evolution.

96 A COMPARATIVE ANALYSIS OF DAWN CHORUS BEHAVIOR IN FIVE CHICKADEE SPECIES

David E. Gammon, Biology Department, St. Edward's University, Austin, TX

A fundamental question in animal communication theory is to explain the evolution of song, which can be broadcast over great distances and which is usually used in mate attraction and stimulation. In the chickadee genus, *Poecile*, some of the species, such as the Carolina chickadee (*Poecile carolinensis*), possess both a long-distance song and short-distance calls, whereas other species, such as the chestnut-backed chickadee (*Poecile rufescens*), possess only short-distance calls. Regardless of whether they possess a song or not, during the breeding season males of all chickadee species vocalize for several minutes prior to dawn in an attempt to attract and then copulate with females. In this talk I will review my previous research in the dawn chorus behavior of the black-capped chickadee (*Poecile atricapillus*) and then discuss upcoming plans to examine similar dawn chorus behavior in five chickadee species. This research will investigate the generality of the behavioral patterns found for the black-capped chickadee, and it may also provide clues into why song evolved in some of the chickadee species.

97 INNER EAR ANATOMY OF THE GRAY SHORT-TAILED OPOSSUM: DIGITAL IMAGING OF A GROWTH SERIES

Eric G. Ekdale, The University of Texas at Austin, Austin, TX

The middle ear region on the ventral surface of the skull of mammals is a classical source of data for phylogenetic analyses. The inner ear within the bones of the skull also may provide phylogenetic information, and the structure of the bony labyrinth might have important implications for the evolutionary history and adaptive radiation of Cenozoic mammals. When dealing with a small number of specimens, which is a common problem for vertebrate paleontologists studying early mammal evolution, it is necessary to determine if the morphology of the inner ear changes appreciably during the ontogeny of a species. Digital endocasts of the bony labyrinth of a growth series of the modern gray short-tailed opossum (*Monodelphis domestica*) were constructed from CT scans in order to ascertain whether or not morphological variations in the inner ear are functions of ontogenetic age. The specimens used in this study were CT scanned at The University of Texas at Austin, and several dimensions of the bony labyrinth were measured, including the number of cochlear turns, volumes of specific regions of the inner ear, and the shape of the arcs of the semicircular canals. Analytical results indicate a strong relationship between total skull length and age, but only a weak correlation between age and bony labyrinth dimensions. Thus, morphological dimensions of the inner ear are independent of age in *Monodelphis*. This result suggests that observed variation in the bony labyrinth can serve as an important source of anatomical data for the phylogenetic analysis of fossil and extant mammals.

98 SEX-BIASED GENE EXPRESSION IN A ZW SEX-DETERMINATION SYSTEM

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Studies of the transcriptome have shown that a substantial fraction of interspecific differences in gene expression are the result of sex biased gene expression. These results suggest that sex-dependent selection may be an important force in generating differences between species but to date all studies have focused on *Drosophila*. We examined a sample of the transcriptome in two species of *Xenopus* to provide an additional test of how sex biased gene expression may contribute to interspecific differences in gene expression. In contrast to *Drosophila*, *Xenopus* provides an example of a ZW system with morphologically indistinguishable sex chromosomes. About 84% of the transcriptome was differentially expressed between *X. laevis* and *X. muelleri* and there were more genes that were male biased compared to the number of genes that were female biased or unbiased. Our results demonstrate the importance of male biased gene expression in *Xenopus* and provide further evidence that sex biased gene expression may be an important factor creating differences between species. We also discuss what evolutionary consequences this may have in relation to the pattern of hybrid sterility observed between *Xenopus* species.

99 A PRELIMINARY REVIEW OF THE LAND SNAIL FAUNA OF THE SIERRA MOJADA REGION OF WESTERN COAHUILA, MEXICO
Ned E. Strenth*, Department of Biology, Angelo State University, San Angelo, TX, Alfonso Correo-Sandoval, Laboratorio de Zoologia, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México, and Lynn McCutchen, Department of Biology, Kilgore College, Kilgore, TX

This study reports those species of land snails which inhabit the mountainous region of the Sierra Mojada range in western Coahuila of northern Mexico. This mountain range is only 18 km in length and 11 km in width, rises to 2463 m (8081 ft), and appears somewhat isolated by surrounding low deserts (especially those of the Zona del Silencio to the south and west.) In spite of its small size and apparent isolation, this region of the Chihuahuan Desert exhibits an unusually high diversity of land snail fauna. While this study is still in its preliminary stage, almost a dozen species of Bulimulidae, Urocoptidae, Succineidae, Zonitidae, Thysanophoridae and Humboldtianidae have so far been collected and identified. The presence of these species of land snails in this region of Coahuila is compared with currently known distributions of congenators from both Mexico and the southwestern United States.

100 GENETIC VARIATION IN THE BONNETED BAT: *EUMOPS GLAUCINUS* AND *EUMOPS FLORIDANUS* (CHIROPTERA: MOLOSSIDAE)
Molly M. McDonough* and Loren K. Ammerman, Angelo State University, San Angelo, TX

The objective of this study was to examine DNA sequence divergence within the karyotypically variable Wagner's bonneted bat, *Eumops glaucinus* and the Florida bonneted bat, *Eumops floridanus*. Karyotypes from Mexico and Costa Rica have demonstrated a diploid number of 2n=38 and a fundamental number of FN=64 and those from Colombia and Jamaica have 2n=40, FN=64 (Warner et al. 1974, Genoways et al. 2005). Another unique karyotype has recently been discovered from Western Ecuador that has 2n=38, FN=54 (Baker, pers. comm.). In this study, a total of 38 individuals collected from Florida, Mexico, Cuba, Jamaica, Venezuela, Ecuador, and Paraguay were examined for genetic variation within 770 base pairs of the cytochrome *b* gene. Data were analyzed using Neighbor Joining in PAUP. Molecular sequence results are consistent with karyotypic data: North American and Caribbean individuals cluster together while specimens from Venezuela and Paraguay cluster together (both with low levels of sequence divergence). In addition, a substantially greater sequence divergence (9%) occurs between those specimens collected west of the Andes mountain range and all other specimens analyzed. Cytochrome *b* data from several other species of *Eumops* were also included to illustrate sequence divergence patterns.

101 VARIATION IN THE VERTEBRAL COLUMN AND TAIL SHIELD OF THE UROPELTIDAE (SERPENTES: ALETHINOPHIDIA)
Jennifer C. Olori, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

The Uropeltidae are a little-studied family of fossorial snakes from India and Sri-Lanka. There is a paucity of data on their general ecology and life history, but even less is known about uropeltid anatomy and osteology. I present preliminary data on the morphology of the vertebral column and tail shield of these obscure snakes. Observations were made on 39 individuals of eight different species, making this one of the most comprehensive studies of uropeltid osteology undertaken so far. Many features shared by uropeltids, such as robustness of the anterior vertebrae relative to the posterior, a short tail, and a reduction of the neural spines are easily explained by the fossorial lifestyle of these taxa. Despite general similarities, observable differences in the persistence of the hypapophyses, the overall number of vertebrae, and the number of elements included in the tail region do occur both within and among species. Additionally, there is marked variation, at least at the generic level, in the morphology of the characteristic caudal 'shield' which provides this family with their common name, shield-tailed snakes. Contrary to earlier studies, some individuals were found to have less than 140 total vertebrae and most retain hypapophyses posterior to the 40th vertebra. The two most well represented taxa, *Uropeltis woodmasoni* and *Teretrurus rhodogaster*, are characterized by 164-177 and 123-175 pre-cloacal vertebrae, respectively. These species have very similar numbers of caudal vertebrae; *U. woodmasoni* possesses 6-10 and *T. rhodogaster* 6-12. Individuals of all species analyzed have either 3, 4, or 5 vertebrae in the cloacal region. Identification of cloacal vertebrae is determined by the presence of forked lymphapophyses, the posterior occurrence of which may be correlated with size or ontogenetic age rather than species. Analysis of vertebral morphology may help clarify uropeltid systematics, and in so doing, would add to our understanding of the relationships between basal altheinophidian snakes.

102 VOCALIZATIONS AND GROUP MOVEMENT OF MONK PARAKEETS (*MYIOPSITTA MONACHUS*)
Elissa Wampler, St. Edward's University, Austin, TX

Many species use communication to help coordinate their group movements. Monk parakeets (*Myiopsitta monachus*) frequently vocalize during group movement. They almost always vocalize when in flight. When taking off from the ground, no vocalization is used to initiate flight, but when taking off from above ground flights are usually preceded by vocalizations. The most common flight group size of monk parakeets is pairs. Taking off often involves a leader who vocalizes first and is followed by other birds.

P59 BALD CYPRESS OF THE TEXAS HILL COUNTRY: TAXONOMICALLY UNIQUE?
Brian Iken* and Dr. Deanna McCullough, University of Houston-Downtown

Bald cypress (*Taxodium distichum var. imbricatum*) found in the Texas Hill Country are thought to be different from members of the species outside of the Texas Hill Country. As reported in the Texas Parks and Wildlife magazine, they typically have no knees, their shape is more spreading and less conical; also their wood and bark appear to be different. There are currently two recognized species of Taxodium in North America, *T. distichum var. distichum* (bald cypress), *T. distichum var. imbricatum* (pond cypress), and *T. mucronatum* (Montezuma cypress) found in Mexico and in the southwest U.S. This study of the Hill Country bald cypress attempts to determine if these trees are different enough to be given a taxonomic designation as a different variety of *T. distichum*. Two genes were studied, the chloroplast *rbc*L gene and portions of the nuclear ribosomal RNA gene, specifically the internal transcribed spacers (ITS-1 & ITS-2) and 5.8S coding portion of the gene. Leaf samples were taken from study bald cypress trees in the Texas Hill Country as well as other bald cypress trees not possessing the distinctive characteristics. Reference trees were also sampled in Harris County. Loblolly pine (*pinus taeda*) was used as an outgroup. Sample DNA was extracted, the targeted genes amplified using polymerase chain reaction (PCR), and the PCR products were ligated into plasmid vectors that were incorporated into chemically modified DH-5 alpha *E. coli* cells for further amplification. Bacterial cells were grown, the plasmids extracted and the DNA sequenced at the UT Medical Center in Houston, Texas. Sequences were aligned using the ClustalX program and analyzed to construct a phylogenetic tree using the computer program PAUP*4 (Phylogenetic Analysis Using Parsimony). The resulting analysis showed few genetic differences, with gene samples showing approximately 99% similarity. The preliminary analysis with PAUP does not support a new varietal designation for the Texas Hill Country bald cypress.

TERRESTRIAL ECOLOGY AND MANAGEMENT

103 THE RAPID DECLINE IN LEPIDOPTERA IN NORTHWESTERN WYOMING WILDERNESS AREAS FROM 2003-2005
Karolis Bagdonas, Sam Houston State University

Throughout the summers of 2003, 2004, and 2005, the numbers of both butterflies and moths were greatly reduced from numbers seen in previous years in northwestern Wyoming wilderness areas. Those species, which did fly, were greatly reduced in size, many ranging from a third to about half normal size. Every family, genus, and species was affected. It appears that the extreme oscillating temperature changes occurring over many days and longer extreme shifts in weather patterns over several weeks affected every group in the Greater Yellowstone Ecosystem. At the end of 2005, roughly 40% of over 800 species of lepidoptera were absent and 30% of remaining species were rare to greatly reduced in numbers. Corresponding changes were also noted in host and nectar plants; many did not flower at all.

104 DO PHYSIOLOGICAL CHARACTERISTICS EXPLAIN THE INVASIVENESS OF *BOTHRIOCHLOA ISCHAEMUM*, KING RANCH BLUESTEM?
Tamara S. Basham, The University of Texas at Austin, Plant Biology Graduate Program, Austin, TX

Bothriochloa ischaemum, King Ranch Bluestem, is a C4 perennial grass that is rapidly converting Texas C3/C4 mixed grasslands to C4, *B. ischaemum* monocultures. This study compares the physiological parameters and photosynthetic characteristics of *B. ischaemum* with those of native species to determine where *B. ischaemum*'s invasiveness is due in part to its physiological capabilities. A LI-6400 infrared gas exchange system (LI-COR, Lincoln, Nebraska, USA) was used to conduct leaf level photosynthetic measurements in the field at the Ladybird Johnson Wildflower Center, Austin, TX. These

measurements were used to compare the physiologies of two dominant native species, *Bothriochloa laguroides* and *Nassella leucotricha* with that of the invasive *B. ischaemum*. Results show that *B. ischaemum* has a significantly higher photosynthetically based nitrogen use efficiency (PNUE) than the two other species examined (Analysis of Variance, F=5.75 $p \leqslant 0.01$;df=2,15). C:N were higher in *B. ischaemum* leaf tissues, but the differences were not significant. Photosynthetically based water used efficiency (PWUE) was significantly higher in *Bothriochloa laguroides* than in *Nassella* (ANOVA, F=8.9 $p<0.05$; df=1,4) but PWUE was not significantly different between either of the natives and the invasive *B. ischaemum*. Construction cost (g glucose/ cm^2 leaf area), however, was significantly higher for *Nassella* leaves than for *B. ischaemum* (ANOVA, F= 10.43 $p<0.01$; df=1,10) and *B. laguroides* (ANOVA, F=4.97 $p<0.05$; df=1,10) leaves, but not significantly different between the two *Bothrichloa* spp. Based on the results of this study, I predict that *B. ischaemum*'s ability to produce energetically and nutrient inexpensive photosynthetic structures will be primary factors in explaining its invasiveness.

105 EXTRA-PAIR MATING TACTICS IN NORTHERN CARDINALS (*CARDINALIS CARDINALIS*): A TEST OF THE 'CONSTRAINED FEMALE HYPOTHESIS'

Sheena K. Humbird* and Diane L.H. Neudorf, Sam Houston State University, Huntsville, TX

Females must weigh the benefits of participating in extra-pair copulations (mating outside of the pair bond) with the costs of retaliation by social mates and the time spent searching for extra-pair males. The 'constrained female hypothesis' may explain variation in female participation in extra-pair copulations within and among species. This hypothesis states that females, in high quality habitats who are not dependent on male parental care, will be more likely to pursue extra-pair matings. We tested this hypothesis in Northern Cardinals (*Cardinalis cardinalis*) by supplementing food on territories and radio-tracking females during their fertile periods. We predicted that females on supplemented territories would have larger home ranges (indicating pursuit of extra-pair copulations) than those on non-supplemented territories. Results indicate that supplemented females did not have larger home ranges than non-supplemented females, which could indicate that in Northern Cardinals, males do not have the ability to place constraints on their social mate. In addition, the number of times the female visited other known territories did not differ for supplemented and non-supplemented females perhaps indicating that females have the ability to move freely without fear of male retaliation.

106 REASSESSING LIZARD COMMUNITY ASSEMBLAGES IN BIG BEND NATIONAL PARK

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A lizard census established in 1955 by Dr. William G. Degenhardt in Big Bend National Park, Texas was reinvestigated in 2005. Using the original study quadrats and methods established by Degenhardt, a lizard/acre index was determined and compared to previous survey years. Overall, the lizard/acre numbers are lower in 2005 when compared to the last time the quadrats were investigated in 1969. On quadrats where *Cophosaurus texanus* had been present up to 1969, there has been a decrease to the point of absence on certain quadrats. The *Aspidoscelis gularis septemvittata* per-acre index number increased on both high elevation quadrats (Green Gulch 1, Green Gulch 2) compared to lower elevation quadrats. Lizard assemblage similarity is highest on the Tornillo quadrat and lowest on the Green Gulch 1 quadrat, when comparing 2005 to previous surveys. Percent vegetative cover was measured and found to have increased on all quadrats. The data suggests lizard composition and density are both at least partially dependant upon changes in vegetative cover.

107 VEGETATIONAL CLASSIFICATION USING REMOTELY SENSED IMAGERY: SUPPORT FOR MANAGEMENT DECISIONS ON LYNDON B. JOHNSON NATIONAL GRASSLANDS, WISE COUNTY, TEXAS

Caren McLemore*, University of North Texas, Denton, TX, and Brian Boe, University of North Texas, Denton, TX

Vegetation is the most conspicuous component in terrestrial landscapes. Its classification and analysis yield important information for land managers. The landscape of Lyndon B. Johnson National Grasslands (LBJG) is botanically diverse due, in part, to the grasslands' location in an ecotone of North Central Texas. Proper management of such 'margin' habitats, where one major ecosystem grades into another, is important for the maintenance of plant biodiversity and other organizational goals. A vegetational classification of LBJG was produced using remotely sensed data. Results of the analysis may aid planners in decision-making for ecosystem maintenance, restoration, and sustainability. Discussion will include potential uses of the data in the following categories: preservation of biological diversity, prescribed fire strategies, range suitability (grazing) evaluation, wildlife habitat assessment, and invasive species detection and control.

108 CHANGES IN SMALL MAMMAL COMMUNITY COMPOSITION FOLLOWING PRESCRIBED FIRE MANAGEMENT IN A PONDEROSA PINE FOREST

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The fire suppression policies of the 1930s have significantly altered the composition of fire-dependant forest communities in the southwestern United States. As a result, increases in tree densities and ladder fuels within ponderosa pine forests have increased the likelihood of stand-replacing wildfires. The unique biological sky islands of ponderosa pine forests at the Davis Mountains Preserve, Jeff Davis County, TX are particularly vulnerable to the devastating impacts of stand-replacing wildfires due to their geographical isolation. Consequently, the Nature Conservancy has implemented a forest restoration program designed to reestablish fire-dependant communities with the use of prescribed burning techniques. Unfortunately, there is no research being conducted in this region to determine if this management technique is creating the desired effects of restoring post-fire wildlife communities. Previous studies of small mammal community composition have been effective in other parts of the country in detecting the impacts of forest management on communities under similar conditions. A small mammal research project is proposed for the spring of 2006 and 2007 at the Davis Mountains Preserve to investigate changes in small mammal community composition following prescribed fire management. A space-for-time substitution method will be used to compare small mammal composition, sex ratio, body weights, and age classes within pre-burned and post-burned succesional stages of vegetation for 6 month, 3 year, and 6 year plots. Small mammals will be sampled using a capture-release method within a 50 m X 80 m trapping grid. Factors affecting small mammal composition, such as canopy and understory cover, structural complexity, and predator presence will also be measured.

109 IMPACTS OF ANTHROPOGENIC SUPPRESSION AND FERTILIZATION ON MYCORRHIZAL ALLOCATION AND EFFECTIVENESS IN WESTERN GULF COAST GRASSLANDS

Somereet Nijjer*, Rice University, Houston, TX, Evan Siemann, Rice University, Houston, TX, and William E. Rogers, Texas A&M University, College Station, TX

Mycorrhizal fungi are ubiquitous components of terrestrial ecosystems and known to influence plant performance, abundance, and diversity in grassland communities. A field experiment was conducted to examine the effects of fungicide and fertilization on mycorrhizal allocation patterns and effectiveness in endangered Western Gulf Coastal grasslands. Fertilization significantly increased total mycorrhizal colonization and vesicle production and displayed a trend for decreased mycorrhizal effectivity. Together these results suggest that mycorrhizae in high fertility soils allocate more to internal fungal storage at the potential cost of plant nutrient exchange, suggestive of a decrease in mycorrhizal mutualistic benefit for their plant hosts. These changes could have important consequences for the aboveground plant community in these endangered grasslands and may destroy mutualistic co-adapted plant-mycorrhizal-soil complexes.

110 INTER-OBSERVER VARIATION IN DETECTION OF FROG CALLS DURING AUDITORY SURVEYS

Benjamin A. Pierce*, Southwestern University, Georgetown, TX and Kevin J. Gutzwiller, Baylor University, Waco, TX

Auditory surveys are used widely to monitor species and abundance of frogs, yet few studies have evaluated variation among observers in detection of frog calls or the effect of environmental parameters such as wind and road noise on detection efficiency. We conducted 199 5-minute frog call surveys in the spring of 2005 at randomly selected locations in central Texas. We resurveyed, on the same night, a randomly selected subset of these sites with a longer, 30-minute survey. During each survey, two observers separated by approximately 10 meters simultaneously recorded all species heard, approximate number of calling frogs, and an index of calling intensity. At least one frog species was detected in 66% of the 5-minute surveys and 80% of the 30-minute surveys. The two observers disagreed on the number of species calling at 21% of the sites. Agreement between observers differed among the calls of different species. There was more disagreement on presence/absence when fewer frogs called with low intensity from distant sites. No significant differences were found in road noise, wind, or amphibian habitat (pond or stream) between surveys in which observers agreed and disagreed on number of species calling. These results indicate that considerable variation may occur in the number of species detected by different observers in frog call surveys.

111 EFFECTS OF INVASIVE EXOTIC PLANT SPECIES ON BIRD COMMUNITIES IN CENTRAL TEXAS PERIURBAN HABITATS
Arlene Kalmbach*, Thomas R. Simpson, Floyd Weckerly, and John Baccus , Wildlife Ecology Program, Department of Biology, Texas State University-San Marcos, San Marcos, TX

Previous research has found that the density of native bird species and the diversity of avian communities are positively correlated with the volume of native vegetation, but negatively correlated with the volume of exotic vegetation found in their habitats. Numerous exotic plant species used in landscaping urban and suburban areas have become naturalized and invasive. The invasive nature of these plants is exacerbated by the fragmented habitat of urban and suburban environments. We examined the effects of invasive non-native plants on abundance, species composition, and diversity of the bird community in an increasingly urbanized area of Central Texas. Study sites were selected and categorized according to the amount of canopy cover from invasive non-native plant species found at each site. The categories for exotic plant impact were light (0-10% exotic plant cover), medium (11-25%), and heavy (>25%). Fixed radius point counts for birds were conducted at 20 points distributed among the study sites approximately once a month for 18 months. Additional data collected at each site included woody plant composition and vertical structure. Species richness, diversity, and evenness of the avian community differed according to percent composition of the woody canopy cover of exotic plants with fewer species and less diversity found at sites with greatest amount of exotic plant cover.

112 INVASIVE PLANT SURVEY OF DYESS AIR FORCE BASE, TAYLOR COUNTY, TEXAS: PRELIMINARY FINDINGS FOR 2005
Herbert D. Grover*, Hardin-Simmons University, Abilene, TX, and Kim Walton, Natural Resources Manager, Dyess Air Force Base, Abilene, TX

In the summer of 2004 we initiated an invasive plant survey to support development of an invasive species management plan for Dyess Air Force Base. The base encompasses approximately 2500 ha located about 10 km southwest of Abilene, TX and has been operated since the mid-1940's first by the United States Army and later the United States Air Force. Although much of the base is directly affected by mission-related operations, a substantial proportion of the base is actively managed for wildlife habitat. The survey described in this presentation was accomplished by walking transects through areas designated by base personnel as particularly vulnerable to establishment of invasive plants; e.g., perimeter fence lines, horse stables, and areas with disturbed soils. In addition to plant collections made during this survey, species lists from earlier unrelated plant surveys conducted by the U.S. Army Corps of Engineers, U.S.D.A. Natural Resource Conservation Service, and the Texas Natural Heritage Program were used to identify potential invasive plants present on the base. A total of 344 vascular plant species representing 224 plant genera in 76 plant families have been identified for Dyess Air Force Base in the combined vascular plant checklist. This represents about 40% of the 700 species included in vascular plant checklists reported by others for surrounding Taylor County. Thirteen vascular plant species designated as invasive species in Texas are included in the species listed for the base, including *Arundo donax, Avena fatua, Centurea melitensis, Convolvulus arvensis, Cynodon dactylon, Rapistrum rugosum, Rumex crispus, Salsola tragus, Solanum eleagnifolium, Sorghum halapense, Tamarix* spp., and *Xanthium strumarium*. The findings of this study are considered incomplete at this time; additional vascular plant surveys are planned for early and late spring, 2006.

113 CHANGES IN WETLAND VEGETATION AND EXOTIC SPECIES DISTRIBUTION IN CADDO LAKE, TEXAS
Christina Barlow* and James Van Kley, Stephen F. Austin State University, Nacogdoches, TX

Caddo Lake, considered to be the largest naturally-formed lake in Texas, is recognized as a wetland of worldwide importance. Extensive vegetation data collected in 1994 and 1995 resulted in description of the principal Caddo Lake wetland plant communities. In light of observations indicating an increase in the abundance and distribution of water hyacinth (*Eichhornia crassipes* (Mart.) Solms and other non-native plants, we resampled the previously-sampled areas in 2005 and used multivariate analysis and GIS mapping to compare the old and new data sets. Results show a dramatic increase in both the abundance and distribution of water hyacinth, which was present at moderate abundance only in the southeastern portion of the study area in 1995, but dominated many sites and was present in all parts of the study area except the far western portion in 2005

114 COMMUNITY CHANGES ON TERRACES OF A SOUTH TEXAS RIVER

Janis K. Bush, Frederick A. Richter*, Department of Earth and Environmental Sciences, The University of Texas at San Antonio, San Antonio, TX, and Oscar W. Van Auken, Department of Biology, The University of Texas at San Antonio, San Antonio, TX

Fifteen separated communities along the San Antonio River were studied in 1983. The communities ranged in age from 5 to 150 years and were used to form a generalized model for development in these communities. It was thought that *Acacia farnesiana* (huisache) was the colonizing woody species that began establishment 5 years after abandonment. *Acacia farnesiana* seemed to become the dominant species until the communities reached the age of 33 years when *Celtis laevigata* (Texas sugarberry), the mid- to late- successional species, dominated the stands. In 2003, seven of the communities that had been left undisturbed were revisited to confirm the validity of the previously formed model. The original age of these seven communities ranged from 19 to 32 years. Both density and basal area of *A. farnesiana* decreased in the successional sequence, while *C. laevigata* density first increased and then decreased, while basal area increased. The changes seen in the communities resampled confirm the validity of the generalized model, but many changes are still expected in the communities before they become mature.

P60 LAND-USE MAP OF JIM NED VALLEY, SOUTHERN TAYLOR COUNTY, TEXAS

Herbert D. Grover, Lauren Field*, Eric Hearn, Josh Bishop, Marilynn Angel, and Andrew Pilgrim, Department of Biology, Hardin-Simmons University, Abilene, TX

As part of an ongoing study of shrubland encroachment in southern Taylor County, a land-use map is being developed for an area of approximately 265 km2, locally referred to as the Jim Ned Valley. Using digital orthophoto quarter-quad (DOQ) data available through the Texas Natural Resource Information System (TNRIS) as a base map, areas were mapped according to their dominant plant composition, physical condition, or managed state. Map units in approximate order of spatial extent included cropland, mixed woodland, pasture, immature mesquite, mature mesquite, post oak, drainageways, water impoundments, homesteads, and hedgerows. The criteria for identifying each of these map units, their estimated spatial extent, correlation of map units with soil type, and implications for potential change in landscape composition will be discussed.

P61 HABITAT USE BY SMALL MAMMALS AT CAMP MAXEY, LAMAR COUNTY, TEXAS

Dyana La Rosa*, James Van Kley and William B. Godwin, Stephen F. Austin State University, Nacogdoches, TX.

We studied the effects of vegetation structure and plant community type on the habitat use of small mammals at Camp Maxey, a Texas Army National Guard training area. The camp contains a diversity of vegetation types including short-leaf pine forests, oak-hickory forests, grasslands, riparian woodlands, seeps, and wetlands. This suggests that there might be a corresponding difference in mammal diversity and abundance among the vegetation types. We sampled vegetation, described and identified plant community types, and live-trapped small mammals for 26 sites representing a range of habitat types throughout the camp in 2004 and 2005. Seven rodent species were captured. *Peromyscus leucopus* was present in all vegetation types but its abundance differed between them. Other species were restricted to only a few plant community types. Most captures were recorded in bluestem grasslands and in seeps. Our results suggest the presence of habitat selection and provide information on keystone structures that are crucial for maintaining mammal species diversity.

P62 DESCRIPTION OF POPULATIONS OF *POPULUS TREMULOIDES* (QUAKING ASPEN) IN THE DAVIS MOUNTAINS OF WESTERN TEXAS, USA

Frederick A. Richter*, Janis K. Bush, Department of Earth and Environmental Sciences, The University of Texas at San Antonio, San Antonio, TX, John Karges, The Nature Conservancy of Texas, Davis Mountains Preserve, Fort Davis, TX, and Oscar W. Van Auken, Department of Biology, The University of Texas at San Antonio, San Antonio, TX

Populus tremuloides is one of the most widespread woody species in North America. It is a broad leaved, deciduous, early successional species that seems to establish after disturbances. In Texas, it is found at high elevations in a few locations in the Guadalupe, Davis and the Chisos Mountains. In the Davis Mountains six communities are reported at about 2300 m in elevation. We examined the structure of these communities. Community age ranged from 25 to 65 years based on tree

ring analysis. The density of tree sized *P. tremuloides* ranged from 429 to 15,520 plants/ha, the average basal area ranged from 8.2 to 305.9 cm^2/plant, and total basal area was 5.1 to 22.9 m2/ha. As community age increased the density of *P. tremuloides* decreased and the average basal area and total basal area increased. There were four to 10 woody species in the various communities. In two communities *Quercus gambelii* relative basal area was 34 and 49% and in one community *Pinus ponderosa* relative basal area was 40%. The diameter distributions for *P. tremuloides* in all of the communities was unimodal but positively skewed. Diameter distributions for *Quercus gambelii* were either steeply descending monotonic functions or unimodal but positively skewed. The highest density of juveniles was in the younger communities, while there were fewer juveniles or small tree sized plants in the older communities. Certainly there are juveniles and small adults in each community suggesting potential replacement of large adults, but the continued establishment and potential changing composition of other species in these communities makes the future structure difficult to predict.

P63 A COPULATORY AID FOR VOLANT INSEMINATION IN BATS OF THE GENUS *LASIURUS*

Christopher M. Ritzi*, Department of Biology, Sul Ross State University, Alpine, TX

Speculation has long covered the nature of copulation and mating in bats of the genus *Lasiurus*. Due to their independent roosting strategy and lack of known hibernacula, the process of finding potential mates, courting them, and direct copulation has been largely unknown. Several reports have documented red bats, *Lasiurus borealis*, engaging in volant copulation. While this may seem improbable to accept due to the physical difficulties in coupling and flight, these bats may possess an anatomical modification that would aid in the process of volant coupling. Strongly developed spines may serve as a holdfast or locking device in combination with the physical properties of engorgement and insemination in these bats. These spines are believed to aid in firmly anchoring the male bat to the female during copulation, while allowing the wings movement in order to either continue flight or seek a safe place to conclude insemination.

P64 THE ALLELOPATHIC POTENTIAL OF *JUNIPERUS ASHEI*

Gwen P. Young*, The University of Texas at San Antonio, San Antonio, TX, and Janis K. Bush, The University of Texas at San Antonio, San Antonio, TX

Juniperus ashei Buchholz, also known as Mountain cedar, rock cedar, post cedar, Mexican juniper, Ash juniper and blueberry juniper, is native to the limestone slopes of Central Texas. *Juniperus ashei* is currently found primarily on the Edwards Plateau Region of Central Texas where soils are shallow (frequently < 20 cm in depth) and overlie a fractured limestone parent material. Studies of morphology, essential oils, and Random Amplified Polymorphic DNAs (RAPDs) of the *Juniperus* species have linked the Texas *J. ashei* to related communities in the Arbunkle and Ozark mountains. Pure stands of *J. ashei* with no other terrestrial species present are common. *Juniperus ashei* is rapidly encroaching into sites considered non-typical, including deep blackland soils of Central Texas. Previous analyses of the essential oils of *J. ashei* derived from steam distillation methods were conducted using gas chromatography – mass spectrometry (GCMS). Forty-six terpenoid compounds, most in amounts less than 2.0%, were identified. Primary of these compounds are; camphor, identified at concentrations between 64.9 and 68.5%; limonene, 4.6 to 5.6%; and borneal acetate, 9.2 to 12.2%. *Juniperus ashei* leaf and litter leachate samples derived from natural and manipulated precipitation events were sampled with Solid Phase Microextraction (SPME) and analyzed using GCMS. Results were compared to those obtained from steam distillation in order to evaluate essential oil exudation by *J. ashei* under field conditions. Concurrently, the leaf and litter leachates were tested for allelopathic properties under field and laboratory germination and growth studies of the native graminoid species *Schizachyrium scoparium* (Little Bluestem), *Bouteloua curtipendula* (Sideoats Grama) and the native sedge *Carex planostachys*. Nematode community analysis of the field site was conducted. Results are expected to lead to a better understanding of the ability of *J. ashei* to encroach into atypical habitat and the absence of other terrestrial species within the area of influence of *J. ashei*.

THREATENED OR ENDANGERED SPECIES

115 FISHERY INVENTORY AND HABITAT ASSESSMENT OF SPRING LAKE AT AQUARENA CENTER
Raymond C. Mathews, Jr.* and Will Watson, Texas Water Development Board, Austin, TX

In order to assist Aquarena Center with their research and educational program, as well as the Endangered Species Recovery Program, fishery collections were made via underwater seining. Some species were difficult to collect, and underwater identifications were made during scuba diving operations. Habitat assessment of the fishes were evaluated based on GPS data, and GIS-ArcMap software was used to develop GIS-DOQ maps with habitat layers for depth contours, major springs, lake morphology and topography, old river channel, riparian zone, nursery areas, and sloughs.

116 INITIAL CHARACTERIZATION OF GENETIC DIFFERENTIATION AMONG *GRAPTEMYS* SPP
Diana J. McHenry*, University of Missouri-Columbia, MO, Jim Godwin, Alabama Natural Heritage Program, Montgomery, AL, and Michael R. J. Forstner, Texas State University, San Marcos, TX

One of the three major lineages in the map turtle genus, *Graptemys* (Testudines: Emydidae), is the *pulchra* group, comprising *G. pulchra, G. gibbonsi, G. ernsti,* and *G. barbouri*. Together, their ranges cover four states and several major drainages in the southeastern United States. Given the undoubtedly close, but as yet not fully understood, relationships among these species, we investigated the utility of several molecular markers in determining evolutionary relationships. Our initial results examine the relationships among populations of *G. barbouri* and *G. ernsti*, including wild-collected putative hybrids, using microsatellites and mtDNA sequence data.

117 THE DEATH OF THE ENDANGERED SPECIES ACT?
Mike Robbins, Environmental Resources Management, Houston, TX

"Threatened and Endangered Species Recovery Act of 2005" (H.R. 3824) marks the most ambitious effort to modify the ESA. The most significant changes in the bill include: deletion of the Critical Habitat designation requirement, revising the definition of "jeopardy," providing compensation to private landowners for economic loss due to the presence of a listed species, and requiring economic analysis as part of the species listing process. The bill, approved by Congress, has been forwarded to the Senate.

P65 DETECTION PROBABILITIES AND OCCUPANCY OF GOLDEN-CHEEKED WARBLERS AT THREE SITES IN THE BREEDING RANGE
Cyndee A. Watson* and Floyd W. Weckerly, Department of Biology, Texas State University, San Marcos, TX

Surveys of presence or absence of golden-cheeked warblers (*Dendroica chrysoparia* (GCWA)) have not assessed the possibility of imperfect detection. We estimated detection probabilities using Occupancy Models to determine proportion of sampling units occupied. From 15 March to 15 May 2005, presence-absence surveys were conducted at three study sites for GCWA. Each site varied in habitat and topography. Study sites were Balcones Canyonlands National Wildlife Refuge (BCNWR), Garner State Park (GSP) and Government Canyon State Natural Area (GCSNA). At BCNWR and GCSNA a 40 hectare detection grid was randomly established in GCWA habitat. Detection stations were established along trails at GSP because of steep terrain that prohibited the establishment of a detection grid. At each site, detection stations were established at 200 meter intervals, and observers remained eight minutes recording auditory and visual detections of GCWA. Using the program PRESENCE eight models were analyzed to examine whether detection probabilities and occupancy were influenced by site, survey date or elevation. Model selection using Akaike Information Criterion values indicated detection probabilities and occupancy varied among sites. Detection probabilities ranged from 0.26 to 0.62 and occupancy of detection stations at the three sites ranged from 0.68 to 0.99.

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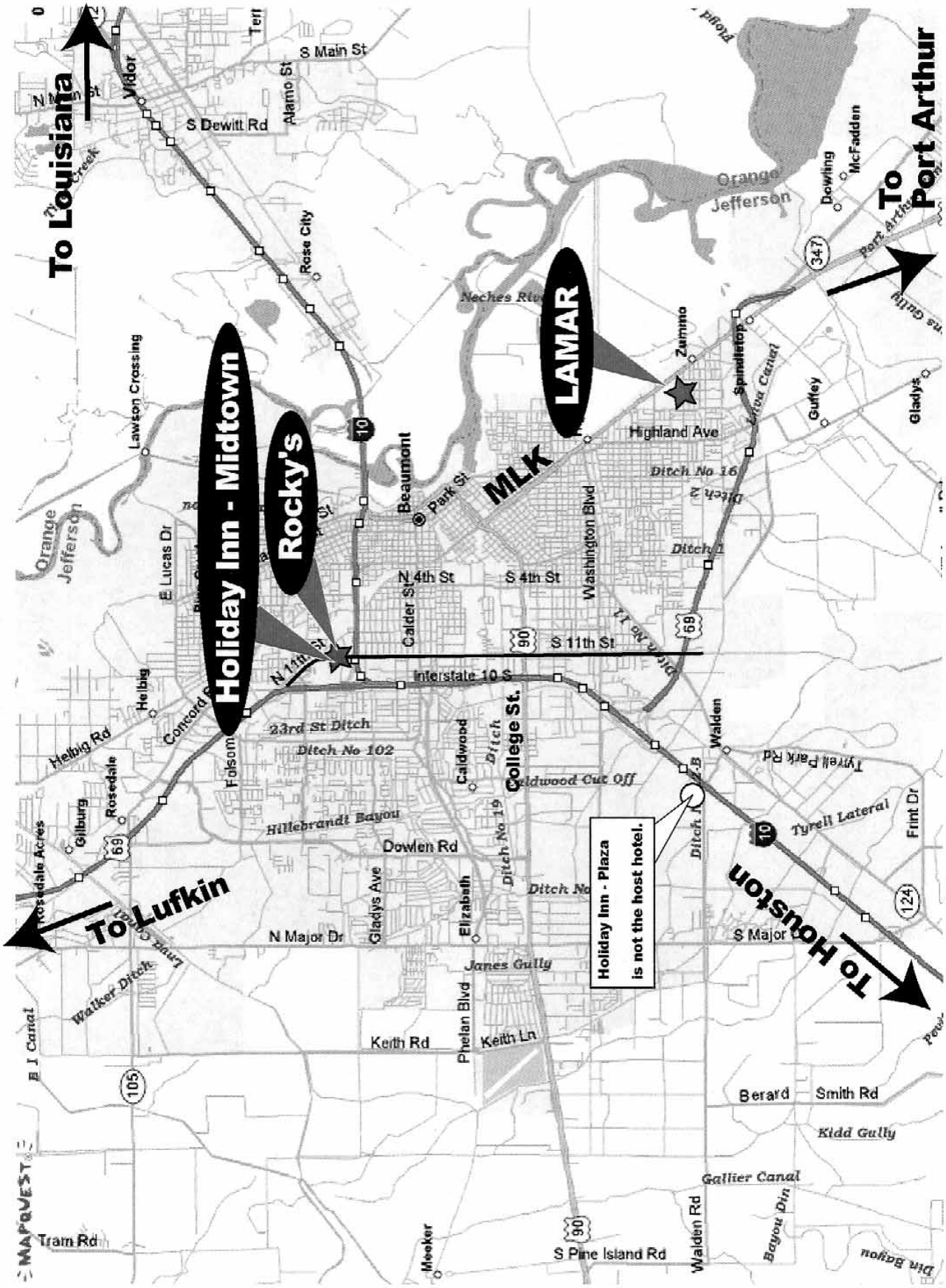
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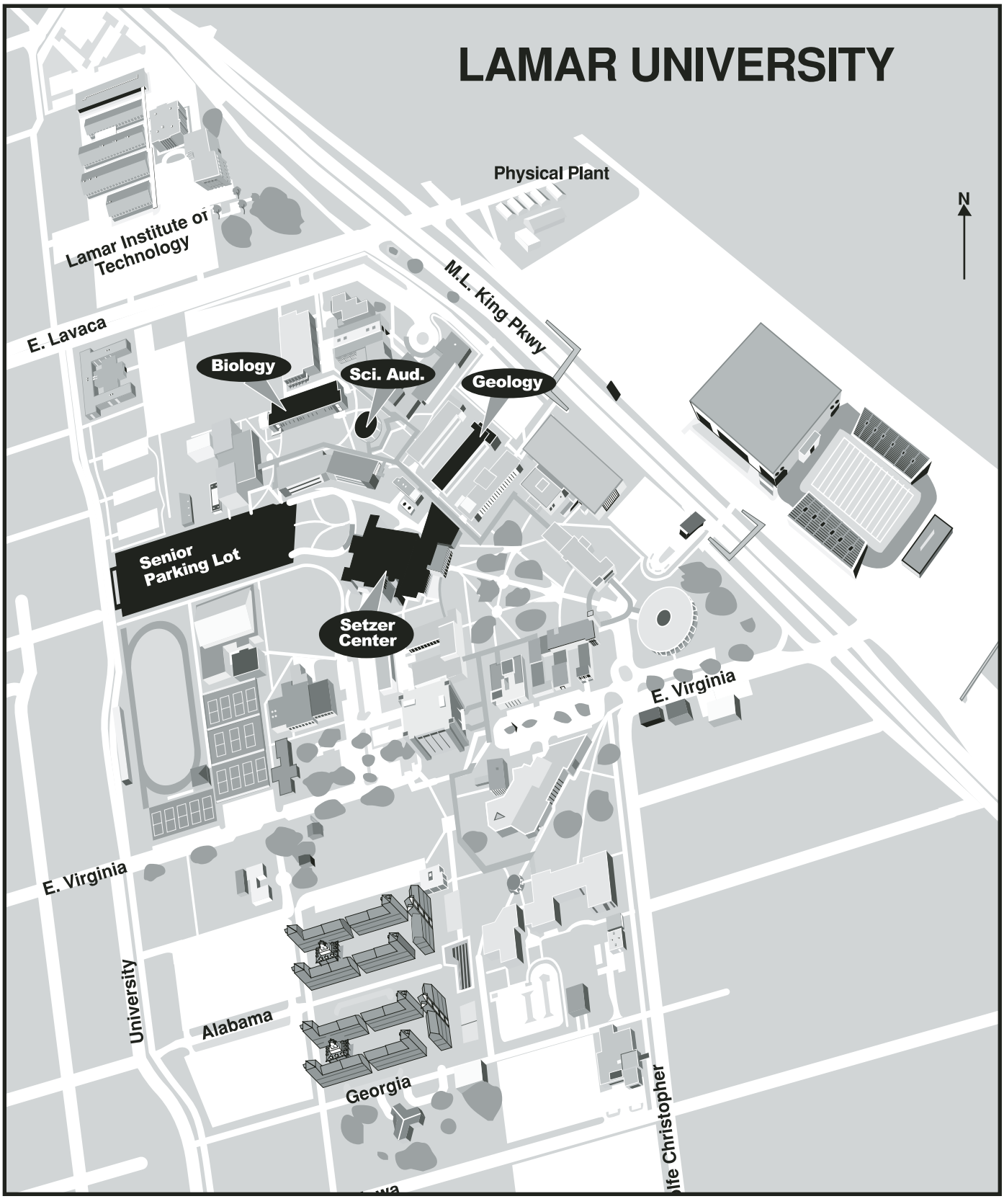
LAMAR UNIVERSITY
Campus Map



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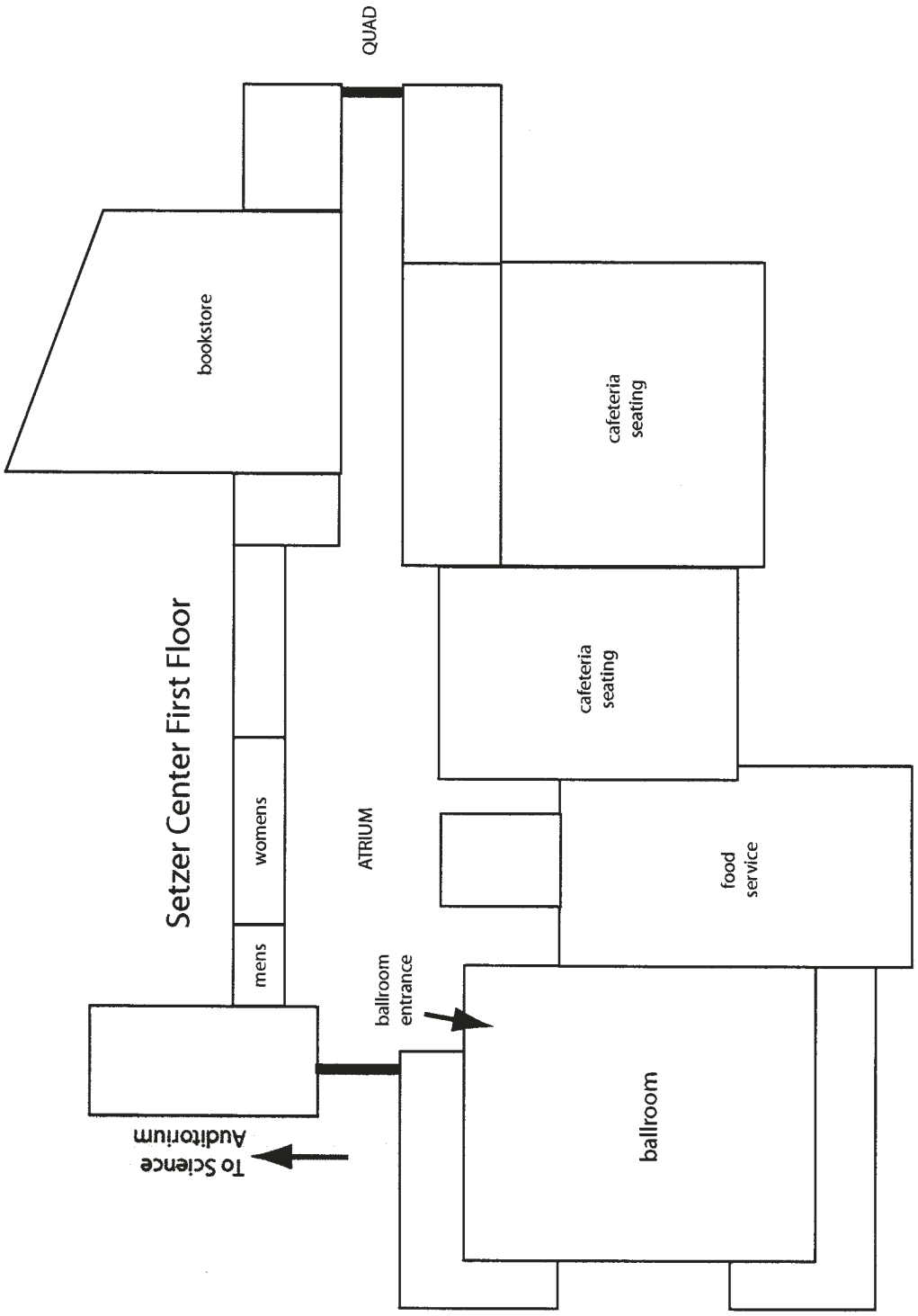

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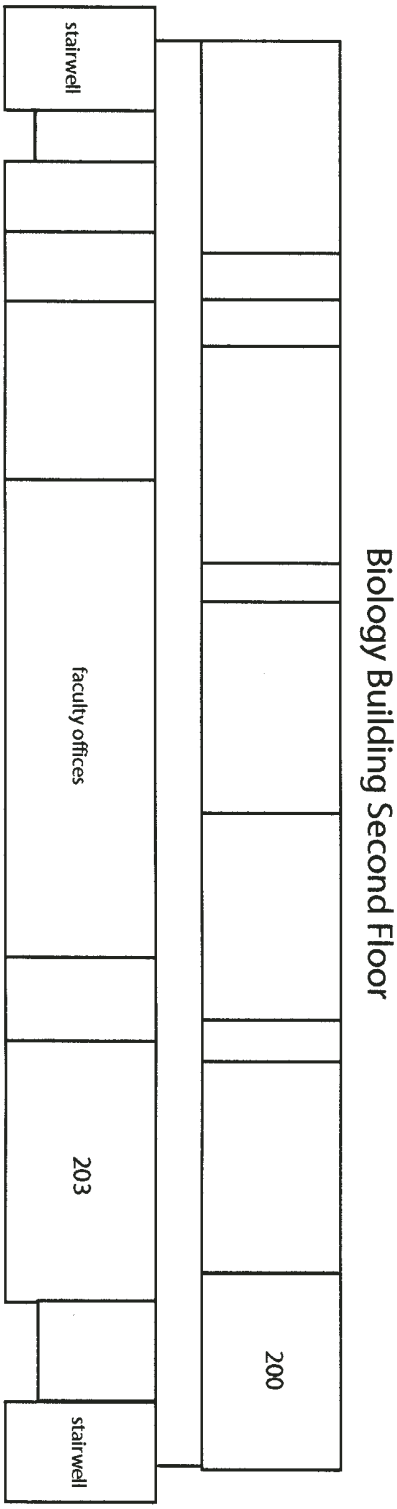

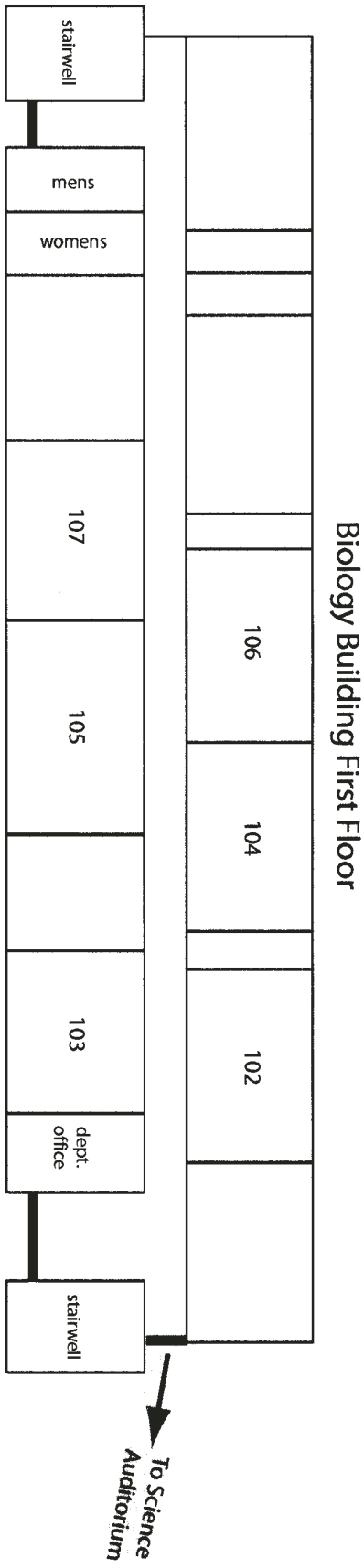

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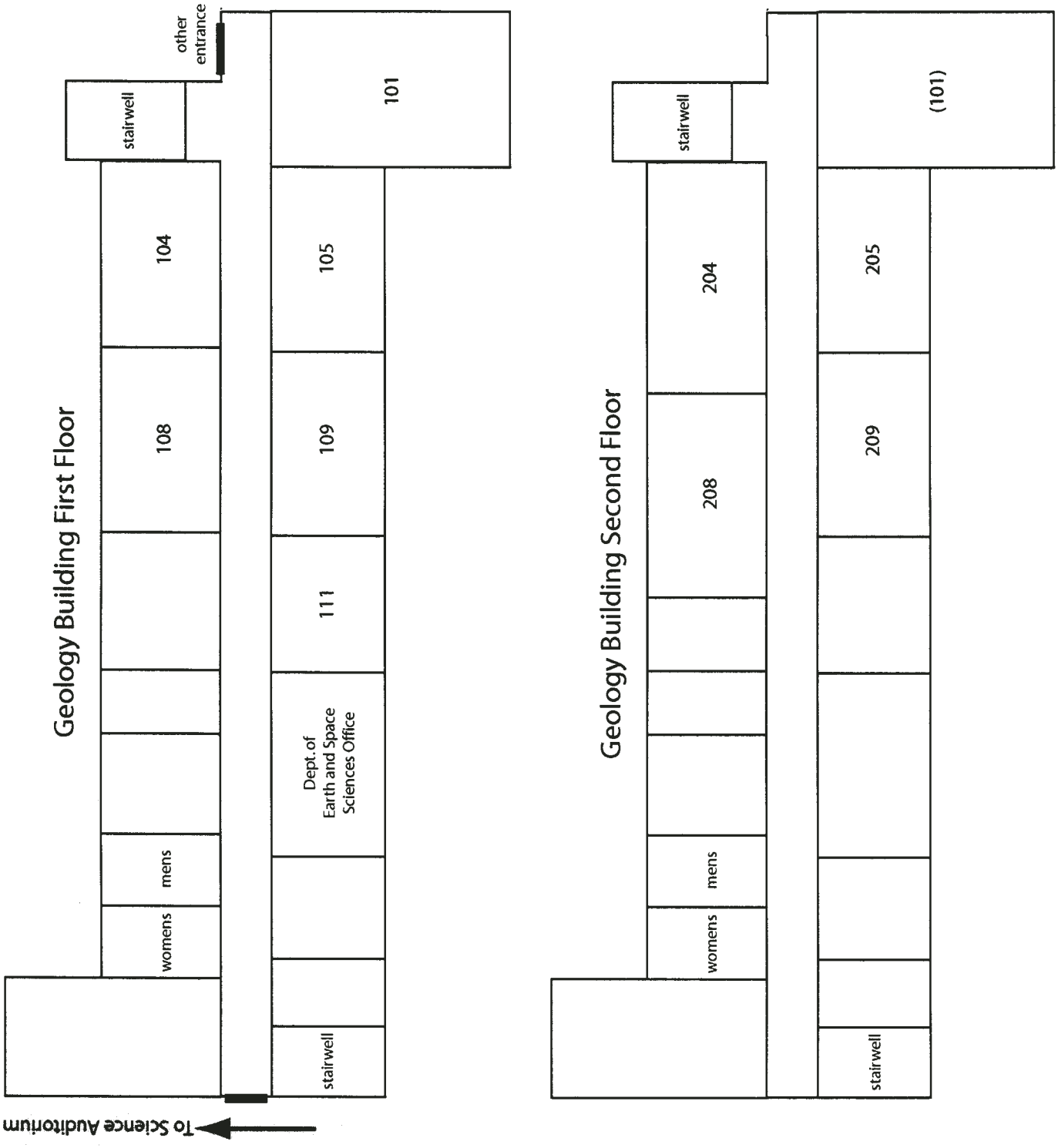

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