

118th Annual Meeting of the Texas Academy of Science



March 6-8, 2014
University of Incarnate Word at
San Antonio, Texas

ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIR

We would like to gratefully thank and acknowledge all the research faculty, professionals, staff and students who have given their time and efforts in individual and collaborative research works to make this meeting possible. We could not bring this conference about without their hard-work and dedication to undergraduate research in Texas. We extend a special thanks to the section chairs and vice-chairs who unselfishly donated their time and expertise reviewing the numerous abstracts, organizing, recruiting judges as well as judging and moderating the talks. We would also like to express our gratitude to the coordinators and student representatives of the panel discussions, symposia, and graduate recruitment workshops. We especially acknowledge our many sponsors this year.

We would like to thank our local host this year, The University of Incarnate Word. We especially acknowledge the organizational expertise and cooperation of the coordinators from UIW: Dr. Paul D. Fogelsong, Dr. Veronica Martinez Acosta, and Dr. Kevin Vichcales, Associate Provost. We would also like to thank the city of San Antonio and Mayor Ivy Taylor for warmly welcoming us to the Alamo City.

On a personal note, I would like to especially thank the dedicated board members of the Texas Academy of Science each of whom has been kind, welcoming and when possible always affording valuable advice. I am pleased to acknowledge the Annual Program Committee members: TAS President, Dr. Chris Ritzi; Vice President, Jason Locklin along with the Awards Committee; the Junior Academy Counselor, Vince Shielcak; Graduate Counselor, Shannon Hill; and Collegiate Academy Counselor, Cathy Early. I would also like to thank many of my TAS colleagues who often work behind the scenes but have not gone unnoticed. They include Marsha May, Cindy Hobson, Romi Burks, Andy Kasner, Frank Dirrigl, and Kathleen Woods. I'd like to personally thank the colleagues of the Texas Department of Parks and Wildlife. You are all an inspiration to me, and I thoroughly enjoy working with each one of you. Most importantly, I am deeply grateful for the help and expertise of Dr. Christopher Vitek who rendered valuable assistance in the preparation and organization of the program. If Chris were an element, he'd surely be carbon.

Lastly, I wish to thank many of my colleagues and friends at Schreiner University who supported me in various ways throughout this process. My role as an elected member of the TAS has always been supported by the President, Dr. Tim Summerlin; and the Provost, Dr. Charlie McCormick. My work on the program was assisted and encouraged by the Dean of the Department of Science and Mathematics, Dr. Diana Comuzzie. I would also like to thank my student, Jasmyn Rosser, who helped me in numerous ways and also provided keen student insight and helpful comments. I am furthermore extremely grateful to my colleague and friend, Dr. Kiley Miller who has put up with me as I worked on this program and supported my duties for the Texas Academy of Science with unflagging encouragement. I also owe a debt of gratitude to Dr. Fred Stevens who paved the way for me and has always provided me with wisdom and friendship. I will always be grateful to Schreiner University, and the place in the heart of the Texas Hill Country I call home.

Danette René Vines, Ph.D.
Program Chair and President-Elect of TAS

ACKNOWLEDGEMENTS FROM THE LOCAL HOST

We acknowledge the work of Dr. Danette Vines and Dr. Chris Vitek in the design of the schedule of events for this meeting.

We gratefully acknowledge the support of Dr. Kevin Vichcales who provided the poster boards and refreshments for the poster sessions, Ms. Ana Gonzalez for audio-visual and computer support, Mr. Sam Wages for help with the bus service, the UIW Police Department for directing traffic, Margaret Garcia for advertisement and public relations, and Dr. Carlos Garcia, Dean of the School of Mathematics, Science & Engineering for support throughout the planning process.

We acknowledge the hard work of numerous members of the faculty of the School of Mathematics, Science & Engineering and the Feik School of Pharmacy throughout the entire process of planning and hosting this meeting: 1) Dr. David Foglesong and Dr. Gerald Mulvey for organization of the Oral Sessions; 2) Dr. Ana Vallor, Dr. Adeola Coker, and Dr. Flor Garcia-Wukovits for organization of the Poster Sessions; 3) Dr. Alison Whittemore, Dr. Sushma Ramsinghani, Dr. Kevin Vichcales, and Dr. Carlos Garcia for the bus service and parking; 4) Dr. Sara Tallarovic, Dr. Veronica Acosta, Dr. David Foglesong, and Dr. Bonnie McCormick for arranging discounted hotels and tours; 5) Dr. Adeola Coker, Dr. Rafael Adrian, Dr. Ana Vallor, and Dr. Jessica Ibarra for planning the entertainment for the reception; 6) Dr. Veronica Acosta, Dr. Kevin Vichcales, and the Executive Board of TAS for fund raising, food, and registration expenses; 7) Dr. David Foglesong and Dr. Jessica Ibarra for public relations and advertisements; 8) Dr. Rosa Cardenas, Bonnie McCormick, and Dr. Betsy Leverett for audio-visual and computer support; 9) Dr. David Coleman, Dr. Julian Davis, Mr. Ben McPherson, Dr. Paul Messina, Dr. Robert Miranda, Ms. Jenny Reamer, and Dr. Robert Garner for general help.

Lastly, we gratefully acknowledge the help of numerous UIW students majoring in the sciences for their enthusiastic help in staffing the registration, setting up the poster sessions, assisting with audio-visual support for the oral presentations, the design of this year's meeting logo, and anything else that we asked them to do. They were great!

Dr. Veronica Acosta and Dr. David Foglesong



Dear Members of the Texas Academy of Science:

It is my great pleasure to welcome you to University of the Incarnate Word for the 118th Annual Meeting. I congratulate each of you for your contributions to the advancement of science.

UIW is an institution of nearly 10,000 students founded in 1881 by the Sisters of Charity of the Incarnate Word, who also established the first civilian hospital in San Antonio. Our Mission Statement reflects a commitment to educational excellence and community service. Accordingly, we support strong programs in the basic sciences and professional schools in the health sciences.

UIW has grown rapidly in recent years, and we are now the largest Catholic university in Texas and the fourth largest private university in the state. We have added many majors during the last decade as well as established the Feik School of Pharmacy, the Rosenberg School of Optometry and the School of Physical Therapy. In 2017, we will open a School of Osteopathic Medicine at Brooks City Base.

Our campus features numerous new facilities (and others under construction), so I hope you will have an opportunity to see them during the tour that has been scheduled for you at 10 a.m. on Sunday, March 8. Other tours will feature the Solar House designed by our engineering students and our fine facility for broadcast meteorology.

I also hope that you will have an opportunity to see some of San Antonio during your stay. Our city boasts a number of outstanding attractions, such as the San Antonio Zoo, the San Antonio Botanical Garden, the Witte Museum, the world-famous Alamo, and the River Walk, one of the nation's outstanding urban developments. Also, the Sisters of Charity of the Incarnate Word invite you to attend a public mass at the Chapel of the Incarnate Word, which is adjacent to the UIW campus, at 10:30 a.m. on Sunday March 8.

On behalf of the UIW community, I wish you a productive meeting!

Sincerely,

A handwritten signature in black ink that reads "Louis J. Agnese Jr".

Louis J. Agnese, Jr., Ph.D.
President

*The Universe is Yours*SM
4301 Broadway, San Antonio, Texas 78209 210 829-6000

THE TEXAS ACADEMY OF SCIENCE

INCORPORATED IN 1929: AFFILIATED WITH THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Letter from the President of the Texas Academy of Science

Dr. Christopher M. Ritzi

Welcome to the 118th Annual meeting of the Texas Academy of Science! We have quite a bit in store for everyone this year, as we seek to continue to provide students and professionals alike the opportunity to share their scientific findings in the state of Texas. This year's meeting here at the University of Incarnate Word is shaping up to be a great one. We have 118 oral presentations and 125 poster presentations signed up for the meeting, with the overwhelming majority of them being undergraduate and graduate student presentations. The Academy is also proud to award \$13,500 in student research awards, in addition to the oral and poster competition awards. Few state academies are able to muster this level of commitment toward supporting their up and coming scientists of the future, and we in Texas have been given the opportunity to continue this great tradition. Thanks to the continued support of our members and a dedicated and hardworking board, we in the Academy look forward to many more years of supporting and fostering science in all its various forms here in Texas.

On the point of thanking people, this academy would not function without the efforts of a good group of people who understand the mission the academy stands for. This year's meeting would not be possible without the hard work and determination of our Program Chair, Danette Vines, and our Coordinator of Information and Technology, Chris Vitek. We were especially lucky this year to have an amazing pair of local hosts, Veronica Acosta and David Foglesong, who were able to coordinate the session rooms, refreshments, meals, and the incredible Rosenberg Skyroom for our Saturday evening banquet. The view of the San Antonio skyline is breathtaking, so I hope you all can join us. Organizing and managing all the abstracts and presentations is quite a task, so I would remiss if I did not thank the section chairs for their hard work in making sure everything was prepared for our team to finalize session times and presentation arrangements. I would also like to thank Immediate Past President Cindy Hobson for helping to keep us on task, provide support and experience to the process, and lining up a great set of new officers for the coming year. The Academy survives in no small part due to the largely thankless toiling of its board, so I cannot thank the board enough for the time and energy they give to this organization. If anyone is interested in seeing how they might further serve the Texas Academy of Science, come and speak to either myself or another member of the board and we can help get you started.

Finally, I hope you enjoy all the opportunities we have available for us during this two-day format meeting in San Antonio. Oral presentations and posters begin on Friday afternoon, followed by a new Graduate Student Symposium and professional development sessions Friday night from 7:00-9:00pm. Saturday will continue with talks and posters in the morning and early afternoon, lunch and business meeting at noon, followed by our Texas Distinguished Scientist and Outstanding Texas Educator presentations. The day will conclude with the awards banquet that evening in the Rosenberg Skyroom. Finally, take advantage of beautiful San Antonio on Sunday with either one of our three field trips (the Headwaters Nature Preserve, tour of the Solar House, or the tour of the Broadcast Meteorology facility), or visit the San Antonio Botanical Gardens or the San Antonio Zoo during your stay. Have a great weekend with us here at University of Incarnate Word and the Texas Academy of Science!

Chris Ritzi

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Romi Burks

**SFASU Department of Chemistry and Biochemistry
(Darrel Fry)**

Aaron Kim Ludeke

Andrew Woodward

Joseph Kowalski

Chris Ritzi

Distinguished Texas Scientist



Dr. Francisco Gonzalez-Lima is the George I. Sanchez Centennial Professor at the University of Texas at Austin. He is an internationally recognized neuroscience leader that investigates the relationship between brain energy metabolism, memory and neurobehavioral disorders. An honors graduate of Tulane University, New Orleans, he received a B.S. in Biology and a B.A. in Psychology. He received a Ph.D. in Anatomy and Neurobiology from the University of Puerto Rico, San Juan. He was introduced to electrophysiology by Dr. Jose del Castillo, co-discoverer of quantum transmitter release (del Castillo and Katz--that led to a Nobel Prize to Katz). His doctoral dissertation utilized electrophysiological recording of single cells and electrical stimulation of the brain. He pursued postdoctoral research training with Dr. H. Scheich in Germany as a Research Fellow of the prestigious Alexander-von-Humboldt Foundation. Their 1982-86 studies in animals, using the brain marker fluorodeoxyglucose (FDG), helped to develop FDG neuroimaging in humans. Dr. Gonzalez-Lima met Texas professors who recruited him to the College of Medicine of Texas A&M University as Assistant Professor in 1986. He joined the Institute for Neuroscience and the Department of Psychology as Associate Professor with tenure in 1991. Dr. Gonzalez-Lima became Professor and Head of Behavioral Neuroscience in 1997, and he received joint appointments as Professor of Pharmacology and Toxicology in 1999. In 2000 he was honored with the first endowed chair named after a Hispanic professor in the USA. In 2002 Dr. Gonzalez-Lima became Director of the Texas Consortium in Behavioral Neuroscience, a doctoral and postdoctoral research training consortium of five Texas universities. In 2007 he was honored with the Distinguished Alumnus Award from his alma mater. In 2011, he became US Councilor, International Behavioral Neuroscience Society, and founding chair of the Neuroscience Section, Texas Academy of Science. Dr. Gonzalez-Lima has been an invited lecturer at >100 institutions around the world and has served on national and international scientific advisory committees (including the US National Academy of Science Committee to the International Brain Research Organization). His lab has been at the forefront of neurometabolic studies of animal behavioral functions in the world, translating new interventions for human neurobehavioral disorders and contributing >300 scientific publications.

Outstanding Texas Educator



Celena Miller earned her B.S. and M.S. from the University of Texas at Pan American and is currently the Science and Technology Lab Instructor at Cesar Chavez Elementary located in Pharr, Texas. Early in her teaching career, Celena applied for and was selected for the prestigious NASA Lift Off Summer Institute which is sponsored by the Texas Space Grant Consortium and returned to the program the subsequent 2 years. This single summer institute provided the jumping board for her involvement in NASA missions, curriculum writing, and other various opportunities. She has since then participated in NASA's Project 3D View, the NASA Endeavor Science Teaching Certificate Project, the ROME (Robotics, Ocean, and Microgravity Explorers) Challenge, as a MAVEN (Mars Atmospheric and Volatile Evolution) Teacher Ambassador, and sponsored two missions in the NCESSSE Student Spaceflight Experiment Program.

In August 2013, Celena sought community funding for 250 4th and 5th grade students to participate in the NCESSSE Student Spaceflight Experiment Program. She raised almost \$50,000.00 to provide all 250 students the necessary materials to conduct experiments in the classroom that would provide research in microgravity and then selected one team's experiment to launch, where astronauts aboard the International Space Station would conduct the experiment in microgravity.

In 2012 and 2014, Celena was awarded the NCESSSE Student Spaceflight Experiment Program Grant and is active mentoring both teachers and students in this endeavor. In 2014, Mrs. Miller was also named the HEB Excellence in Education Rising Star Winner for Texas and is currently a 2013-2014 Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) State Finalist. Celena states "When students are excited about going to class, eager to dive into science, and ask other students in the hall about the daily science activity, then I know learning is happening and that I am on the right track. I feel like I'm creating the scientists of tomorrow, and that makes me very happy."

2015 Fellow of the Academy

John Burch



Mr. John Burch received a B.S. from Texas A&M University and completed post-graduate coursework at Texas State University-San Marcos. He is currently the Water Quality Supervisor/Aquatic Biologist at the Colorado River Municipal Water District in Big Spring, Texas where he monitors water quality of surface waters and groundwater. In this capacity, he monitors policy changes for water quality programs issued by Texas Commission on Environmental Quality's Texas Clean Rivers, Non-point Source Pollution, and Nutrient Criteria Water Quality Standards Programs; invasive Golden Algae (*P. parvum*) and Salt Cedar (*Tamarix* spp.); Texas Environmental Flow Assessments; and Texas Freshwater Mussel Status. John has been a TAS member since the late 1990's and has served on the Board of Directors as a Non-Academic Director since 2011.

2015 Fellow of the Academy

Dr. Chris Distel



Dr. Chris Distel received a B.A. from Hiram College, a M.S. from Eastern Kentucky University, and Ph.D. from Miami University. He currently is an assistant professor at Schreiner University. Using mesocosms, his research investigates ecological community structure with particular focus on the effects of pesticides on community composition. Chris has been very active in TAS over the last 4 years.

2015 Fellow of the Academy

Dr. Chris Vitek



Dr. Christopher Vitek received a B.A. from Drew University and a Ph.D. from Clark University. He is currently a medical entomologist at the University of Texas – Pan American. His research has examined the phenotypic plasticity in behavior and development of mosquitoes in response to climate variability, the epidemiology and transmission cycle of West Nile virus, and the biology, ecology, and distribution of disease vectors in South Texas with particular focus on chikungunya virus and dengue virus vectors. Chris has been active in TAS and has worked for the past two years transitioning the TAS website and improving the registration and abstract submission process.

2015 Fellow of the Academy

Dr. Jason Locklin



Dr. Jason Locklin received an A.A. from Temple College, a B.S. and M.S. from Texas State University-San Marcos, and a Ph.D. from Baylor University. He currently serves as biology department chair at Temple College. His research has investigated plasticity in life history characteristics in aquatic insects, the distribution and fitness costs of parasitism among dragonfly populations, and the migration dynamics of monarch butterflies. Jason actively promotes undergraduate research at the community college level. His students have been published, presented at national and regional conferences, and are active in TAS. He has also served as the chair of the TAS Graduate Student Research Awards Committee, Graduate Academy Counselor, and as faculty co-sponsor of the Temple College Science Club, a collegiate chapter of TAS, since 2004.

In Memoriam:

Jim Collins



Jim Collins, first graduate academy counselor of the Texas Academy of Science and professor at Kilgore College, passed away last year (2013) in Lindale, Texas. He received his B.B.A. from Texas Tech, M.S. from Angelo State University, and Ph.D. from Texas Tech University. Jim served at Kilgore College for 17 years as a Biology Instructor, colleague, and mentor to biology students.

During his time at Kilgore, he taught numerous biology courses to both majors and non-majors. He was a hardworking, diligent, and caring instructor, who was devoted to the biological sciences. He set high standards and was at times uncompromising in his love and dedication to his field. However, his dedication showed as he led the Kilgore College Biology Club, advised students, and worked with graduate students through the Texas Academy of Sciences.

2015 New Officers/ Special Recognition

New Officers (2015-16)

Vice President – Neil Gray

Nonacademic Director – Felipe Chavez-Ramirez

Academic Director – Kathryn Perez

Student Director – Brandon Hill

Special Recognition Awards

Past Presidents' Award: Christopher M. Ritzi

Academic Director: Raelynn Deaton Haynes

Non Academic Director: Chip Ruthven

Student Representative: Ivy McClellan

Collegiate Academy: Linda Southwick

Schedule

Friday, March 6

001. Breakfast Buffet and Meeting of the Executive Board

8:00 am to 12:00 pm

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Breakfast Buffet and Meeting of the Executive Board

002. Registration

8:00 am to 7:00 pm

McCombs Center, Atrium

Texas Academy of Science Annual Meeting

Registration

003. Lunch For Section Chairs and Board

12:00 to 1:00 pm

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Lunch For Section Chairs and Board

004. Poster Set Up

12:00 to 2:00 pm

Wellness Center, Room 101

Texas Academy of Science Annual Meeting

Poster Set Up

005. Botany Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 123

Botany

Botany Oral Session I

Chair: **Martin Terry**, *Sul Ross State University*

Participants:

- 1:00 005.001 G *Euphorbia abramsiana* (**Euphorbiaceae**): **New to Texas**, *Nathan Caleb Taylor, Sul Ross State University; Martin Terry, Sul Ross State University*
- 1:15 005.002 G **A morphological and cytogenetic study comparing *Ibervillea lindheimeri* and *Ibervillea tenuisecta***, *Richard Newbold, Sul Ross State university; Christopher M Ritzi, Sul Ross State University*
- 1:30 005.003 U **Understanding bacterial and fungal communities in and around *Juniperus ashei* (Cupressaceae)**, *Andres Frank Garza, St. Edwards University; Charles Hauser, St. Edward's University*
- 1:45 005.004 N **Upper Cretaceous conifers of Terlingua Ranch, Brewster County, Texas**, *David E Lemke, Texas State University; Alaa Ibrahim, Texas State University*

006. Environmental Science Oral Session I

1:00 to 2:30 pm

Ila Faye Miller Nursing Building, NB 214

Environmental Science

Environmental Science Oral Session I

Chair: **Kristine Lowe**, *University of Texas - Pan American*

Participants:

- 1:00 006.005 G **Investigation into Neritic Water Conditions as Primary Driver of Vegetative Fragmentation Rates of Sargassum Naitans and Fluitans**, *Brandon Nicholas Hill, TAMUG Mars Department; Robert Webster, TAMUG Mars Department; Thomas Linton, TAMUG Mars Department*

NS = Non-student presentation/poster; HS = High School student presentation/poster

U = Undergraduate student presentation/poster; G = Graduate student

- 1:15 006.006 G **Abrasive detachment of platinum group elements in catalytic converters**, *Mayada Coleman, Texas Southern University; Daniel Vrinceanu, Texas Southern University*
- 1:30 006.007 G **Assessing wetland degradation and contamination due to agricultural tile drainage**, *Drew R Davis, University of South Dakota; Matthew S Schwarz, United States Fish and Wildlife Service; Jacob L Kerby, University of South Dakota*
- 1:45 006.008 G **Distance Based Mercury Contamination in Association to Small-Scale Gold Mining in Zimbabwe**, *Corey Green, Sam Houston State University*
- 2:00 006.009 G **Object based vegetation classification with unmanned aerial system to assess the productivity of a constructed wetland**, *Nicholas Robb Villarreal, The Meadows Center for Water and the Environment*

007. Graduate Student Competition I

1:00 to 2:30 pm

AT&T Center, AT&T 121

Graduate Student Paper Competition

Graduate Student Competition I

Chair: **Shannon Hill**, *Temple College*

Participants:

- 1:00 007.010 G **Alternative restoration treatments to maximize growth and survival of Tamaulipan thornscrub species during seedling establishment**, *Jennifer Lynn Vela, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville; Jonathan Moczygema, United States Fish and Wildlife Service; Alejandro Fierro Cabo, University of Texas at Brownsville*
- 1:15 007.011 G **Functional analysis of novel conserved mixed-isoform B56δγ within the canonical Wnt signaling pathway in *Xenopus laevis***, *Celso S. G. Catumbela, Sam Houston State University; Joni Seeling, Sam Houston State University*
- 1:30 007.012 G **Long-term effects of woody plant expansion in a humid, tropical grassland of Venezuela**, *Soraya Delgado, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville*
- 1:45 007.013 G **Territoriality and ‘dear enemy’ recognition between heterospecific pupfishes (genus *Cyprinodon*)**, *Christopher Brooks, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University*
- 2:00 007.014 G **The role of sexual selection in hybridization between pupfishes (genus *Cyprinodon*)**, *Cory Becher, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University*

008. Neuroscience Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 321

Neuroscience

Neuroscience Oral Session I

Chair: **George Perry**, *The University of Texas at San Antonio*

Participants:

- 1:00 008.015 G **Molecular Mapping of Alzheimer's Disease – Imaging Mass Spectrometry**, *Andrea Renee Kelley, University of Texas at San Antonio; George Perry, The University of Texas at San Antonio; Rudolph J. Castellani, University of Maryland School of Medicine; Stephan B.H. Bach, University of Texas at San Antonio*
- 1:15 008.016 U **Seizures on postnatal day 10 suppress isolation-induced ultrasonic vocalizations in mice.**, *Conner Douglas Reynolds, Baylor University; Joaquin Lugo, Baylor University*
- 1:30 008.017 U **Social interaction prevents salt addiction in group-housed animals.**, *Ashley M. Rivera, Wayland Baptist University; Melissa Perez, Wayland Baptist University; derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University*
- 1:45 008.018 U **WBU athletes displayed higher taste preference for salty foods than WBU non-athletes**, *Sharon Robinson, Wayland Baptist University; Whitney Michelle Phillips, Wayland Baptist University; JohnMark Avila, Wayland Baptist University; derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University*

009. Science Education Oral Session I

NS = Non-student presentation/poster: HS = High School student presentation/poster
U = Undergraduate student presentation/poster: G = Graduate student

1:00 to 2:30 pm

Gorman Center, GB 119

Science Education

Science Education Oral Session I

Chair: **Patricia Eldredge**, Faculty

Participants:

- 1:00 009.019 N **Characterization of Environmental Science Student Responses to Advanced Placement Free-Response Questions: The Need for Student Metacognition**, Frank Joseph Dirrigl, Jr., University of Texas-Pan American
- 1:15 009.020 G **Confusing Words in Math & Science**, Alicia Katherine Sanders, Texas State University; Sandra S. West, Texas State University
- 1:30 009.021 G **Developing Successful STEM Students while Increasing their Science Identity**, Michele J Mann, University of Texas
- 1:45 009.022 N **The impact of guided student generated questioning on chemistry achievement and efficacy**, Marilyn Ibey, Brown Mackie College; christine moseley, UTSA

010. Systematics and Evolutionary Biology Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 129

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Oral Session I

Chair: **Andrea Jensen**, Hardin-Simmons University

Participants:

- 1:00 010.023 G **Is the zonadhesin gene a useful molecular marker for determining phylogenetic relationships among mammalian orders?**, Emma K Roberts, Texas Tech University; Daniel M Hardy, Texas Tech University Health Sciences Center; Robert D Bradley, Texas Tech University
- 1:15 010.024 N **Pleurocerid population structure assessed with ISSRs.**, Bethany McGregor, University of Louisiana at Monroe; Russell Minton, University of Houston Clear Lake
- 1:30 010.025 U **Shoaling and exploration behaviors as functions of female reproductive state in largespring gambia**, James Stewart, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University
- 1:45 010.026 G **Who are the fathers: characterizing hybrid origins of parthenogenetic *Aspidoscelis* lizards**, Alexander S. Hall, University of Texas at Arlington; Jose Maldonado, University of Texas at Arlington; Matthew Fujita, University of Texas at Arlington

011. Terrestrial Ecology and Management Oral Session I

1:00 to 2:30 pm

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session I

Chair: **Richard James Patrock**, Texas A&M, Kingsville

Participants:

- 1:00 011.027 G **A Gentle Introduction to High Throughput Sequencing Applications and Study Design**, Alexander S. Hall, University of Texas at Arlington
- 1:15 011.028 G **A comparison of ectoparasite diversity found on three North American songbirds and their nests between urban and rural habitats**, Faith N.K. Byrd, Sam Houston State University
- 1:30 011.029 N **A look at the diversity of bees in Kleberg County**, Richard James Patrock, Texas A&M, Kingsville; John Reilley, USDA- NRCS
- 1:45 011.030 U **A phenology of Texas amphibians**, Sara J. Crady, The University of Texas at Austin; Travis J. LaDuc, The University of Texas at Austin
- 2:00 011.031 G **Diet analysis of Texas diamondback terrapin (*Malaclemys terrapin littoralis*)**, Bryan Alleman, University of Houston-Clear Lake; George Guillen, University of Houston Clear Lake

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2:15 011.032 G **Effects of Environmental Temperature on the Critical Thermal Limits of the Tawny Crazy Ant** (*Nylanderia fulva*), Lance Umlang, Sam Houston State University

012. Geosciences Oral Session I

3:00 to 4:30 pm

Bonilla Science Hall, BSH 123

Geosciences

Geosciences Oral Session I

Chair: **Mindy Faulkner**, Stephen F Austin State University

Participants:

3:00 012.033 G **A Taxonomic and Geologic Study on an Oreodont Skull Excavated from Buffalo Gap National Grasslands of South Dakota**, Garrett Williamson, Stephen F. Austin State University; Tim Walsh, Wayland Baptist University; David Schmidt, Westminster College

3:15 012.034 N **Development of rill marks on the beach face at Sea Rim State Park, Texas**, Russell LaReill Nielson, Stephen F. Austin State University; Chris A Barker, Stephen F, Austin State University

013. Graduate Student Competition II

3:00 to 4:30 pm

AT&T Center, AT&T 121

Graduate Student Paper Competition

Graduate Student Competition II

Chair: **Shannon Hill**, Temple College

Participants:

3:00 013.035 G **CD4+ T cell effector function is impaired by Erk2 deletion**, Julie Tudyk, UTSA; Emily Zboril, UTSA; Thomas Forsthuber, University of Texas at San Antonio

3:15 013.036 G **Comparison of Herpetofaunal Communities in Areas Disturbed by Oak Regeneration Silvicultural Treatments**, Chad Sundol, The University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio; Cathryn Greenberg, USDA Forest Service; Christopher Moorman, North Carolina State University; Jerry K Jacka, The University of Texas at San Antonio

3:30 013.037 G **Crossing to the dark side: convergent evolution in the development of a vestigial eye**, Ruben Uranga Tovar, Texas State University; Dana M. Garcia, Texas State University

3:45 013.038 G **Mandibular notch shape in extant Hominidae using 2D Elliptic Fourier Analysis**, Timothy Lee Campbell, Texas A&M University; Thomas J. DeWitt, Department of Wildlife and Fisheries Sciences, Texas A&M University; Darryl de Ruiter, Department of Anthropology, Texas A&M University

4:00 013.039 G **Therapeutic effects of methylene blue on cognitive impairments during chronic cerebral hypoperfusion**, Allison Auchter, University of Texas at Austin; Justin Williams, University of Texas at Austin; Bryan Barksdale, University of Texas at Austin; Marie Monfils, University of Texas at Austin; F Gonzalez-Lima, University of Texas at Austin

014. Marine Science Oral Session I

3:00 to 4:30 pm

Bonilla Science Hall, BSH 321

Marine Science

Marine Science Oral Session I

Chair: **James Simons**, Center for Coastal Studies

Participants:

3:00 014.040 U **Assessing Biodiversity and Population Estimates of Syngnathidae Fishes in the Aransas Bay, Texas**, Janaee Wallace, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University; Mia Valdez, St. Edward's University

3:15 014.041 G **Do female dusky dolphins (*Lagenorhynchus obscurus*) have the potential to exercise active mate choice?**, Dara Orbach, Texas A&M University at Galveston; Jane Packard, Texas A&M University; Bernd Würsig, Texas A&M University at Galveston

3:30 014.042 N **Pulse-Amplitude-Modulated (PAM) fluorescence response of the seagrass, *Thalassia testudinum***

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Banks ex König (turtle grass) to rapid, short-term hyposalinity exposure., *Joseph Kowalski, The University of Texas-Pan American*

- 3:45 014.043 N **Return to San Antonio Bay: a Second Year of Seagrass Monitoring**, *Cynthia Hobson, Texas Parks and Wildlife Dept.*
- 4:00 014.044 U **Seagrass associated fish biodiversity along the Texas Coast**, *Andre Guy Osvaldo Brebion, St. Edward's University; Janaee Wallace, St. Edward's University; Roberta Engel, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
- 4:15 014.045 U **The effects of tides and currents on larval blue crabs (*Callinectes sapidus*)**, *Claire Weirich, Texas Lutheran University*

015. Science Education Oral Session II

3:00 to 4:30 pm

Gorman Center, GB 119

Science Education

Science Education Oral Session II

Chair: Patricia Eldredge, Faculty

Participants:

- 3:00 015.046 G **Know your bioregion: A journey towards developing a personal sense of place**, *Wayne shelden, UTSA; Deepti Kharod, UTSA; christine moseley, UTSA*
- 3:15 015.047 G **Place Consciousness as a pathway towards campus sustainability**, *Deepti Kharod, UTSA; Wayne shelden, UTSA; christine moseley, UTSA*
- 3:30 015.048 G **Resaca Rangers: a school-based network to monitor resaca ecosystem health**, *Buford J. Lessley, University of Texas at Brownsville; Alejandro Fierro Cabo, University of Texas at Brownsville; Jude Benavides, Department of Chemical and Environmental Sciences, University of Texas at Brownsville; Susan Fagan, University of Texas at Brownsville*
- 3:45 015.049 G **Resaca Rangers: a school-based network to monitor resaca ecosystem health**, *Buford J. Lessley, University of Texas at Brownsville; Alejandro Fierro Cabo, University of Texas at Brownsville; Jude Benavides, Department of Chemical and Environmental Sciences, University of Texas at Brownsville; Susan Fagan, University of Texas at Brownsville*
- 4:00 015.050 N **STEM Administrator Leadership**, *Sandra S. West, Texas State University*
- 4:15 015.051 N **The Echoes of an Adaptationist Legacy: (Not) Teaching Non-adaptive Evolution**, *Rebecca M Price, University of Washington, Bothell; Kathryn E Perez, University of Texas Pan American*

016. Systematics and Evolutionary Biology Oral Session II

3:00 to 4:30 pm

Bonilla Science Hall, BSH 129

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Oral Session II

Chair: Andrea Jensen, Hardin-Simmons University

Participants:

- 3:00 016.052 G **A comprehensive revision of the New World genus *Metaparria* (Coleoptera:Chrysomelidae)**, *Clayton Sublett, Sam Houston State University; Jerry L. Cook, Sam Houston State University*
- 3:15 016.053 U **A tale of two species: comparative phylogeography and genetic diversity of *Pomacea canaliculata* and a putative cryptic congeneric in the Rio de la Plata Basin**, *Lourdes Sofia Campos, Southwestern University; Cristhian Clavijo, 2del Museo de Historia Natural, Montevideo, Uruguay; Fabrizio Scarabino, Museo National de Historia Natural; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA*
- 3:30 016.054 G **Determining morphometric and genetic variation among relationships of eight breeds of Ethiopian camels (*Camelus dromedarius*)**, *Christopher Dale Dunn, Texas Tech University; Yoseph Legesse, Jijiga University; Robert D Bradley, Texas Tech University*
- 3:45 016.055 G **Does evidence exist for the exclusion of *Isthmomys* from *Peromyscus*?**, *Megan Keith, Texas Tech University; Robert D Bradley, Texas Tech University; Roy N. Platt II, Texas Tech University*

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- 4:00 016.056 U **Fighting with swords: genital combat as an alternative explanation for same sex mating in a coercive livebearer (*Gambusia affinis*)?**, Julian Alejandro Rios, St. Edward's University
- 4:15 016.057 G **Insights to the evolution of the pineal eye from phylogenetics and the fossil record**, William B Gelnaw, University of Texas at Austin

017. Terrestrial Ecology and Management Oral Session II

3:00 to 4:30 pm

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session II

Chair: **Richard James Patrock**, Texas A&M, Kingsville

Participants:

- 3:00 017.058 G **Effects of shrub encroachment and shrub removal methods on South Texas coastal prairies**, Parker Watson, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville; Jonathan Moczygemba, United States Fish and Wildlife Service
- 3:15 017.059 G **Forest restoration and its effect on birds in the Lower Rio Grande Valley**, John S Brush, University of Texas-Pan American; Timothy Brush, University of Texas-Pan American; Teresa P. Feria, The University of Texas- Pan American
- 3:30 017.060 G **Impact of Climate Change on the Breeding Ranges of Some Tropical and Subtropical Bird Species**, Mayra Oyervides, University of Texas-Pan American; Timothy Brush, University of Texas-Pan American; Teresa P. Feria, The University of Texas- Pan American
- 3:45 017.061 G **Intergroup variation in estrogenic plant consumption for the black-and-white colobus monkey of Kibale National Park, Uganda**, Kathryn Michelle Benavidez, Texas State University
- 4:00 017.062 G **Neighborhood structure of the Comanche harvester ant, *Pogonomyrmex comanche*: what role does aggression play?**, Ann B. Mayo, University of Texas-Arlington
- 4:15 017.063 N **Preliminary assessment of predator-prey dynamics in an urban ecosystem**, Troy A Ladine, East Texas Baptist University

018. Poster Session I

4:30 to 6:00 pm

Wellness Center, Room 101

Anthropology

Anthropology Poster Session

Participants:

- 018.064 N **Estimation and multivariate comparison of the adult cranial morphology of *Australopithecus sediba***, Keely Carlson, Texas A&M University; Darryl de Ruiter, Department of Anthropology, Texas A&M University; Kieran McNulty, University of Minnesota; Thomas J. DeWitt, Department of Wildlife and Fisheries Sciences, Texas A&M University; Lee Berger, University of the Witwatersrand

Botany

Botany Poster Session

Participants:

- 018.065 U **A study of amino acid substitution in the large subunit of ribulose biphosphate carboxylase: Implications for DNA sequence evolution and phylogenetic analysis.**, Sucharitha Marneni, Lamar University; Randall Gene Terry, Lamar University

- 018.066 U **Analysis of fungal and bacterial root microbiomes of *Carex planostachys* (Cyperaceae)**, Joe Dylan Sosa, St. Edward's University; Charles Hauser, St. Edward's University

Cell and Molecular Biology

Cell and Molecular Biology Poster Session

Participants:

- 018.067 U **Analysis of Bacterial and Fungal Root Microbiomes of *Muhlenbergia reverchonii* at Wild Basin**, Margaret Ann Walsh, St. Edwards University

- 018.068 U **Characterization of Eip63E and its role in *Drosophila* axonal transport**, Diana Aguirre, Schreiner

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University; Brooke Bailey, Schreiner University; Emma McCormick, Schreiner University; Susan Klinedinst, Schreiner University

018.069 U **Convergent Extension Epistasis of B56 α and B56 γ Isoforms in *Xenopus laevis***, Cody Austin Brannan, Sam Houston State University; Joni Seeling, Sam Houston State University

018.070 U **Defining Cancer to Defy Cancer: PA28 γ 's effect on cancer formation in MEF cells**, Lance Barton, Austin College; Rose Massey, Austin College; Archit Vasan, Austin College

018.071 G **Effect of Platinum Group Element-exposure on a gut microbiome model system *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli*, and HT29 cells**, Allen Ladd White, Texas Southern University; Mariam Konate, Texas Southern University; Jason A. Rosenzweig, Texas Southern University

018.072 U **Effects of Indole-3-Butyric Acid on *Arabidopsis thaliana***, Kevin Chappell, University of Mary Hardin-Baylor; Andrew W. Woodward, Univ. Mary Hardin-Baylor

018.073 G **Expression of B56 in the Embryonic Gut of *Xenopus laevis***, Douja Chamseddine, Sam Houston State University; Raymond Torrecampo, Sam Houston State University; Joni Seeling, Sam Houston State University

018.074 U **Finding genes that alter Dynactin-related motor disease using a *Drosophila* model**, Soledad Diaz, Schreiner University; Ulises Zoe Jasso, Schreiner University; Susan Klinedinst, Schreiner University

018.075 U **G1P3 Alters Redox Signaling and Induces Mitochondrial Fusion to Evade Apoptosis in Breast Cancer Cells**, Kailee Johnson, Texas A&M University-Commerce; Ashjan Khalel, Texas A&M University-Commerce; Venu Cheriya, Texas A&M University-Commerce

018.076 U **Genetic background affects the expressivity of EGFR pathway mutations in *Drosophila melanogaster***, Amanda Guilmette, student

018.077 G **MIF inhibition as novel treatment for autoimmune myocarditis and dilated cardiomyopathy**, Julian Phillip Casabar, University of Texas at San Antonio Department of Biology; Saisha Nalawade, University of Texas at San Antonio; Daniel Maldonado, University of Texas at San Antonio; Yoni Adler, University of Texas at San Antonio; Thomas Forsthuber, University of Texas at San Antonio

018.078 U **Optimization of fluorescent immunoblots for the detection of viral proteins**, Ravaen State Slay, Stephen F Austin State University; Katelyn D Defrates, Stephen F Austin State University; Rebecca D Parr, Stephen F Austin State University

018.079 G **Phylogenetic analysis of the B56 gene family of PP2A regulatory subunits**, Lauren Sommer, Sam Houston State University; Hyuk Cho, Sam Houston State University; Madhusudan Choudhary, Sam Houston State University; Joni Seeling, Sam Houston State University

018.080 U **RNA-Seq Analysis of Phosphate-Stressed *C. reinhardtii* Cells**, Savannah Reyes, St Edwards

018.081 U **Requirement for the SWR1 complex and Nap1 chaperone after TBP association in *Saccharomyces cerevisiae***, Julia Taylor, Abilene Christian University; Tim Kang, Abilene Christian University; Hillary Eichelberger, Abilene Christian University; Liangqun Huang, Colorado State University; Sarah Lee, Abilene Christian University

018.082 U **The Effects of PP2A Regulatory Subunits on Embryonic Development of *Xenopus laevis***, Grayson Hobart Means, Sam Houston State University

Chemistry and Biochemistry

Chemistry and Biochemistry Poster Session

Participants:

018.083 U **Interactions between RNA and the nanomaterial Hydroxide studied using physical and electrophoretic approaches**, Nicole Pollok, Texas Lutheran University

018.084 U **A New Means to Study Polysaccharides Hydrolysis by Voltammetry**, Angela Vang, University of Houston-Downtown; Resha Shrestha, University of Houston-Downtown; Mandira Lamichhane, University of Houston-Downtown

018.085 U **Analysis of VOCs emitted by *Ulmus crassifolia***, Gladis Bahena, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University

018.086 U **Analysis of crude oil degradation by bacterial co-cultures under halophilic conditions**, Mary M Bailey, Hardin-Simmons University; Zachary K Boswell, Hardin-Simmons University; Jennifer Hennigan,

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Hardin-Simmons University; Richard Garner, Hardin-Simmons University

018.087 U **Design and synthesis of potential acetylcholine esterase inhibitors**, Lauren Dennis, UIW; Sebastian Hickmann, UIW; Tracy Nguyen, UIW; Julian Davis, University of the Incarnate Word; Donald Sikazwe, UIW Feik School of Pharmacy; Frank Wood, UIW

018.088 U **Effect of trifluoromethyl group on the ground and excited state properties of a new ruthenium(II) polypyridine complex**, Jasmen Hale, University of the Incarnate Word; Robert N Garner, University of the Incarnate Word

018.089 U **Electrochemical study of prussian blue in sensory chemistry**, Charles Korah Punnathara, University Of Houston- Downtown

018.090 U **Geared motion: The study and synthesis of molecular motors**, Erik B Gentzel, Austin College; Stephanie Gould, Austin College

018.091 U **Identification of *Alternaria* fungal strain VOCs isolated from *Atriplex canescens* using SPME and GC-MS**, Ivana Garza, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University

018.092 U **Identifying Volatile Organic Compounds Released by Bacteria on Decomposing Rat Carrion and Their Attractiveness to *Nicrophorus Burying* Beetles**, Lillian Manley, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University; Donald Wharry, St. Edward's University

018.093 U **PEGylation of Bacterioferritin, A Protein Scaffold for Delivery of Toxic Iron to Cancer Cells**, Christopher Kennedy, University of Texas at San Antonio; Emily Boice, UTSA; Donald Kurtz, UTSA

018.094 U **PVOCs as a potential attractant or deterrent to browse preferences of *Odocoileus virginianus***, Lauren Garcia, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University

018.095 U **Preliminary testing of N-benzyl isonipecotate derivatives as a potential acetylcholine esterase inhibitors**, Tracy Nguyen, UIW; Lauren Dennis, UIW; Steven Garza, UIW; Sebastian Hickmann, UIW; Greiman Tristyn, UIW; Veronica Acosta, UIW; Julian Davis, University of the Incarnate Word; Donald Sikazwe, UIW Feik School of Pharmacy; Frank Wood, UIW

018.096 U **Salt formation of potential acetylcholine esterase inhibitors**, Julian Davis, University of the Incarnate Word; Sebastian Hickmann, UIW; Tracy Nguyen, UIW; Lauren Dennis, UIW; Donald Sikazwe, UIW Feik School of Pharmacy; Frank Wood, UIW

018.097 G **Synthesis and Characterization of Biodiesel Mixtures via Clay-Catalyzed Transesterification**, Lauren N. Williams, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University

018.098 U **Synthesis and functional verification of quorum signaling lactones for studies in interkingdom communication**, Brian Garcia, University of the Incarnate Word; Julie Cavazos, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word

018.099 U **The Use of Microwave Heating for Biodiesel Synthesis via K₂CO₃-Catalyzed Transesterification**, Amanda L. Raley, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University

018.100 G **The Use of Microwave Heating for Biodiesel Synthesis via NaOH-Catalyzed Transesterification**, Daniel G. Kushaney, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University

Computer Science

Computer Science Poster Session

Participants:

018.101 U **robo-roach: Biologically-Inspired Robots using the Lego Mindstorm EV3**, Erik Coronado, University of the Incarnate Word; Michael Frye, University of the Incarnate Word; Sree Nair, University of the Incarnate Word

Conservation Ecology

Conservation Ecology Poster Session

Participants:

018.102 U **Analysis of Fungal Community Structure of Wildfire Burned Soils in Bastrop, Texas**, Dylan Fox, St Edward's Universty

018.103 G **Distribution and Taxonomy of the Texas gartersnake (*Thamnophis sirtalis annectens*)**, Kayla N Key, The University of Texas at Tyler; Andy Gluesenkamp, Texas Parks & Wildlife Department; Marsha

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Williams, Department of Biological Sciences. The University of Texas at Tyler, Tyler TX; Josh Banta, The University of Texas at Tyler; John S Placyk, Jr., The University of Texas at Tyler

018.104 G **Influence of recreation on water quality in the San Marcos River**, Rachel Erin Byrne, University of Houston Clear Lake; George Guillen, University of Houston Clear Lake

018.105 U **Model of the respiratory requirements of the Meganisoptera**, Adam Hawbaker, East Texas Baptist University; Troy A Ladine, East Texas Baptist University

018.106 U **Preliminary biodiversity survey of mammals on a ranch in Runnels County**, leslie Ann Morrell, Hardin Simmons University; Darby Thornton, Hardin Simmons University; Anthony W Kocher, Hardin Simmons University; Wendi Wolfram, Hardin-Simmons University

018.107 G **Testing whether ecological differentiation supports the taxonomy of three hibiscus species in Northeast Texas**, Melody Page Sain, The University of Texas at Tyler; Lance Williams, The University of Texas at Tyler; Marsha Williams, Department of Biological Sciences. The University of Texas at Tyler, Tyler TX; John S Placyk, Jr., The University of Texas at Tyler; Randall Small, The University of Tennessee - Knoxville; Josh Banta, The University of Texas at Tyler

018.108 G **Using Maximum Entropy Modeling to Predict Suitable Habitat for *Sistrurus catenatus tergeminus* and *Sistrurus catenatus edwardsii*, The Western and Desert Massasauga**, Steven R Hein, University of Texas at Tyler

Environmental Science

Environmental Science Poster Session

Participants:

018.109 U **A Population Study of Feral Hogs in Hill And McLennan Counties, Texas – A Comparison of Deer Feeder Practices**, Tracina N Maiden, McLennan Community College

018.110 G **Atmospheric Particulate Matter Monitoring in Houston Using a Portable Aerosol Monitor**, Bianca Hayes, Texas Southern University; Hyun-Min Hwang, Texas Southern University

018.111 U **Atmospheric particulate matter pollution and platinum (Pt) in soil, road dust, and plants in Houston, Texas**, Donyeil Hoy, Texas Southern University; Laura Lay, Michael E. Debakey High School for Health Professions; Tan Nguyen, Texas Southern University; Jay Saynonh, Texas Southern University

018.112 G **Cellulose digestion by the higher attine fungus gardening ant *Trachymyrmex septentrionalis***, Alexandria DeMillo, University of Texas at Tyler

018.113 G **Characterization of ambient water quality in natural and created wetlands of the Texas coast**, Natasha Zarnstorff, University of Houston Clear Lake; George Guillen, University of Houston Clear Lake

018.114 G **Distribution, Abundance, and Habitat Use of the Saltmarsh Topminnow (*Fundulus jenkinsi*)**, Josi Robertson, University of Houston-Clear Lake; Stephen Curtis, Environmental Institute of Houston; George Guillen, University of Houston Clear Lake

018.115 G **Effect of changes in hydrochorous behavior of seeds on the future vegetative community**, Anna Boeck, University of Texas at San Antonio; J K Haschenburger, The University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio; Katherine Elliott, USFS, Coweeta Hydrologic Laboratory, Southern Research Station

018.116 U **Effects of Flooding and Drying Soil on the Uptake of Arsenic in Rice**, Alison Bray, Texas Lutheran University; Rhaya Johnson, Texas Lutheran University; Sioned Kirkpatrick, Texas Lutheran University; Chad Ladewig, Texas Lutheran University; Nicole Pollok, Texas Lutheran University

018.117 U **Iron Concentrations of the Scarborough Creek in Stream Bed Sediment**, Philip James Webster, Student

018.118 U **Nature vs. Nurture: Examining the Impact of a Manipulated Environment**, Allison Nicole Frando, Saint Edward's University; Fidelma O'Leary, St. Edward's University

018.119 U **Phosphorous Retention in the riverbanks of the Bosque River and the Paluxy River**, Kimberly Marie Hogan, Tarleton State University

018.120 G **Relative Abundance of Herpetofauna in Response to the Season of Burn in a Southern Appalachian Forest**, Tyler Jay Seiboldt, University of Texas at San Antonio; Cathryn Greenberg, USDA Forest Service; Janis Kathleen Bush, UT San Antonio; Fernando A. Martinez, UTSA; Matthew J Gdovin, University of

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Texas at San Antonio

018.121 G **Road Dust Activated ERK in Lung Epithelial Cells** *in vitro*, Nkem Azu, Texas Southern University; Shishir Shishodia, Texas Southern University

018.122 U **The Effects of Wetting and Drying Cycles on Phosphorus within Streambank Sediments**, Erica Saucedo, Tarleton State University

018.123 G **The effect of fire severity and hillslope gradient on the relationship between soil pH and soil depth after wildfire.**, Andrea Russie, University of Texas San Antonio; Janis Kathleen Bush, UT San Antonio; J K Haschenburger, The University of Texas at San Antonio

018.124 U **The effects of the pesticide imidacloprid on physiological and neural functions of the non-target organism *Caenorhabditis elegans***, Cynthia Marie Tapia, St. Edward's University; Jordan Elise Villemare, St. Edwards; Fidelma O'Leary, St. Edward's University

018.125 U **Comparison of abundance of small mammals in areas disturbed by controlled burning during the growing season versus the dormant season.**, Christopher Edward Adkison, University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio

019. Reception

6:00 to 7:00 pm

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Reception

020. Graduate Student Symposia

7:00 to 9:00 pm

International Conference Center, International Conference Center Auditorium

Texas Academy of Science Annual Meeting

Graduate Student Symposia

021. Graduate and Professional School Recruitment Sessions

7:00 to 9:00 pm

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Graduate and Professional School Recruitment Sessions

022. Professional Development Sessions for Faculty

7:00 to 9:00 pm

Bonilla Science Hall, BSH 129

Texas Academy of Science Annual Meeting

Professional Development Sessions for Faculty

Saturday, March 7

023. Past Presidents' Breakfast

7:00 to 8:00 am

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Past Presidents' Breakfast

024. Registration II

7:00 am to 12:00 pm

McCombs Center, Atrium

Texas Academy of Science Annual Meeting

Registration II

025. Biomedical Oral Session I

8:00 to 9:30 am

Ila Faye Miller Nursing Building, NB 214

Biomedical

NS = Non-student presentation/poster; HS = High School student presentation/poster
U = Undergraduate student presentation/poster; G = Graduate student

Biomedical Oral Session I

Chair: **James Masuoka**, *Midwestern State University*

Participants:

- 8:00 025.126 U **Associations between obesity and osteoarthritis in the knee joints of participants in the Trans Pecos Area**, *Kassandra Hernandez, Sul Ross State University; Christopher M Ritzi, Sul Ross State University*
- 8:15 025.127 G **Identifying prognostic biomarkers in multiple sclerosis using a chronic progressive murine model of experimental autoimmune encephalomyelitis**, *Carol Ann Chase, University of Texas at San Antonio; Niannian Ji, University of Texas at San Antonio; Erica Saenz-Trevino, University of Texas at San Antonio; Itay Raphael, University of Texas at San Antonio; Thomas Forsthuber, University of Texas at San Antonio*
- 8:30 025.128 G **New cyanide antidote (sulfur donor X) and its pH dependence for oral formulation efficacy**, *Reny Jacob Roy, Sam Houston State University*

026. Cell and Molecular Biology Oral Session I

8:00 to 9:30 am

International Conference Center, International Conference Center Auditorium

Cell and Molecular Biology

Cell and Molecular Biology Oral Session I

Chair: **Amaris Amaris Guardiola**, *Angelo State University*

Participants:

- 8:00 026.129 U **Biochemical and Structural Dissection of the Coat Nucleoporin Interactions**, *Samantha Parsons, na*
- 8:15 026.130 U **Can variation in dietary protein levels affect the severity of Parkinson's disease symptoms in *Drosophila melanogaster*?**, *Maria Nathalie Eguiza, Biology*
- 8:30 026.131 U **Development of an Initial Culture Procedure that May Eventually Decrease the Time for Chromosome Analysis of Tumor Cells**, *Kajal Bhakta, Temple College*
- 8:45 026.132 N **Development of genetic tools to study the Lumbriculid central nervous system as a model for wound healing and regeneration**, *ROBERT MIRANDA, UNIVERSITY OF THE INCARNATE WORD*
- 9:00 026.133 U **Effects of hydroquinone on S17 murine stromal cells**, *Jeremy D Kotin, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*
- 9:15 026.134 U **Purification of components from *Inula helenium* (elecampane) which are cytotoxic to the 4T1 murine breast cancer cell line.**, *Thomas Evan McElwan, Wayland Baptist University; Sarah C. Kelly, Wayland Baptist University; Ashley M. Rivera, Wayland Baptist University; Jessica Rose Kenneson, Wayland Baptist University; Robert T. McCutcheon, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam J. Reinhart, Wayland Baptist University*

027. Conservation Ecology Oral Session I

8:00 to 9:30 am

Bonilla Science Hall, BSH 129

Conservation Ecology

Conservation Ecology Oral Session I

Chair: **Troy A Ladine**, *East Texas Baptist University*

Participants:

- 8:00 027.135 U **A Multi-year Analysis of Wing Loading in the Monarch Butterfly During the Fall Migration: Effects of Habitat Loss on Migrants.**, *Joshua Shayne Huckabee, Temple College/University of Mary Hardin-Baylor; Jason Locklin, Temple College*
- 8:15 027.136 U **Anuran Population Response to Artificial Wetlands**, *Alan Lizarraga, University of Texas at Tyler*
- 8:30 027.137 U **Dispersal of the Georgetown salamander (*Eurycea naufragia*) within two spring sites**, *Areli Micol Gutierrez, Southwestern University; Benjamin Allen Pierce, Southwestern University*
- 8:45 027.138 U **Effects of Facial Stripes on Attacks in Snake Models**, *Jacob Scribner, Stephen F Austin State University; Matthew A Kwiatkowski, Stephen F Austin State University*
- 9:00 027.139 U **Effects of dynamic species ratios and densities on interspecific mating in the endangered**

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Gambusia nobilis and its invasive congener, *Gambusia geiseri*, Brittni Broca, St. Edwards University

- 9:15 027.140 U **Habitat complexity as a predictor for female oviposition preference in two gulf coast gobies**, Clint Stephen Morris, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University

028. Freshwater Science Oral Session I

8:00 to 9:30 am

AT&T Center, AT&T 121

Freshwater Science

Freshwater Science Oral Session I

Chair: **Paul Fleming**, Texas Parks and Wildlife Department

Participants:

- 8:00 028.141 U **Cling On Me: Impacts of settlement of invasive *Limnoperna fortunei* (Dunker, 1857) on the native *Pomacea canaliculata* (Lamarck, 1822) in Uruguay**, Averi Harp Segrest, Southwestern University; Cristhian Clavijo, 2del Museo de Historia Natural, Montevideo, Uruguay; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA
- 8:15 028.142 U **Cued In : Adult and hatchling *Pomacea maculata* behavioral responses to predator chemical cues**, Allie Watts, Dr. Burks, Southwestern University, Georgetown, TX; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA
- 8:30 028.143 G **Determining viable host-fish species for *Fusconaia askewi*, *Potamilus amphichaenus*, and *Pleurobema riddellii* of East Texas**, Ein Bertram, University of Texas at Tyler; John S Placyk, Jr., The University of Texas at Tyler; Lance Williams, University of Texas at Tyler
- 8:45 028.144 G **Flow-dependent competition between the endangered *Gambusia nobilis* and invasive *Gambusia geiseri***, Kelbi Dayne Delaune, Sam Houston State University
- 9:00 028.145 N **Healthy watershed approach to managing streams: Role of science, stakeholders, education and partnerships**, Tom Arsuffi, Texas Tech University Llano River Field Station
- 9:15 028.146 U **Possible correlation between cardiac malformations within Plains Leopard Frogs (*Rana blairi*) in the Texas Panhandle and concentrations of environmental pollutants**, Enrique Vargas, University of Texas at Austin; Travis J. LaDuc, The University of Texas at Austin; Mary Poteet, The University of Texas at Austin

029. Physics Oral Session I

8:00 to 9:30 am

Bonilla Science Hall, BSH 223

Physics

Physics Oral Session I

Chair: **John McClain**, Temple College

Participants:

- 8:00 029.147 G **Experimental Probe of Ionizing Radiation from Superconductors Predicted by the Hole Theory of Superconductivity**, Hamilton Carter, Texas A&M University

030. Science Education Oral Session III

8:00 to 9:30 am

Gorman Center, GB 119

Science Education

Science Education Oral Session III

Chair: **Patricia Eldredge**, Faculty

Participants:

- 8:00 030.148 N **University-Community Partnership and Underrepresented Minority Students Engagement in Science Technology Engineering and Mathematics (STEM) Education**, Mamta Singh, Lamar University
- 8:15 030.149 G **A Female Hispanic's Mission to Obtain a STEM Degree: Esperanza's Persistence in the Face of Adversity**, Michele J Mann, University of Texas; Jair Aguilar, The University of Texas at Austin
- 8:30 030.150 G **Beyond Individual Difference: Exploring School Effects on Scientific Literacy in PISA 2012**

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using Hierarchical Linear Modeling, Hye Sun You, University of Texas at Austin

8:45 030.151 G **Effects on Self-Efficacy and Self-Regulated Learning**, Christopher Golubski, University of Texas at Austin; Michele J Mann, University of Texas

031. Terrestrial Ecology and Management Oral Session III

8:00 to 9:30 am

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session III

Chair: **Richard James Patrock**, Texas A&M, Kingsville

Participants:

8:00 031.152 G **Serosurvey of Marfa Plateau Coyotes (*Canis latrans*) for Canine Distemper**, John Timothy Stone, Sul Ross State University; Christopher M Ritzi, Sul Ross State University; Sean Graham, Sul Ross State University

8:15 031.153 G **Sexual Dimorphism and Intersexual Niche Divergence in *Nerodia rhombifer***, Steven R Hein, University of Texas at Tyler

8:30 031.154 G **Spatial ecology of Western Screech-Owls (*Megascops kennicottii*) in the Davis Mountains of West Texas**, Corin M Olivas, Sul Ross State University; Andrew Kasner, Wayland Baptist University; Christopher M Ritzi, Sul Ross State University

8:45 031.155 N **Status of the subtropical tamarisk beetle (*Diorhabda sublineata*) as a saltcedar (*Tamarix*) biocontrol agent along the Río Grande and its impact on a non-target species, *Tamarix aphylla***, Anne Marie Hilscher, Sul Ross State University; Christopher M Ritzi, Sul Ross State University

9:00 031.156 U **The Role of Microhabitat Suitability in Plant Competition**, Michelle Victoria, St. Edward's University; Stephanie Yelenik, U.S. Geological Survey Pacific Island Ecosystems Research Center; Susan Cordell, U.S. Forest Service, Institute for Pacific Island Forestry

032. Cell and Molecular Biology Oral Session II

10:00 to 11:30 am

International Conference Center, International Conference Center Auditorium

Cell and Molecular Biology

Cell and Molecular Biology Oral Session II

Chair: **Amaris Amaris Guardiola**, Angelo State University

Participants:

10:00 032.157 U **Sequencing and determining the ETOH-sensitivity of *b1101* mutation in *Danio rerio***, Courtney Brock, St. Edward's University; Johann Eberhart, University of Texas

10:15 032.158 G **The Role of B56γ in canonical Wnt signaling in *Xenopus laevis***, Osama Qureshi, Sam Houston State University; Joni Seeling, Sam Houston State University

033. Chemistry and Biochemistry Oral Session I

10:00 to 11:30 am

Mabee Library, Library Auditorium

Chemistry and Biochemistry

Chemistry and Biochemistry Oral Session I

Chair: **Benny Ervin Arney**, Sam Houston State University

Participants:

10:00 033.159 N **An Overview of Recent Biodiesel Research Activity at Stephen F. Austin State University**, Russell J. Franks, Stephen F. Austin State University

10:15 033.160 U **Challenges in visualizing RecA-DNA interaction in chemiluminescent electrophoretic mobility shift assays**, Jessica Rose Kenneson, Wayland Baptist University

10:30 033.161 U **Did the Bastrop Wild Fire affect the phosphorus quantity in the soil?**, Mohammad Abu-Esba, Student

10:45 033.162 U **Morphological Control of Film Structure in Perovskite Solar Cells**, Christopher Jackson, Saint Edward's University

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034. Conservation Ecology Oral Session II

10:00 to 11:30 am

Bonilla Science Hall, BSH 129

Conservation Ecology

Conservation Ecology Oral Session II

Chair: **Troy A Ladine**, East Texas Baptist University

Participants:

- 10:00 034.163 U **Organic compound analysis red wolves**(*Canis rufus*) vs. coyotes(*Canis lantrans*), *Lauren Renee Spindler, Hardin Simmons University; Hannah Jones, Hardin-Simmons University; Kylie Donch, Hardin Simmons University; Erin Ray, Hardin Simmons University; Wendi Wolfram, Hardin-Simmons University*
- 10:15 034.164 N **Population density and habitat associations of the seaside sparrow at Laguna Atascosa National Wildlife Refuge, Cameron County, Texas**, *jacqueline ferrato, The Nature Conservancy; Randy Simpson, Texas State University; Michael Small, South Carolina Department of Natural Resources; Joseph Veech, Texas State University; Mark Conway, South Texas bird banding*
- 10:30 034.165 N **Survey of (north)east Texas bat reports: connecting the dots...**, *David Brooks, East Texas Baptist University*
- 10:45 034.166 G **Territoriality and ‘dear enemy’ recognition between heterospecific pupfishes (genus *Cyprinodon*)**, *Christopher Brooks, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University*
- 11:00 034.167 U **The impact of biometeorology on the behavior of red wolves (*Canis rufus*)**, *Hannah Jones, Hardin-Simmons University; Sarah Bowen, Hardin-Simmons University; Tessa Tenczar, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*
- 11:15 034.168 U **Using Camera Trapping Techniques to Identify the Presence of Meso-mammals and Determine Habitat Preferences within the Caprock Canyonlands of West Texas**, *Trudi Cooke, Wayland Baptist University; Andrew Kasner, Wayland Baptist University*

035. Freshwater Science Oral Session II

10:00 to 11:30 am

AT&T Center, AT&T 121

Freshwater Science

Freshwater Science Oral Session II

Chair: **Paul Fleming**, Texas Parks and Wildlife Department

Participants:

- 10:00 035.169 U **Spread of Invasive *Pomacea maculata*, Perry, 1810 (Ampullariidae) in the Southeastern United States**, *Carson Elizabeth Savrick, Southwestern University; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA*
- 10:15 035.170 U **The Effect of Alternative Mating on Sperm Competition in Coercive Livebearing Fish**, *Alenka Versi Cardenas, student; Raelynn Deaton Haynes, St. Edward's University*
- 10:30 035.171 G **Trends in land-use and Texas lotic fish communities**, *Michael Lane, University of Houston - Clear Lake; Mustafa Mokrech, University of Houston - Clear Lake; Stephen Curtis, Environmental Institute of Houston; Oakley Jenny, University of Houston - Clear Lake; George Guillen, University of Houston Clear Lake*
- 10:45 035.172 N **Use of Side-scan Sonar to Identify and Count Alligator Gar: Potential for Evaluating Population Density from Sonar Imagery**, *Paul Fleming, Texas Parks and Wildlife Department; Daniel J. Daugherty, Texas Parks and Wildlife Department; Nathan G. Smith, Texas Parks and Wildlife Department; Michael Baird, Texas Parks and Wildlife Department*

036. Mathematics Oral Session I

10:00 to 11:30 am

Bonilla Science Hall, BSH 223

Mathematics

Mathematics Oral Session I

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Chair: **Elsie Mae Campbell**, Angelo State University

Participants:

- 10:00 036.173 U **Behavior of Soliton Solutions to the Korteweg de Vries equation**, Erica Renee Johnson, University of the Incarnate Word
- 10:15 036.174 N **Diastolic function measured as left ventricular pressure (LVP) dynamics in humans diagnosed as normal.**, John A Ward, Brooke Army Medical Center; K. W. Brown, San Antonio Military Medical Center; H. M. Coke, San Antonio Military Medical Center; B. J. Rubal, San Antonio Military Center
- 10:30 036.175 N **Obtaining Sine-Gordon Surfaces Using Deformation of Parameters**, Suleyman Tek, University of the Incarnate Word
- 10:45 036.176 G **Using Bayesian Methods to Analyze Small Sample Size Data**, Christopher Golubski, University of Texas at Austin; Michele J Mann, University of Texas
- 11:00 036.177 N **What happened in Seoul didn't stay in Seoul: the 1988 Olympics**, John T Sieben, Texas Lutheran University

037. Poster Session II

11:30 am to 1:00 pm

Wellness Center, Room 101

Biomedical

Biomedical Poster Session

Participants:

- 037.178 U **4T1 murine breast cancer cell cytotoxins in *Rumex crispus* (yellow dock)**, Ashley M. Rivera, Wayland Baptist University; Sarah C. Kelly, Wayland Baptist University; Jessica Rose Kenneson, Wayland Baptist University; Robert T. McCutcheon, Wayland Baptist University; Thomas E. McElwain, Wayland Baptist University; Adam J. Reinhart, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University
- 037.179 U **Can citrus juice decontaminate *Salmonella* tainted strawberries?**, Ashley Cheryl Lopez, St. Edward's University
- 037.180 U **Can kombucha tea inhibit the growth of *Salmonella enterica*?**, Maria Arcelia Zamora, Student
- 037.181 G **Characterization and synthesis of superparamagnetic iron oxide nanoparticles**, Antonio Eli Pena, Graduate Student; Gabriel Gonzalez, student; Mkhitar hobosyan, Graduate student; Boris Ermolinsky, Primary investigator
- 037.182 U **Characterizing the effect of SSRI withdrawal on a serotonin-mediated behavior in the model organism *C. elegans* following a brief, low-dose exposure to Paxil**, Cobby Caputo, St. Edward's University; Fidelma O'Leary, St. Edward's University
- 037.183 U **Characterizing the onset, progression, and mitigation of motor chorea symptoms in a transgenic *C. elegans* model of Huntington's disease**, Olivia O'Keefe, St. Edwards University; Fidelma O'Leary, St. Edward's University
- 037.184 G **In vitro cytotoxicity of metal complexes containing platinum and palladium**, Jomana Alqurashi, University of the Incarnate Word; Rafael Adrian, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word
- 037.185 U **Mapping the onset and progression of neurological and physiological deficits in Alzheimer's disease: The role of insulin-degrading enzyme in restoring function**, Sasha Michel Escamilla, St. Edwards University
- 037.186 U **Prevalence of *Trypanosoma cruzi* in Chagas disease vectors from South Texas**, Ramiro Patino, The University of Texas- Pan American; Sergio Gonzalez, The University of Texas- Pan American; Rodion Gorchakov, Baylor College of Medicine, Department of Pediatrics, Section of Pediatric Tropical Medicine; Kristy Murray, Baylor College of Medicine, Department of Pediatrics, Section of Pediatric Tropical Medicine; Teresa P. Feria, The University of Texas- Pan American
- 037.187 U **Temperature sensitivity of rhizosphere bacteria associated with common plants found at Wild Basin Wilderness Preserve (Austin,Tx)**, Victoria Susan Alford, St. Edward's University
- 037.188 H **The effect of caffeine on regeneration and behavior in the California Blackworm, *Lumbriculus variegatus***, Ana Henriquez, The Atonement Academy; Michael J. Vallor, The Atonement Academy; Veronica

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Acosta, UIW

037.189 U **The impact of coconut oil supplement on cognitive function in young adults**, *Jacob Boos, St. Edward's University; Lauren Heller, St. Edwards University; Fidelma O'Leary, St. Edward's University*

Freshwater Science

Freshwater Science Poster Session

Participants:

037.190 N **Bacterial diversity and abundance in freshwater snail shell biofilms**, *Russell Minton, University of Houston Clear Lake; Clinton Charles Creech, University of Louisiana at Monroe; Debra W Jackson, Louisiana Delta Community College*

037.191 U **Life in a container: larval competition between two container breeding mosquitoes**, *Felicia Vasquez, University of Texas Pan American; Christopher Vitek, University of Texas - Pan American*

037.192 G **Restoration of Quail Creek at the Texas Parks and Wildlife Nature Center, Tyler, Texas**, *Brianna G Ciara, The University of Texas at Tyler; Ein Bertram, University of Texas at Tyler; Lance Williams, University of Texas at Tyler; Marsha Williams, Department of Biological Sciences. The University of Texas at Tyler, Tyler TX*

037.193 U **The Relationship between the Ingestion of Microplastic Particles and Organic Food Items in Sunfish from the Brazos River Basin, Central Texas**, *Colleen Peters, Baylor University; Susan Bratton, Co-author; Kaitlyn Rieper, Co-author*

037.194 U **The genetics of the visual system of pupfish**, *Chelsey Price, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University*

Geosciences

Geosciences Poster Session

Participants:

037.195 G **Evaluation of responses from handheld Gamma-Ray spectrometers: How reliable is outcrop data?**, *Hunter Green, Fort Hays State University; Tim Walsh, Wayland Baptist University; Peter Holterhoff, Hess Corporation*

037.196 G **Geochemical Analyses of Karst Springs within the Owl Mountain and Nolan Creek Provinces, Fort Hood Military Installation, Texas**, *Mindy Faulkner, Stephen F Austin State University; Kevin W Stafford, Stephen F Austin State University*

037.197 U **Hydroclimatological and Environmental Factors Affecting Volume Fluctuation of Lake Theo, Caprock Canyons State Park, Texas**, *Kaylee Maureen Lawrence, Wayland Baptist University; Tim Walsh, Wayland Baptist University*

037.198 N **Karst Development in the Northern Edwards Aquifer, Bell and Williamson Counties, Texas**, *Kevin W Stafford, Stephen F Austin State University; Ashley Landers, Department of Geology, SFASU; Jessica Shields, Department of Geology; Mindy Faulkner, Stephen F Austin State University*

037.199 U **Results of 2014 excavations from WU-26, the first Uinta C micro-mammal fossil locality from the Uinta Formation in northeastern Utah**, *C. Melisa Guillot, Lamar U.; James Fairchild, Lamar U.; Christopher Sanders, Lamar U.; James Westgate, Lamar U.*

037.200 N **Utilizing Ground Penetrating Radar for Characterization of Karst Features**, *Wesley Augustus Brown, Stephen F. Austin State University; Trina Kay Melville, Weatherford; Kevin W Stafford, Stephen F Austin State University*

Marine Science

Marine Science Poster Session

Participants:

037.201 U **A behavioral study of a cleaner fish, *Bodianus rufus*, (Spanish Hogfish) and their clients**, *Andrea Christine Edie, McLennan Community College*

037.202 G **Carbon and Nitrogen Dynamics in Anthropogenically Disturbed Seagrass Ecosystems**, *Alison Shepherd, University of Texas Brownville; Dr. Abdullah Rahman, University of Texas Pan American; Dr. Heather Alexander, University of Texas Brownsville*

037.203 H **Effects of salinity on primary productivity and respiration in the seagrass, *Thalassia testudinum* Banks ex König (turtle grass), from the Lower Laguna Madre of Texas.**, *Mary Grace Chiu, The International*

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Baccalaureate Program at Lamar Academy; Brandon Brandon Tiu, The University of Texas-Pan American; Mandira Banik, The University of Texas-Pan American; Lauren Ancil, The University of Texas-Pan American; Hudson R DeYoe, The University of Texas-Pan American; Joseph Kowalski, The University of Texas-Pan American

037.204 U **Fish bite prevalence on Yellow-band diseased corals off the coast of Roatan, Honduras**, Kara Leigh Schmidt, McLennan Community College

037.205 U **Growth, abundance, and characterization of anaerobic, sulfur-reducing microorganisms isolated from a salt lake, La Sal del Rey, in Deep South Texas**, Maurine Ramirez, University of Texas - Pan American; Kristine Lowe, University of Texas - Pan American

037.206 H **Leaf production, leaf fall, and decomposition of the black mangrove, *Avicennia germinans* (L.) L., from the Lower Laguna Madre of Texas.**, Mandira Banik, The University of Texas-Pan American; Lauren Ancil, The University of Texas-Pan American; Brandon Brandon Tiu, The University of Texas-Pan American; Mary Grace Chiu, The International Baccalaureate Program at Lamar Academy; Hudson R DeYoe, The University of Texas-Pan American; Joseph Kowalski, The University of Texas-Pan American

037.207 U **Macroalgal Preferences for *Diadema antillarum* on the Mesoamerican Reef in Roatan Honduras**, Clara Valentina Hernandez, McLennan Community College

037.208 U **Species Richness and Diversity in Coral Reef Communities off the Coast of Roatan, Honduras Impacted by Lionfish (*Pterois volitans*) Invasion**, Bradley Raymond Gravitt, McLennan Community College

037.209 U **Which way did it go?: Directional choices in the brittle star *Ophiactis simplex***, Zachary Holt, Biology Department, Lamar University; Ana Christensen, Biology Dept., Lamar University

Mathematics

Mathematics Poster Session

Participants:

037.210 G **Breaking the rules: when creativity drives students to find an original solution for a model-eliciting activity**, Jair Aguilar, The University of Texas at Austin

037.211 U **Modeling the Dynamics of Competition and Antibiotic Resistance in Gonorrhea**, Anthony Thomas, University of the Incarnate Word

Neuroscience

Neuroscience Poster Session

Participants:

037.212 U **Age comparisons of estrogen receptor-alpha expression in the developing rat brain**, Gloimai Ari'elle Cowan, Texas Lutheran University

037.213 U **Episodes of repeated dehydration induce hypothalamic gene expression plasticity I: transient receptor potential cation channel (Trpv4) and vasopressin (Avp) transcripts.**, derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University; Jake Brozek, Wayland Baptist University; Jose Vanderlei Menani, Sao Paulo State University; Laurival Antonio De Luca Jr., Sao Paulo; Silvana Chiavegatto, University of Sao Paulo

037.214 U **Episodes of repeated dehydration induce hypothalamic gene expression plasticity II: voltage-gated sodium channel, rabaptin, jun proto-oncogene, and interleukin 1 alpha.**, derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University; Catherine Wiechmann, Wayland Baptist University; Ashlyn Westerman, Wayland Baptist University; Jose Vanderlei Menani, Sao Paulo State University; Laurival Antonio De Luca Jr., Sao Paulo; Silvana Chiavegatto, University of Sao Paulo

037.215 U **Evaluating the quality of life and functional outcomes in patients with diffuse axonal injury post TBI**, Jonathan Siktberg, Baylor University; Mayur B. Patel, Vanderbilt University

037.216 U **Hyperglycemic-induced circadian gene expression alterations in three brain regions of a rat model of human type 2 diabetes mellitus**, Carlos A. Garcia, The University of the Incarnate Word; Elizabeth P. Gutierrez, The University of the Incarnate Word; Jessica Ibarra, The University of the Incarnate Word

037.217 N **Oxidative damage is correlated with mitochondrial autophagy**, George Perry, The University of Texas at San Antonio; EA Perry, Harvard Dental School; Paula Isavel Moreira, University of Coimbra; Sonia Correia, University of Coimbra; Rudolph J. Castellani, University of Maryland School of Medicine; Xinglong Wang, Case Western Reserve University; Hyoung-gon Lee, Case Western Reserve University; Xiongwei Zhu,

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Case Western Reserve University

Physics

Physics Poster Session

Participants:

037.218 G **Cell Interaction Effects due to Surface Coatings on Highly Fluorescent Nanoparticles**, Francisco Javier Pedraza, *The University of Texas at San Antonio*; Dhiraj Sardar, *The University of Texas at San Antonio*; Andrew Tsin, *The University of Texas at San Antonio*; Lawrence C Mimun, *UT San Antonio*; Julio Avalos, *The University of Texas at San Antonio*; Brian Yust, *University of Texas Pan American*

037.219 G **Multifunctional Near infrared Emitting Luminescent Nanocrystals for Biomedical Imaging**, Lawrence C Mimun, *UT San Antonio*; Chris Rightsell, *UT San Antonio*; G.A. Kumar, *UT San Antonio*; Francisco Javier Pedraza, *The University of Texas at San Antonio*; Teja Guda, *UT San Antonio*; Vinayak P Dravid, *Northwestern University*; Dhiraj Sardar, *The University of Texas at San Antonio*

037.220 H **Variable analysis of photovoltaic cell exposure efficiency**, Christopher Arguello, *University of the Incarnate Word*; Erik Coronado, *University of the Incarnate Word*; Daniel Potter, *Administration*; Sree Nair, *University of the Incarnate Word*

037.221 U **White Dwarf G29-38**, Woody Woodall, *Temple College Physics Club*

Science Education

Science Education Poster Session

Participants:

037.222 N **Building a Community of Microbiology and Developmental Entomology Undergraduate Researchers to Increase Scientific Expertise and Confidence**, Lisa M Goering, *St. Edward's University*; Patricia J Baynham, *St. Edward's University*

037.223 G **Environmental Monitoring of Soils along Houston Highways**, Matthew John Fiala, *Texas Southern University*; Hyun-Min Hwang, *Texas Southern University*

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Poster Session

Participants:

037.224 U **Do cannibalistic mothers discriminate against their own young?**, Amanda Reed Broca, *St. Edward's University*

037.225 U **Do coercive males trade-off mating for competition when faced with multiple competitors?**, Hufsa Ali, *St. Edward's University*

037.226 N **Evolution of shell shape in the land snail family Polygyridae**, Kathryn E Perez, *University of Texas Pan American*; Russell Minton, *University of Houston Clear Lake*

037.227 U **Impact of prey availability on behavior in *Elaphe guttata***, Aubery Norman, *UT Tyler*

037.228 U **Invertebrate diversity in the seagrass meadows of Texas**, Ashleigh Brown, *St. Edward's University*; Roberta Engel, *St. Edward's University*

037.229 U **Methodology for sperm extraction and a preliminary assessment of predicting reproductive allocation based on mating system in sex role reversed fishes**, Sana Rashid, *St. Edward's University*; Raelynn Deaton Haynes, *St. Edward's University*

037.230 N **Prevalence of parasitism in a newly described cave-adapted fish**, David E Starkey, *University of the Incarnate Word*; Julie L. Day, *U.S. Fish and Wildlife Service*

037.231 U **The evolution and selection pressures of facial stripes in birds**, Stephen Eric Scribner, *Stephen F Austin State University*

Terrestrial Ecology and Management

Terrestrial Ecology and Management Poster Session

Participants:

037.232 U **A Test of the Relative Abundance, Diversity and Distribution of Ants at the Vireo Preserve in Relation to Habitat Manipulation for the Black-capped Vireo (*Vireo atricapilla*)**, James Thomas LaManna, *St. Edward's University*

037.233 U **Analysis of a plant community after 10 years of not mowing**, Brittney Garner, *East Texas Baptist University*; Troy A Ladine, *East Texas Baptist University*

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U = Undergraduate student presentation/poster: G = Graduate student

037.234 U **Analysis of predator-prey interactions in resource stressed environments with extreme changes in drought conditions**, Emily Herzog, *Midwestern State University*; Eric Savage, *Midwestern State University*; Joseph Falade, *Midwestern State University*; Dale McDonald, *Midwestern State University*; Michael M. Shipley, *Midwestern State University*

037.235 G **Characteristics and prevalence of intradermal chigger mites *Hannemania* sp. among a population of *Gastrophryne olivacea* (Amphibia: Microhylidae) in South Texas**, Mayra Oyervides, *University of Texas-Pan American*; Andrea Lozano, *University of Texas-Pan American*; Adriana Huerta, *University of Texas-Pan American*; Maximiliano Barbosa, *University of Texas-Pan American*; Ramiro Patino, *The University of Texas-Pan American*; Teresa P. Feria, *The University of Texas-Pan American*; Frederic Zaidan, *University of Texas-Pan American*

037.236 N **Do cavity nesting birds recognize predator odors?**, Diane Neudorf, *Sam Houston State Univ.*; Nicole Vaughn, *Sam Houston State Univ.*; Elisabeth Horstman, *Sam Houston State Univ.*

037.237 U **Egg-laying habits of Slosser's buckmoth (Lepidoptera: Saturniidae) from Andrews County in northwest Texas**, Trilby Olivia King, *Angelo State University*; Nicholas Negovetich, *Angelo State University*; Lendon Partain, *Angelo State University*; Ned Strenth, *Angelo State University*

037.238 U **Forest Floor Characteristics in Areas Disturbed by Oak Regeneration Silvicultural Treatments**, Meagan Bell, *University of Texas at San Antonio*; Chad Sundol, *The University of Texas at San Antonio*; Janis Kathleen Bush, *UT San Antonio*; Fernando A. Martinez, *UTSA*; Cathryn Greenberg, *USDA Forest Service*

037.239 U **Germination rates of Cajander larch (*Larix cajanderi*) seeds from northeastern Siberia under different environmental conditions**, Ivonne Lidia Trujillo, *University of Texas at Brownsville*; Aaron P. White, *University of Texas at Brownsville*; Dr. Heather Alexander, *University of Texas Brownsville*

037.240 U **Reproductive Condition of Aestivating *Siren intermedia* in Deep South Texas**, Randy L Powell, *Texas A&M, Kingsville*; Ayssa E. Trevino, *Texas A&M, Kingsville*; M. Andres Soto, *Texas A&M, Kingsville*; Ashton V. Crocker, *Texas A&M, Kingsville*; Shawnda L. Kumro, *Texas A&M, Kingsville*

037.241 U **Species Diversity of Herpetofauna in Response to Silvicultural Treatments in the Southern Appalachians**, Melissa Todd, *UTSA*; Chad Sundol, *The University of Texas at San Antonio*; Janis Kathleen Bush, *UT San Antonio*; Fernando A. Martinez, *UTSA*; Cathryn Greenberg, *USDA Forest Service*

037.242 G **Tracking the elusive Maritime Pocket Gopher (*Geomys personatus maritimus*)**, Tara Hansler, *Texas A&M, Kingsville*; Scott Henke, *Texas A&M, Kingsville*; Jon Baskin, *Dept. of Biology and Health Sciences*

038. Lunch Business Meeting

1:00 to 3:30 pm

McCombs Center, Atrium

Texas Academy of Science Annual Meeting

Lunch Business Meeting

039. Distinguished Texas Scientist and Outstanding Texas Educator

3:30 to 5:30 pm

International Conference Center, International Conference Center Auditorium

Texas Academy of Science Annual Meeting

Distinguished Texas Scientist and Outstanding Texas Educator

040. Reception and Banquet

6:00 to 10:00 pm

McCombs Center, Rosenberg Skyroom

Texas Academy of Science Annual Meeting

Reception and Banquet

Sunday, March 8

041. Headwaters

10:00 am to 12:00 pm

International Conference Center, International Conference Center Auditorium

Texas Academy of Science Annual Meeting

Headwaters

NS = Non-student presentation/poster: HS = High School student presentation/poster

U = Undergraduate student presentation/poster: G = Graduate student

Friday, March 6

005. Botany Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 123

Botany

Botany Oral Session I

Participants:

- 1:00 005.001 G *Euphorbia abramsiana* (**Euphorbiaceae**): **New to Texas**, Nathan Caleb Taylor, Sul Ross State University; Martin Terry, Sul Ross State University
Euphorbia abramsiana L.C. Wheeler is a prostrate annual found throughout southern California, Arizona, the southwest corner of New Mexico, and adjacent Mexico. It is now also known for Trans-Pecos Texas. Misidentified *E. abramsiana* specimens, mostly confused with *E. glyptosperma* and *E. serpyllifolia*, have been found from locations mainly in and near Big Bend National Park and Big Bend Ranch State Park. *Euphorbia abramsiana* differs generally from *E. glyptosperma* and *E. serpyllifolia* by the presence of very short, stiff hairs on the stems, distinct pale lines following the pattern of the pinnate venation on the leaf blades, leaf blade maculation comprised of a series of spots along and near the midvein, and angles of the four-angled seeds mostly entire or with a few inconspicuous notches. This is a classic example of how misidentifications can be self-propagating, particularly in less well-studied taxa where the misidentified specimens are from populations that are geographically distant from known populations that are correctly identified.
- 1:15 005.002 G **A morphological and cytogenetic study comparing *Ibervillea lindheimeri* and *Ibervillea tenuisecta***, Richard Newbold, Sul Ross State University; Christopher M Ritzi, Sul Ross State University
Ibervillea lindheimeri is a deciduous vine most commonly found in central and eastern Texas but has been reported in southern Oklahoma, New Mexico and west Texas. It was the goal of this project to examine a population of this species from within the standard range of central Texas and compare to a population from its edge along the far west Texas extreme of Jeff Davis County. These specimens were to be compared both morphologically and cytogenetically for variation from each other and the current species description. Due to a lack of precipitation and inability to locate any Jeff Davis populations, the project was modified to compare *Ibervillea lindheimeri* to *Ibervillea tenuisecta*, a sister taxa found in the southeastern part of Arizona to south and west Texas stretching into northern Mexico. As *I. tenuisecta* has not had a recorded chromosome count conducted on it to this point,

its documentation will be a significant contribution to the field.

- 1:30 005.003 U **Understanding bacterial and fungal communities in and around *Juniperus ashei* (Cupressaceae)**, Andres Frank Garza, St. Edwards University; Charles Hauser, St. Edward's University
The overall goal of the project is to provide a preliminary characterization of the root microbiome of *Juniperus ashei* of the family Cupressaceae, for plants located within the Wild Basin Creative Research Center in Austin, Texas. Starting by collecting soil and root samples from four separate areas of the Wild Basin, these samples were fractionated into four separate types: Bulk Soil, Neighboring Soil, Rhizosphere, and Endosphere. The Bulk Soil is soil that has been taken directly from the site, but is not associated with plants. The Neighboring Soil is close to plants, along the root line of the plants. The Rhizosphere is soil that is adherent to the root (about 2mm off the root). The Endosphere samples are the actual root of the plant with its diverse fungal (ITS) and bacterial (SSU rRNA) communities. Total DNA was extracted from each sample; bacterial and fungal diversity is currently being assessed using Illumina sequencing. The bacterial and fungal sequences obtained will be analyzed using the Quantitative Insights Into Microbial Ecology (QIIME) pipeline. This analysis allows us to estimate alpha- and beta-diversity, construct phylogenetic trees of the communities found in the sample, and compare communities present in each fraction. The implications of this information ranges from knowing more about plant ecology in terms of metagenomics but also restoration in terms of the endangered species located at Wild Basin. Based on data from the human microbiome project, where correlations are being made between human health and microbial populations, similar functions will likely be ascribed to microbial communities in the plant rhizosphere.
- 1:45 005.004 N **Upper Cretaceous conifers of Terlingua Ranch, Brewster County, Texas**, David E Lemke, Texas State University; Alaa Ibrahim, Texas State University
Late Cretaceous and early Tertiary strata (Aguja, Javelina and Black Peaks formations) exposed across Terlingua Ranch in southern Brewster County, Texas, contain an abundance of fossilized wood specimens. Material ranges from large logs 1.6 m in diameter and 15 m in length to much smaller logs and float. This study focuses on material collected from the Upper Cretaceous Aguja formation (ca. 80–70 mya) in the eastern portion of Terlingua Ranch in proximity to Big Bend National Park. Preliminary examination of thin sections prepared from this material indicates

the presence of several conifer taxa, including representatives of Araucariaceae, Cheirolepidiaceae, Cupressaceae and Podocarpaceae. A comparison between the fossil conifers of Terlingua Ranch and those previously documented for Big Bend National Park, as well as implications for the paleoecology of the area, will be discussed.

006. Environmental Science Oral Session I

1:00 to 2:30 pm

Ila Faye Miller Nursing Building, NB 214

Environmental Science

Environmental Science Oral Session I

Participants:

1:00 006.005 G **Investigation into Neritic Water Conditions as Primary Driver of Vegetative Fragmentation Rates of Sargassum Naitans and Fluitans**, Brandon Nicholas Hill, TAMUG Mars Department; Robert Webster, TAMUG Mars Department; Thomas Linton, TAMUG Mars Department

Previous studies have shown enhanced productivity by *Sargassum* due to high nitrogen and phosphate levels in the western North Atlantic Ocean (Lapointe, 1993). The Sargassum Early Advisory System has sought to illuminate a similar Neritic vs Oceanic difference evident on the Texas coast. The two holopelagic species *Sargassum fluitans* and *S. natans*, have been studied intently. Their nursery ground has been debated between the Sargasso Sea and the Bay of Campeche. One point not debated is the importance of high nutrient levels within the neritic waters. A pier of maximum length from Galveston's Seawall was chosen as a sampling and testing site. Three equidistant zones along the length of the pier were designated in order to sample increasing depths from the littoral to the deeper surf zone. A YSI Pro2030 handheld unit and YSI Photometer 9500 were used throughout this study. Four nutrient reagents were measured: Fe, NO₃⁻, NH₄⁺, and PO₄³⁻. Data was also taken on temperature (°C), dissolved oxygen, and conductivity. We sought to determine which nutrients were most important in the accelerated growth of *S. natans* and *S. fluitans*. This work has been an attempt to economically investigate the intricacies of *Sargassum* growth, their nutrient requirements, their rates of growth, and how these variables correlate with seasonal landings.

1:15 006.006 G **Abrasive detachment of platinum group elements in catalytic converters**, Mayada Coleman, Texas Southern University; Daniel Vrinceanu, Texas Southern University

In recent years, and specifically since catalytic converters have become mandatory on vehicles, the environmental concentration of platinum and its group metals has dramatically increased. The

effects of this fairly recent addition to the environment have not been explored fully to understand its true short-term and long-term impacts not only on the environment (water, air, soil), but on living organisms, as well. To understand the effects of these new chemicals, we seek to study the catalytic converters. Specifically, our project research involves studying the actual reaction that takes place once exhaust fumes are exiting through the catalytic converter by modeling a molecular dynamics simulation. The simulation would model exhaust fumes as they are entering the catalytic converter and as they exit into the environment, to include anticipated chemical and physical structures, particulate matter, viscosity, different forces, turbulence, circulation, heat and other effects. The molecular dynamic simulation will use the LAMMPS Molecular Dynamics Simulator to better understand what happens during this process. This would be beneficial in understanding how the inner coating of the catalytic converter is affected by these forces and describe the process by which certain materials are extracted from the coating by ablation or abrasion, and released into the environment. A specific interest of this research would be understating how platinum and platinum group metals are ablated and released into the environment. An additional interest would be to determine the chemical and physical composition of platinum and its group metals as they exit into the environment

1:30 006.007 G **Assessing wetland degradation and contamination due to agricultural tile drainage**, Drew R Davis, University of South Dakota; Matthew S Schwarz, United States Fish and Wildlife Service; Jacob L Kerby, University of South Dakota

Wetland habitats have long been recognized as important adult and breeding habitats for many species of vertebrates. Unfortunately, the size and number of wetlands across the United States have decreased dramatically in the past 200 years and these losses are still occurring today. While steps have been taken to prevent the further loss of wetland habitats, it is important to ensure that remaining wetlands continue to function as high quality habitats. Unfortunately, the use and installation of subsurface tile drains in agricultural fields is contributing to habitat degradation of nearby wetlands. Subsurface tile drains decrease soil moisture and drain standing water off agricultural fields, increasing the total area of cropland, and thereby, increasing crop growth and yield. Water from these fields is drained into nearby wetlands, resulting in increased levels of contaminants. Here, we present an assessment of contaminants found in wetlands in the Priarie Pothole Region of South Dakota. Wetlands that

receive agricultural tile drainage have significantly higher concentrations of nutrients and contaminants, many which are above acceptable benchmarks. Numerous contaminants found in these wetlands are known to have toxic effects on organisms, including selenium and neonicotinoid pesticides. In summary, agricultural tile drainage is responsible for elevated levels of contaminants in wetlands throughout South Dakota, and these contaminants may represent a chronic stressor and be contributing in part to regional species declines.

1:45 006.008 G **Distance Based Mercury Contamination in Association to Small-Scale Gold Mining in Zimbabwe**, *Corey Green, Sam Houston State University*

The use of mercury in mining to extract precious metals is known to cause a multitude of negative ramifications. In developed countries, mercury has been largely removed from large scale mining processes; however, in poorer countries such as Zimbabwe, the practice has remained in small-scale and artisanal mining. These practices expose workers and surrounding populations to the negative health effects of mercury, which can include tremors, loss of cognitive abilities, and kidney failure. One of the largest sources for mercury contamination are tailing piles. For this project, soil, water, and biotic samples surrounding tailing piles will be collected from two gold mining sites in southern Zimbabwe. Terrestrial samples will be taken every 10 m along north-south and east-west transects extending 200 m. Aquatic sampling will be taken from one reservoir and two flowing sources. Samples from the reservoir will be taken along north-south and east-west transects. Samples from the flowing source leaving the reservoir will be taken every 10 m extending 100 m downstream. The second flowing source will be the Mzingwane River where samples will be taken every 10 m extending 100 m both upstream and downstream from the nearest tailing pile. Samples will be transported to the Texas Research Institute for Environmental Studies where water samples will be analyzed using cold vapor atomic fluorescence spectrometry; all other samples will be analyzed using ICP-AES and ICP-MS. Results from this study will help further the understanding of the fate of mercury in small-scale mining operations and be of aid in preventative measures against human exposure.

2:00 006.009 G **Object based vegetation classification with unmanned aerial system to assess the productivity of a constructed wetland**, *Nicholas Robb Villarreal, The Meadows Center for Water and the Environment*
Wetlands maintain critical ecological processes that enhance water quality and habitat.

Constructed wetlands are implemented to mitigate the loss of natural wetlands, improve water quality, and support wildlife habitat. The 58 km² Richland Creek Wildlife Management Area located near Palestine, Texas, features a constructed wetland that covers 9 km². The wetland system incorporates 5 sediment basins and 20 inundated cells. As nutrient-rich water from the Trinity River flows cell-to-cell, clay substrate and vegetation absorb phosphorus and other nutrients, and improve water quality before it is returned to the Trinity River. Cell to cell vegetation assemblages fluctuate by amount and species, indicating annual aerial vegetation coverage estimates are essential to evaluating the health, and biodiversity of the system. In Fall 2014, Meadows Center for Water and the Environment used an unmanned aerial vehicle to collect high-resolution imagery of the wetland cells with a spatial resolution of 18 cm. Trimble Geo XH units were utilized to collect four hundred point, polygon, and line attribute data. Post-processing was completed with Agisoft's Photoscan, eCognition, and ArcGIS. The 1,699 images collected were then mosaicked, classified using an object-oriented approach, and verified by ground control data. An object-oriented method can assist in designating priority areas for management. Areal vegetation coverage estimates were calculated for classified objects within ArcGIS. The results from these analyses will assist in establishing annual growth rates for vegetation assemblages and habitat suitability for wildlife ecology.

007. Graduate Student Competition I

1:00 to 2:30 pm

AT&T Center, AT&T 121

Graduate Student Paper Competition

Graduate Student Competition I

Participants:

1:00 007.010 G **Alternative restoration treatments to maximize growth and survival of Tamaulipan thornscrub species during seedling establishment**, *Jennifer Lynn Vela, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville; Jonathan Moczygema, United States Fish and Wildlife Service; Alejandro Fierro Cabo, University of Texas at Brownsville*

Anthropogenic activities that destroy, degrade, or fragment terrestrial ecosystems can have long-lasting detrimental impacts on ecosystem function, services, and biodiversity. The Tamaulipan thornscrub ecoregion of south Texas and northeastern Mexico has sustained considerable loss, degradation, and fragmentation due land conversion for agriculture, urbanization, and introduction of invasive flora and fauna. In an attempt to restore habitat for endangered and migratory animals, United States Fish and Wildlife

Service has undertaken a large-scale thornscrub revegetation effort in south Texas. The goal of this on-going study is to develop effective restoration techniques for ensuring growth and survival of Tamaulipan thornscrub species during seedling establishment. In March 2014, this study began assessing the effects of pre-planting severe burning, seedling shelter tubes, and high (0.5 m⁻²), medium (1.0 m⁻²), and low (2.0 m⁻²) planting densities on seedling height, basal diameter, and survival in relation to percent cover of surrounding invasive grasses and browse severity. Seedling survival in burned and ‘tube’ treatments remained relatively constant, but decreased in ‘no tube’ treatments by as much as 25% as density decreased. Seedling height nearly doubled in most treatments, increasing more so in burned*tubed treatments; while basal diameter increased by as much as 30% in burned treatments. A key knowledge gap will be filled by providing baseline data that will contribute to understanding the ecological conditions most suitable for improving the growth and survival of thornscrub seedlings, as well as providing data to aid land managers in adjusting current restoration practices for preparing and planting thornscrub in degraded habitats.

- 1:15 007.011 G **Functional analysis of novel conserved mixed-isoform B56δγ within the canonical Wnt signaling pathway in *Xenopus laevis***, Celso S. G. Catumbela, Sam Houston State University; Joni Seeling, Sam Houston State University

The canonical Wnt pathway is crucial to embryogenesis and tumorigenesis. Components of this pathway are deregulated in several carcinomas, and even Alzheimer’s disease. Protein phosphatase 2A (PP2A), consisting of a structural A, catalytic C, and regulatory B subunits, both positively and negatively regulates Wnt signaling. The largest B subunit family, B56, is regulated by five paralogous genes (α β δ γ ε) that inhibit Wnt tumorigenesis, with the exception of B56ε, an activator. B56 subunits differ in their N- and C-termini, while displaying a high degree of conservation within the core domain (80%). The novel conserved mixed-isoform B56δγ, an alternatively spliced variant of B56γ, contains a B56δ-like N-terminal and a B56γ core. This project seeks to provide a functional analysis of B56δγ, and aid our understanding of mixed-isoforms within cell regulatory pathways. Wnt is endogenously expressed in the dorsal region of developing *Xenopus laevis* embryos, and if injected in the ventral region, induces a new dorsal-ventral body axis (two-headed tadpoles). We will microinject B56δγ RNA into the ventral and dorsal regions of *X. laevis* embryos. Resulting embryos will be analyzed to determine if B56δγ

promotes or inhibits canonical Wnt signaling. Preliminary findings strongly suggest that reduced expression of B56δ isoforms lead to increased β catenin abundance, and that anti-human B56δ antibodies recognize *Xenopus* B56δγ. Therefore, we hypothesize B56δγ to inhibit canonical Wnt signaling and tumorigenesis. Moreover, we also hypothesize that PP2A:B56δγ acts as a ventralizing factor, and dephosphorylates key components of the canonical Wnt pathway whose phosphorylation lead to Wnt signaling.

- 1:30 007.012 G **Long-term effects of woody plant expansion in a humid, tropical grassland of Venezuela**, Soraya Delgado, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville

Shrub encroachment into grasslands is a process affecting ecosystems around the world with implications for biodiversity conservation. Most studies have focused on arid and semi-arid regions, but less is known about how shrub encroachment affects the humid grasslands of South America, which has unusually high level of biodiversity, unique disturbance regimes, and are predicted to respond differently to climate change. Especially important to understand is how woody plant expansion affects populations of animals that depend on food produced by grassland plant communities. This project evaluates shrub encroachment processes in conjunction with a long-term population study of green-rumped parrotlets (*Forpus passerinus*) in the seasonally flooded savannas of Venezuela. Since 1987, parrotlet population growth and demographic, along with a plant component, have been quantified, providing a unique opportunity to understand the effects of shrub encroachment on forbs that produce seeds preferred by parrotlets. Landsat analysis suggests woody plant cover has increased significantly over the study period. In 2014, we quantified woody plants and preferred forbs in areas of high, medium and low levels of woody plant cover to provide baseline data on how plant communities change across a gradient of woody plants. Density of preferred forbs decreased between low and medium levels and virtually disappeared in high levels. These changes were accompanied by proportionate increases in woody shrubs between low and medium, but not in high levels. Data will be extrapolated to historical images to estimate rate of woody plant expansion to better understand changes in parrotlet demography over the same period.

- 1:45 007.013 G **Territoriality and ‘dear enemy’ recognition between heterospecific pupfishes (genus *Cyprinodon*)**, Christopher Brooks, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University

Territorial animals are aggressive towards other individuals, but territorial aggression can vary among species or based on the identity of the competitor. Some territorial species exhibit “dear enemy” recognition; where lower levels of aggression are directed at neighboring, territorial individuals compared to intruders or unfamiliar individuals. The sheephead minnow, *Cyprinodon variegatus*, is more aggressive than and has been shown to outcompete some closely related species. Territorial males of this species also exhibit ‘dear enemy’ recognition among neighbors. Recently, *C. variegatus* has been introduced into the home range of *Cyprinodon rubrofluviatilis*, leading to hybridization between the species. We examined territorial formation between heterospecific neighbors and evaluated if heterospecific neighbors express ‘dear enemy’ recognition towards each other. We also tested the hypothesis that territorial males of these two *Cyprinodon* species differ in expression of ‘dear enemy’ recognition. We found that territorial male *C. rubrofluviatilis* in conspecific groups and both *C. rubrofluviatilis* and *C. variegatus* in heterospecific groups do show more aggression towards non-territorial males. Territorial males also reduce aggression over time. Energetically expensive aggressive acts (bites and chases) towards territorial neighbors decreased while aggression towards non-territorials remained unchanged. Less energetically expensive behaviors (displays) increased towards territorial males while no displays were shown towards non-territorials. Increasing displays allows for more energy to be used for foraging and courting females. This is the first example of ‘dear enemy’ recognition between heterospecifics in vertebrates. When aggression is decreased towards invasive species, hybridization events may increase ultimately leading to introgression with native species.

2:00 007.014 G **The role of sexual selection in hybridization between pupfishes (genus *Cyprinodon*)**, Cory Becher, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University

Hybridization is a driving force for the loss of biodiversity worldwide, and is of particular concern for freshwater fishes. Reproductive isolating mechanisms play a role in hindering hybridization, but for closely related allopatric species, reproductive isolating mechanisms can break down when the species come into secondary contact with each other. Reproductive isolation is often due to processes involving sexual selection, such as conspecific mating preferences or intrasexual competition for mates. We examined behavioral reproductive isolation between endemic populations of the Red River

Pupfish (*Cyprinodon rubrofluviatilis*) and the recently introduced Sheephead Minnow (*C. variegatus*). *Cyprinodon variegatus* has been introduced into the ranges of multiple *Cyprinodon* species in the southwestern US where results vary in the type and extent of reproductive isolation between species. Female preference trials quantifying association time were used to identify if either species prefers conspecific males to heterospecific males. Male-male competition trials identified fight winners and quantified aggressive behaviors. Many *Cyprinodon spp.* males defend territories to attract females, therefore if one species is more aggressive, they may control more or higher quality territories at spawning sites. Our results show that reproductive isolation is not maintained by either female mate choice or male-male competition. Females do not have a preference for males of either species, and neither species is more likely to win a fight. Understanding behavioral interactions that may promote heterospecific matings is critical to management strategies in systems threatened by hybridization.

008. Neuroscience Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 321

Neuroscience

Neuroscience Oral Session I

Participants:

1:00 008.015 G **Molecular Mapping of Alzheimer's Disease – Imaging Mass Spectrometry**, Andrea Renee Kelley, University of Texas at San Antonio; George Perry, The University of Texas at San Antonio; Rudolph J. Castellani, University of Maryland School of Medicine; Stephan B.H. Bach, University of Texas at San Antonio
 Limited information is available regarding the intact human tissue analysis of patients with Alzheimer's Disease (AD). This project focuses on the comparative analysis of formalin-fixed, paraffin-embedded human hippocampal brain tissue from AD patients and healthy patients, as well as mapping the chemical composition of the tissue for the plaques and tangles associated with the onset of the disease. In addition, this project involves the mass spectrometric analysis of purified amyloid plaques extracted from AD brains. We employ advanced imaging mass spectrometry (IMS) technology utilizing matrix-assisted laser desorption/ionization (MALDI) and time-of-flight (TOF) mass spectrometry to provide the first quantitative analysis of AD lesions. This enables a better understanding of the molecular composition of the plaques and tangles associated with the onset of AD *in situ*. Our preliminary results have demonstrated this technique's usefulness for the comparison of diseased versus normal tissue at a molecular level while

maintaining topological and morphological integrity. From the observed peptide clip masses we have established preliminary molecular identifications of the amyloid-beta proteins known to be prominent in the brains of those with AD. We have also identified the amyloid-beta proteins in the extracted amyloid plaque after developing a method for preparing the aliquot for analysis directly on a glass slide. These results will aid in further investigation into the mapping of tissue and identification of protein sequences prevalent in the brains of those with AD. The potential for quantitative analysis of tangles and plaques within AD tissue will further aid in the diagnosis and treatment of the disease.

- 1:15 008.016 U **Seizures on postnatal day 10 suppress isolation-induced ultrasonic vocalizations in mice.**, *Conner Douglas Reynolds, Baylor University; Joaquin Lugo, Baylor University*
Infantile crying is an evolutionarily conserved behavior that serves as a primary mode for communicating needs with adult caregivers. Rodent neonatal ultrasonic vocalizations have been investigated as potential analogs to this behavior. The acoustic features of these vocalizations are particularly sensitive to genetic abnormalities and have consequently received much attention in studies of childhood language development. Few studies have investigated the effects of seizures on vocalization behavior during the neonatal time period. The purpose of this study is to investigate the effects of kainate-induced neonatal seizures on vocalization behavior. On postnatal day 10, male and female 129SvEvTac mice received a single injection of 2 mg/kg (intraperitoneal) kainic acid. The kainate administration resulted in 1-2 hours of continuous seizures (status epilepticus). On postnatal days 11 and 12, the mice were removed from their mother and the quantity and duration of isolation-induced ultrasonic vocalizations were recorded using the UltraVox software (Noldus). Both the quantity and duration of vocalizations at the 50 kHz frequency on postnatal day 12 were significantly decreased in mice after seizures, $p < 0.05$. We did not observe changes at the 60, 70, and 80 kHz range on postnatal day 12 and did not observe changes at any frequency on day 11. These results provide evidence that neonatal seizures may impair selective aspects of early communication behavior in young mice.

- 1:30 008.017 U **Social interaction prevents salt addiction in group-housed animals.**, *Ashley M. Rivera, Wayland Baptist University; Melissa Perez, Wayland Baptist University; derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University*
Social interaction positively drives reward

behavior. Salt intake enhancement is a behavioral sensitization due to repeated sodium deficiency adaptation, like water deprivation (WD)-partial rehydration (PR)-sensitization in individually-housed (IH) animals. We investigated if repeated WD-PR would affect salt addiction in group-housed (GH) animals. Adult male Sprague-Dawley rats were GH (five/cage) or IH (one/cage) and had access to chow, water, and 0.3 M NaCl. Spontaneous salt intake was recorded for four weeks. Daily sodium intake in GH dep did not alter (3.9 ± 0.1 , 4.0 ± 1.1 , 4.9 ± 1.1 , 4.6 ± 0.7 mL/week, respectively). Daily salt intake in IH dep increased after the first WD-PR (1.7 ± 0.5 , $2.5 \pm 0.7^*$, $3.3 \pm 0.8^*$, $2.6 \pm 0.6^*$ mL/week, respectively, $*p < 0.05$). Blood biochemistry was similar between GH dep and GH non-dep (145 ± 1 Na+ mEq/L, 6.6 ± 0.1 K+ mEq/L, 7.3 ± 0.2 g% total protein, 289 ± 1 mOsmol/kg). Serum sodium decreased in IH dep compared to IH non-dep ($144 \pm 1^*$ vs. 140 ± 1 Na+ mEq/L). The other parameters were similar between both groups (6.7 ± 0.2 K+ mEq/L, 6.8 ± 0.2 g% total protein, 288 ± 2 mOsmol/kg). All groups presented more taste bud open-pores ($62 \pm 9\%^*$) than closed-pores ($16 \pm 3\%$). There was no difference on open- or closed-pores between IH or GH groups. Stomach epithelium analysis (A=rosy, B=reddish, C=deep reddish, D=pinpoint ulcers) among groups showed similar pigmentation (IH dep: A/B=50%; IH non-dep: A=70%, B=30%; GH dep: A=30%, B=70%; GH non-dep: A=40%, B=60%). Thus, spontaneous sodium intake enhancement impairment in GH animals was not dependent on changes in blood homeostasis, taste bud open-pore count, or stomach pigmentation. Therefore, salt addiction in IH animals may be driven by long-term changes in the brain.

- 1:45 008.018 U **WBU athletes displayed higher taste preference for salty foods than WBU non-athletes**, *Sharon Robinson, Wayland Baptist University; Whitney Michelle Phillips, Wayland Baptist University; JohnMark Avila, Wayland Baptist University; derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University*
Increased salty food is seen in sodium depleted human. Vigorous physical activities cause sodium depletion. Thus, we investigated if WBU athletes crave more salt rich foods than non-athletes. Ninety-six healthy college student volunteers completed a food survey questionnaire. Pleasantness of twenty-nine foods was ranked from 0 (not pleasant) to 10 (extremely pleasant). Subjects endorsing either satiety (0-4 answer in a 0-10 scale) or hunger (5-10 answer) were divided by gender into two groups, athlete and non-athlete. Data was analyzed based on ranked food pleasantness and salt content. From highest to lowest salt content, the foods analyzed included

potato chips, bacon, olives, soup, ham, hot dogs, cheese sticks, french-fries, crackers, pizza, pickles, peanut butter, hamburgers, tuna salad, spaghetti, salad, bread, rice, celery, cookies, carrots, milk, cake, ice-cream, soda, grapefruit, bananas, oranges, and apples, respectively. Satisfied female athletes (n=13) did not show any change in food pleasantness compared to female non-athletes (n=26). However, hungry female athletes (n=12) showed increased preference for cheese sticks (7±1*) compared to female non-athletes (3±2) (n=7, *p<0.05). Satisfied male athletes (n=8) liked more peanut butter (9±0*), spaghetti (9±0*), salad (7±1*), and ice-cream (9±1*) than male non-athletes (6±1, 7±1, 5±1, 7±1, respectively) (n=8). Hungry male athletes (n=10) craved crackers (8±1*) and bananas (9±0*) compared to male non-athletes (5±1, 6±1, respectively) (n=12). Results suggest that hungry female athletes craved the 7th saltiest food, hungry male athletes preferred the 9th, and satisfied male athlete desired the 12th. WBU college athletes demonstrated a moderate taste preference for salty foods compared to non-athletes.

009. Science Education Oral Session I

1:00 to 2:30 pm

Gorman Center, GB 119

Science Education

Science Education Oral Session I

Participants:

- 1:00 009.019 N **Characterization of Environmental Science Student Responses to Advanced Placement Free-Response Questions: The Need for Student Metacognition**, *Frank Joseph Dirrigl, Jr., University of Texas-Pan American*
The interdisciplinary nature of environmental science, drawing on the natural and social sciences, challenges high school students to synthesize knowledge to address issues relating to the use and impact of people on resources and the environment. One assessment of this knowledge environmental science students may choose to take is the College Board's Advanced Placement Environmental Science (APES) test to obtain college credit. The free-response section of this test contains one data-set question, one document-based question, and two synthesis and evaluation questions. Evaluation of student answers and awarding of points is based on a collaborative, team developed rubric, which considers the range and correctness of student answers. My participation as an examination "reader" from 2010-2014, provided the opportunity to participate in the APES grading process and assess the variety of student answers to standardized questions. An examination of the different answer types revealed that students could benefit from teacher lead Cognitive

Strategy Instruction and student metacognition of answering free-response questions. In this presentation, I characterize student answers to the APES examination to assist Advanced Placement high school teachers in teaching learning strategies to environmental science students and guiding student metacognition. Whereas numerous APES test taking skills and practice exams are the focus of study guides to increase test scores, I contend that students will also benefit from self-learning the reasons why free-response answers are correct or incorrect.

- 1:15 009.020 G **Confusing Words in Math & Science**, *Alicia Katherine Sanders, Texas State University; Sandra S. West, Texas State University*
English is one of the most confusing languages for our students. Our language is rife with homophones, homonyms, synonyms, and antonyms that can be confusing to ESL students. This session is designed to demonstrate how to help teachers use math and science vocabulary effectively within a classroom that integrates math and science concepts. The knowledge of the differences in vocabulary meanings amongst math and science will enable teachers how to have a better grasp on math concepts and will thereby effectively teach the math concepts within the science classroom. Strategies to help students recognize when to use a vocabulary term and which meaning applies will be demonstrated. Studies show that students learn and retain knowledge more consistently in classrooms that integrate multiple disciplines and are horizontally aligned. Students can benefit from using this model because it will clarify what a term actually means and that many terms have multiple meanings depending on which content area they are being used in
- 1:30 009.021 G **Developing Successful STEM Students while Increasing their Science Identity**, *Michele J Mann, University of Texas*
Current science, technology, engineering and mathematics (STEM) college graduates are not a true racial reflection of the diversity of young adults in the United States. If STEM degrees were equally accessible to all students there would not be a lower percentage of Black/African American and Latino/Hispanic graduates in STEM than in the general population. Colleges and universities want to have greater rate of degree completion for underrepresented minority students (URM) in STEM. Successful current collegiate programs implemented to increase URM completion of STEM degrees fall roughly into six categories: authentic discovery; community support; supplemental instruction; deliberate faculty support; extracurricular opportunities; and comprehensive programs. When carefully examining these programs it was found that the

successful programs all integrated the development of participants' science identity. Science identity is described as who we are by the ways we experience science through participation as well as by the ways we and others reify our selves as scientists. While there have been no specific STEM pipeline science identity studies done, all of the successful programs have some form of mentoring and building communities of people in STEM. For instance, the undergraduate research programs, which acculturates students into the community of a working research laboratory. Science identity development is important for persistence in the STEM pipeline especially for URM and female students, who must make the figuratively "cultural border crossing" to participate in science communities. Colleges and Universities should examine their intervention programs through the lens of science identity development.

- 1:45 009.022 N **The impact of guided student generated questioning on chemistry achievement and efficacy**, *Marilyn Ibey, Brown Mackie College; christine moseley, UTSA*
 The subject of chemistry is often considered difficult by elementary preservice teachers. This finding is relevant as negative beliefs about chemistry can lead to a dislike and avoidance of the subject. Furthermore, preservice teachers often perceive chemistry concepts as largely abstract and, consequently, are unable to explain or apply them to real world. Several studies of preservice elementary teachers suggest that they generally have negative attitudes and a lack of confidence towards the teaching of physical science concepts. These negative attitudes may be related to a lack of understanding of basic scientific concepts and/or prior negative experiences in school. Research also shows that attitudes about science influence abilities in science. For preservice teachers, this relationship between attitudes and achievement can impact how and what they will teach in their future classrooms. This quantitative study investigated the use of Guided Student-Generated Questioning (GSGQ) as a metacognitive instructional strategy to increase chemistry achievement and self-efficacy of elementary preservice teachers. The Chemistry Self-Efficacy Scale (CSES) was constructed to determine elementary preservice teachers' self-reported confidence in understanding chemistry. Findings indicated that GSGQ was significantly related to an increase in chemistry achievement but not significantly related to chemistry self-efficacy.

010. Systematics and Evolutionary Biology Oral Session I

1:00 to 2:30 pm

Bonilla Science Hall, BSH 129

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Oral Session I
 Participants:

- 1:00 010.023 G **Is the zonadhesin gene a useful molecular marker for determining phylogenetic relationships among mammalian orders?**, *Emma K Roberts, Texas Tech University; Daniel M Hardy, Texas Tech University Health Sciences Center; Robert D Bradley, Texas Tech University*
 The reigning paradigm of cellular biology suggests that structure determines function with regard to protein interactions. Molecules that are directly involved in reproduction are often subject to rapid evolutionary change. Zonadhesin (ZAN) is a multi-domain sperm protein that is crucial in species specific fertilization. The mRNA for this protein spans more than 7 kb in most taxa with three domains that are directly related to the adhesion function of the protein, including a hemostatic glycoprotein called von Willebrand D (VWD) domain, mucin, and a receptor component. Mammalian VWD domains are highly variable between taxa and conserved in others. The VWD domain mRNA sequences (>6kb) for fifteen different orders of mammals, including 44 species, were obtained from GenBank and Ensembl, aligned, and then analyzed using both Bayesian and maximum likelihood methods to generate a phylogenetic tree. In most cases, relationships corresponded to phylogenies recovered from other datasets. For example, Primates, Artiodactyla, Perissodactyla, etc. each were recovered as monophyletic groups. However, some results were unusual, such as Afrosorocida grouping with Sirenia. Based on this study, baseline information suggests that variability among ZAN sequences in mammals is phylogenetically informative.
- 1:15 010.024 N **Pleurocerid population structure assessed with ISSRs.**, *Bethany McGregor, University of Louisiana at Monroe; Russell Minton, University of Houston Clear Lake*
 Inter-simple sequence repeats (ISSRs) represent a useful, cost-effective means of assessing genetic population structure across plant and animal taxa. ISSRs are generated by amplifying regions between microsatellites, scoring the fragments as present or absent, and analyzing the resulting binary matrix. We aimed to explore genetic structure in pleurocerids at three levels: within a population and between populations of a single species; and between populations of two unrelated species. We collected 50 snails each from four populations of *Elimia potosiensis*, along with 50 snails from a single population of *Pleurocera canaliculatum*, and generated ISSRs using four different primers. The binary matrix of 250 snails and 125 markers was analyzed in both GenAlEx and STRUCTURE. An analysis of molecular variance (AMOVA) indicated that while most of

the variation was seen within populations (~75%), there were significant genetic differences between populations of *E. potosiensis* and between *E. potosiensis* and *P. canaliculatum*. A STRUCTURE analysis clearly separated each population of snails, and placed *E. potosiensis* into two geographic groups. Our results support the utility of ISSRs as population markers in freshwater snails, and planned future implementations of the method will be discussed.

- 1:30 010.025 U **Shoaling and exploration behaviors as functions of female reproductive state in largespring gambia**, James Stewart, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University

Gambusia geiseri is a livebearing freshwater fish native to Comal and San Marcos Rivers but has become invasive in several spring systems through central and west Texas. We are interested in further understanding the distribution of this species through both behavioral and reproductive life history parameters. This study examines social behaviors (shoaling and exploration) in relation to pregnancy state, which may speak directly to the invasive capabilities of this species. Deaton et al. (in prep) showed that female body size may contribute to shoaling preferences in females, and Hemingway et al. (in prep) showed that female reproductive state may play a role in both shoaling and exploration behaviors. Therefore, in this study, we investigated more fully whether reproductive state (measured as number and state of embryos, and gonosomatic index), affects the amount of time females engage in shoaling (proxy for social) and exploratory (proxy for boldness) behaviors. To date, results show no significant relationship between size of female and time spent shoaling. However results show a possible correlation between dominant embryo stage and time spent shoaling, along with gonosomatic index and shoaling time. This research will hopefully shed light on the behavioral ecology and reproductive capabilities of this fish in relation to its native and invasive ranges.

- 1:45 010.026 G **Who are the fathers: characterizing hybrid origins of parthenogenetic *Aspidoscelis* lizards**, Alexander S. Hall, University of Texas at Arlington; Jose Maldonado, University of Texas at Arlington; Matthew Fujita, University of Texas at Arlington

Over the last fifty years, conclusive population assignments for North American whiptail lizards (*Aspidoscelis*; formerly *Cnemidophorus*) eluded investigators utilizing morphology, skin histocompatibility, karyotypes, and mitochondrial gene trees. Hybridization between several whiptail species complicates phylogenies because female F1 hybrids reproduce independently from

males via true parthenogenesis. Typically these hybrids are diploid with one complete set of chromosomes from each 'parent' species. Interestingly, primarily clonal parthenogenetic lizards exhibit some phenotypic variation in scalation, size, and color. This study sought to infer lineages within the diploid parthenogenetic *Aspidoscelis tessellata/dixoni* complex. I hypothesized multiple hybridization events between the parent species *A. marmorata* and *A. scalaris* (cf. *A. gularis*). To capture the maximal genetic information across multiple (~50) individuals per species and across species, I sequenced thousands of homologous unlinked loci using double digest restriction associated DNA sequencing (ddRADseq) and sequenced entire mitochondrial genomes. Parental population assignments for *A. tessellata/dixoni* can be inferred using *structure* and species tree inference in the context of each population's geographic range. This presentation includes comments on species concepts as they (struggle to) apply to parthenogenetic lineages. Multiple origins of a vertebrate parthenogen would constitute diversity not otherwise expected of a completely clonal lineage from one origin.

011. Terrestrial Ecology and Management Oral

Session I

1:00 to 2:30 pm

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session I
Participants:

- 1:00 011.027 G **A Gentle Introduction to High Throughput Sequencing Applications and Study Design**, Alexander S. Hall, University of Texas at Arlington

With promises of unlocking the secrets worlds of genomes, high throughput sequencing technologies have quickly transformed from 'next-gen' to 'current-gen' practice. However, outside of dedicated systematics and genomics research groups, few labs have incorporated the new data types afforded by great quantities of sequence data. DNA and RNA sequencing via the Sanger approach remains viable for targeted sequencing, but when economy of scale is important then different strategies should be considered. In this talk, I will outline current sequencing technologies with special consideration to cost, implementation, and study design. In particular, I will share my experiences working with population genetics and entire mitochondrial genome sequencing. Special attention will be paid to caveats not often discussed in the primary literature: lab technique, the potentially high cost of poor sequence, and data management. Overall, high throughput sequencing experiments hold great promise for lending evidence towards research questions

outside of systematics and genomics. The presentation will be made available on my website after the conference: allopatry.com

- 1:15 011.028 G **A comparison of ectoparasite diversity found on three North American songbirds and their nests between urban and rural habitats**, *Faith N.K. Byrd, Sam Houston State University*
The specific objectives of this study are to (1) investigate the abundance and distribution of ectoparasites found on three species of North American passerines and (2) determine if there is a significant difference between the abundance and diversity of ectoparasites found on the three study species in urban versus rural habitats. The study will compare ectoparasite sheds and remains from fresh nests, and will also attempt to collect ectoparasites directly from nestlings and adult birds. The species and abundance of ectoparasites found on nesting versus non-nesting Carolina Wrens (*Thryothorus ludovicianus*) will be documented for comparison. The study will also analyze if there are any differences in ectoparasite species and abundance on two other native songbirds, Eastern Bluebirds (*Sialia sialis*), and Carolina Chickadees (*Poecile carolinensis*). Carolina Chickadees and Eastern Bluebirds commonly use the nest boxes that are put up for wrens during mating season, so their nests will also be included in this study.
- 1:30 011.029 N **A look at the diversity of bees in Kleberg County**, *Richard James Patrock, Texas A&M, Kingsville; John Reilley, USDA- NRCS*
There has been substantial new interest in pollinator ecology with the recent declines in important flower-visiting species, such as the honeybee, bumblebees and the monarch butterfly. This new attention has refocused awareness of the importance of understanding local diversity in pollinator species richnesses and floral associations. We have catalogued over a two year period (2013-2015) the bees and their floral visits in Kleberg County to document the phenology and interactions with a select group of native and other ornamental plants to help generate baseline knowledge for conservation of the local flower-visiting guild of insects. To date, we have found 150 species of bees, with the most commonly observed bees being social and generalist foragers. We will present a summary of the community dynamics of the bees with a focus on temporal and special diversity.
- 1:45 011.030 U **A phenology of Texas amphibians**, *Sara J. Crady, The University of Texas at Austin; Travis J. LaDuc, The University of Texas at Austin*
Phenologies are commonly used to describe the seasonal periodicity of plants or the temporal

occurrence of birds at a given site, but are infrequently compiled for non-avian vertebrates. We chose to capitalize on an increasing body of data compiled by citizen scientists and combine these with museum voucher records to create a statewide phenology for amphibians in Texas. Data were gathered from a variety of sources including iNaturalist, the Texas Parks and Wildlife Department's Amphibian Watch program, and VertNet. These data were merged to create occurrence records of anuran calls and sightings of all amphibians throughout Texas. Over 24000 records from all years (1890-2014) were included, though some datasets were temporally biased (e.g., iNaturalist data predominantly collected 2012-2014). When compared to literature records, some species were observed when expected, though many species, such as the American Toad and the Gulf Coast Toad, were observed calling either earlier or later (or both) than previously reported. By incorporating the growing amounts of verifiable occurrence data into similar analyses, we will be able to assess the effects of environmental phenomena such as season creep on amphibians, a vertebrate group already under duress from other environmental stressors.

- 2:00 011.031 G **Diet analysis of Texas diamondback terrapin (*Malaclemys terrapin littoralis*)**, *Bryan Alleman, University of Houston-Clear Lake; George Guillen, University of Houston Clear Lake*
The diamondback terrapin (*Malaclemys terrapin*) is an Emydid turtle specialized for living in brackish and salt marsh environments. The Texas diamondback terrapin (*M. t. littoralis*) subspecies is found along most of the Texas Gulf coast. Past studies have been conducted on the diet of the Atlantic subspecies of diamondback terrapin. Previous studies indicate a diet primarily consisting of various crustacean and mollusk species with variations along their range. Due to body size sexual dimorphism, studies also show differences in diet between males and females. There is currently a paucity of data on the diet of this species along Gulf of Mexico, and specifically on the Texas Gulf Coast. This study examines the diet of Texas diamondback terrapin. Fecal samples (n=64) were acquired in order to analyze terrapin diet. The remains of plicate horn snails (*Cerithiidea pliculosa*) and fiddler crabs (*Uca* spp.) were the most common prey items found in all samples, encountered in 59% and 41% of samples respectively. As expected, there were significant differences ($p \leq 0.049$) in the diet of males and females for periwinkle snails (*Littorina irrorata*), blue crabs (*Callinectes sapidus*), total Gastropods, and total Decapods. We also found significant differences ($p \leq 0.022$) in diet between seasons for total Gastropods, *C. sapidus*, and *Uca* spp. Our results indicate a slightly different diet

for terrapin than previously report in other studies. These findings extend the basic knowledge and understanding of habitat utilization by this species which will be useful for ongoing conservation and management of *M. terrapin*, especially the Texas subspecies.

- 2:15 011.032 G **Effects of Environmental Temperature on the Critical Thermal Limits of the Tawny Crazy Ant (*Nylanderia fulva*)**, Lance Umlang, Sam Houston State University
 This research represents the first investigation into the thermal physiology of the tawny crazy ant (*Nylanderia fulva*) with a focus on two temperature-dependent processes (thermal tolerance and reproduction) that are essential to the survival and spread of an ant colony in an invaded area. A dynamic method (increasing test temperatures until an endpoint is reached) was used to determine the thermal tolerances of *N. fulva*. Critical thermal limits of *N. fulva* at several acclimation temperatures (10 - 35C) are reported here for the first time. Mean CT limits were determined to be significantly influenced by location, temperature, and the interaction of these two factors, with CTMax ranging from 49.2 – 50.7C & and CTMin from 4.9 – 5.2C. CT limits of *N. fulva* exceed those reported for biologically similar invasive ant species, such as the Argentine ant (*Linepithema humile*) and the red imported fire ant (*Solenopsis invicta*), by approximately 5-10C. This apparent physiological predisposition to survival at higher temperatures than its competitors might allow this species to biologically function at temperatures (or thermal niches) that are unavailable to those species with lower thermal tolerances. This environmental niche partitioning may be responsible for the observed competitive dominance of this invasive ant and could provide justification for species specific control methods to be developed as the relationship between these South American species becomes less ambiguous.

012. Geosciences Oral Session I

3:00 to 4:30 pm

Bonilla Science Hall, BSH 123

Geosciences

Geosciences Oral Session I

Participants:

- 3:00 012.033 G **A Taxonomic and Geologic Study on an Oreodont Skull Excavated from Buffalo Gap National Grasslands of South Dakota**, Garrett Williamson, Stephen F. Austin State University; Tim Walsh, Wayland Baptist University; David Schmidt, Westminster College
 During the summer of 2012, a Wayland Baptist University geology field team located and excavated numerous Eocene-Oligocene age fossil specimens from the White River Group in the

Buffalo Gap National Grasslands, South Dakota. A skull, preserved within a sandstone concretion that had eroded out of the Scenic Member of the Brule Formation, was discovered within a gully cutting through a slump block. The slump, from the upper part of the Scenic Member, sustained approximately 23 meters of displacement and currently rests upon the upper portion of the underlying Chadron Formation. Slump failure occurred along a slip face with similar orientation to that of the linear stream patterns within the area and both may have the same structural control. The skull lacks most of the cranium (only represented by a sandstone mold), but the maxilla, mandible, some teeth, and part of the right orbital were preserved. After lab preparations at least one of each tooth type is represented, except for the lower incisor (i1). Characteristics used for taxonomic identification were primarily restricted to tooth morphology and positioning. Since the skull was found on a slump with substantial displacement, small mammals from throughout the Scenic Member (Orellan age, NALMA) were considered for identification. The mammalian families under consideration were Agriocheridae, Camelidae, Hypertragulidae, Leptomerycidae, Merycoidodontidae, and Protoceratidae. Analyses of morphometric characteristics, such as lack of diastema, tooth row lengths, and molar sizes, indicate that the specimen is likely a Merycoidodon starkensis which is part of the Merycoidodontidae family.

- 3:15 012.034 N **Development of rill marks on the beach face at Sea Rim State Park, Texas**, Russell LaReill Nielson, Stephen F. Austin State University; Chris A Barker, Stephen F, Austin State University
 Well developed rill marks are present on the beach face at Sea Rim State Park, Texas. These rill marks are produced as the tide goes out and water drains from the berm and bars that are found on the beach face. They develop in zones where there is a higher permeability in the berm and bars that run parallel to the beach face. These zones contain a higher concentration of fossil fragments and a smaller amount of clay. Below each permeable zone, the sand contains fewer shell fragments and larger amounts of clay resulting in the zone being less permeable. Rill marks are produced by a thin film of water that flows out of the sand and down the beach face following the breaking of each wave as the tide goes out. Rill marks are divided into five different types: fringing, conical, branching, meandering, and bifurcating. All five types of rill marks are found on the beach face at Sea Rim State Park. The type of rill mark present is determined by: the angle of the slope on the berm and bar face, the amount of porosity and permeability of the sand, and wave impact

direction and intensity. They are best developed during stormy days with high tides. Preservation and recognition of rill marks in the rock record is low, because the next high tide destroys the rill marks that developed during the last low tide.

013. Graduate Student Competition II

3:00 to 4:30 pm

AT&T Center, AT&T 121

Graduate Student Paper Competition

Graduate Student Competition II

Participants:

- 3:00 013.035 G **CD4+ T cell effector function is impaired by *Erk2* deletion**, Julie Tudyk, UTSA; Emily Zboril, UTSA; Thomas Forsthuber, University of Texas at San Antonio
 Extracellular signal-regulated kinase 2 (*Erk2*) is required for CD4+T cell development and positive selection in the thymus, however, the role of *Erk2* in mature CD4+T cells is unknown. *Erk2* is a key player of the mitogen activated protein kinase (MAPK) pathway which, in T cells, transduces crucial signals such as TCR engagement, CD28 co-stimulation, and cytokine binding. Upon activation, these signals are carefully coordinated to initiate gene expression programs, thus directing the expansion and differentiation of Ag-specific cells. The exquisite control of these signaling mechanisms is needed to maintain tolerance; dysregulation can result in inappropriate immune responses. In this study we used a mouse model with T cell-specific deletion of *Erk2* to determine the role of *Erk2* for CD4+T cell function. Our results show that increased numbers of *Erk2Δ* CD4+T cells from naïve mice express markers for activation (CD25, CD44, and CD69). Further, *Erk2Δ* CD4+T cells are able to survive and expand in vivo and proliferate upon IL-2, IL-7, and IL-15 cytokine stimulation. Importantly however, although the frequency and magnitude of Ag-specific *Erk2Δ* CD4+T cell responses was comparable with controls upon antigen recall, secretion of IFN- γ and IL-17 was significantly impaired. As CD4+T cells orchestrate immune responses primarily via cytokine production, our results suggest that *Erk2* is required for CD4+T cell effector function.
- 3:15 013.036 G **Comparison of Herpetofaunal Communities in Areas Disturbed by Oak Regeneration Silvicultural Treatments**, Chad Sundol, The University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio; Cathryn Greenberg, USDA Forest Service; Christopher Moorman, North Carolina State University; Jerry K Jacka, The University of Texas at San Antonio
 Reptile and amphibian communities are crucial components of hardwood forests and could be impacted by disturbance from silvicultural practices in the Southern Appalachian Mountains.

From May to August 2013 and 2014 herpetofauna were trapped to evaluate the impacts of silvicultural practices. Silvicultural treatment (midstory herbicide, shelterwood-burn, repeated prescribed fire) and control (no treatment) consisted of five-ha units with four replicates each. Herpetofauna were trapped using eight drift fences with two pitfall and two funnel traps at each fence in each treatment. Total abundance (animals caught over two years) by treatment was determined for reptiles and amphibians. Effects of silviculture treatment (4 levels) and year of sampling (2 levels), and their interaction on abundance were determined using two-way ANOVA's. Silviculture treatment affected abundance; however year, or interaction between year and treatment were not significant and had no effect on abundance. Reptile abundance was higher in shelterwood-burn treatments (8 ± 3 , $\bar{x} \pm 1$ SD) than prescribed burn (1 ± 1 , $P = 0.0187$). Amphibians abundance was significantly lower in the shelterwood-burn treatment (7 ± 4 , $P = 0.0024$) than the prescribed burn (21 ± 8) and midstory herbicide (18 ± 8); however it was not significantly different than the control (12 ± 6). Decreases in canopy cover in the shelterwood-burn may allow for more thermoregulatory opportunities and could also lead to an increase in prey availability for reptiles. The converse would be expected for amphibians as they depend on cool, moist microclimates promoted by heavy overstory cover.

- 3:30 013.037 G **Crossing to the dark side: convergent evolution in the development of a vestigial eye**, Ruben Uranga Tovar, Texas State University; Dana M. Garcia, Texas State University
 The south central Texas *Eurycea* clade exhibits a continuum of karst salamander phenotypes. The Texas blind salamander (*E. rathbuni*) is considered a stygobiont because it completes its life cycle in an aquatic subterranean habitat where it lives in perpetual darkness. Consequently, *E. rathbuni* exhibits highly reduced eyes. In contrast, the Barton Springs salamander (*E. sosorum*) is epigeal and is endemic to surface habitats; it exhibits well developed eyes. To determine the sequence of events during development that leads to widely disparate ocular outcomes and to gain insights into the molecular mechanisms responsible, embryos at various stages of development were obtained from two species (*E. sosorum* and *E. rathbuni*) and sectioned using a Shandon cryotome. Five developmental stages of *E. sosorum* and six developmental stages of *E. rathbuni* were identified, and sections taken from these embryos were labeled for Pax6 and Shh using immunohistochemistry. Images were obtained using a scanning confocal microscope.

Expression of Pax6 and Shh proteins is observed in both morphotypes represented by *E. rathbuni* and *E. sosorum*. *Eurycea sosorum* maintained expression of Pax6 and Shh through embryogenesis and into a juvenile stage. Decreased labeling of the Pax6 protein was observed during later stages of *E. rathbuni* development, while Shh protein labeling was increased in a select subset of cells surrounding the brain and eye. Interestingly, these results parallel Pax6 and Shh expression in 2 morphotypes explored in *Astyanax mexicanus*, suggesting some degree of convergent evolution in the developmental mechanisms that lead to the development of vestigial eyes.

- 3:45 013.038 G **Mandibular notch shape in extant Hominidae using 2D Elliptic Fourier Analysis**, Timothy Lee Campbell, Texas A&M University; Thomas J. DeWitt, Department of Wildlife and Fisheries Sciences, Texas A&M University; Darryl de Ruiter, Department of Anthropology, Texas A&M University
 Considerable variation exists in the mandibular ramal morphology of living apes and humans. Recent studies have demonstrated that analyses of ramal morphology can yield high classification rates among taxa. Additionally, pronounced morphological differences in the superior portion of the mandibular ramus have been consistently identified, including aspects of the coronoid process and sigmoid notch. In many of these analyses, however, only a portion of the condylar process has been included resulting in a larger emphasis placed on the superior and anterior portions of the ramus. In this study we assess the superior ramal morphology of extant adult apes and humans and include the entire ramal morphology around the sigmoid notch using 2D Elliptic Fourier Analysis. Results from both shape and form analyses show highly significant differences between genera and classification rates comparable to previous studies. These results indicate that this portion of the mandible can be successfully used to differentiate modern apes and humans. We also discuss ongoing work for including proportionally greater amounts of the superior ramal contour, and the logistics of its application to studies of fragmentary fossilized specimens.

- 4:00 013.039 G **Therapeutic effects of methylene blue on cognitive impairments during chronic cerebral hypoperfusion**, Allison Auchter, University of Texas at Austin; Justin Williams, University of Texas at Austin; Bryan Barksdale, University of Texas at Austin; Marie Monfils, University of Texas at Austin; F Gonzalez-Lima, University of Texas at Austin
 Chronic cerebrovascular ischemia, one of the risk factors for mild cognitive impairment (MCI) and

Alzheimer's disease (AD), has been shown to diminish mitochondrial respiration and impair memory consolidation. As such, drugs that improve mitochondrial function may be appropriate treatments for cerebral hypoperfusion. Methylene blue (MB) is a historical blue dye that crosses the blood-brain barrier and serves as an electron cyler in the mitochondrial electron transport chain. Previous studies implicate MB in both memory enhancement and neuroprotection. This experiment followed a 2x2 factorial design in which animals underwent either permanent bilateral carotid occlusion (2-VO) or sham surgery (no-VO) followed by daily intraperitoneal injections of either 4 mg/kg USP MB or saline. Following surgery, animals went through a battery of different behavioral tests, including an open field task, visual water maze task and odor-recognition task. Results reveal that rats that underwent 2-VO surgery show worse performance in the visual water task and odor-recognition test without showing differences in general motor activity or swimming ability. Additionally, daily administration of MB was able to prevent some of the cognitive deficits that resulted from cerebrovascular insufficiency. Specifically, after 10 days of training on three different elemental discrimination patterns in the visual water task, 2-VO animals showed lower performance in a memory probe test. However, animals that received daily injections of MB performed significantly better than saline-treated subjects. Similar memory improvement by MB was not observed in the odor-recognition task. These data suggest that MB treatment may be therapeutic in conditions of chronic cerebral hypoperfusion.

014. Marine Science Oral Session I

3:00 to 4:30 pm

Bonilla Science Hall, BSH 321

Marine Science

Marine Science Oral Session I

Participants:

- 3:00 014.040 U **Assessing Biodiversity and Population Estimates of Syngnathidae Fishes in the Aransas Bay, Texas**, Janaee Wallace, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University; Mia Valdez, St. Edward's University
 Due to significant changes in the earth's ecosystems' biodiversity is declining at an unprecedented rate. One major ecosystem affected is seagrasses, which provide critical habitat and nursery grounds for many aquatic organisms. Syngnathid fishes (pipefishes and seahorses) have been identified as good bio-indicators of healthy seagrassbeds due to their dependence on the seagrasses for the duration of their life cycle. Thus, assessing biodiversity (species richness and number) and population sizes of syngnathids is

vital to our understanding of the health of these ecosystems. This summer (June -July 2014) we assessed population sizes and biodiversity of syngnathids in the Gulf of Mexico. It has been reported that Texas' seagrass beds support six species of syngnathids: three pipefishes (Gulf, dusky and chain) and three seahorses (dwarf, slender and lined). We quantified population size and biodiversity of these fishes using random sampling in twelve grassbeds (biodiversity) and the depletion method in two beds (population estimates). Firstly, our results have shown that the depletion method is an effective method to capture the majority of individuals present within seagrass bed habitats (previously unknown). Further, our results show that the Gulf pipefish is the most prominent species present in the area, followed by chain and dusky pipefishes, dwarf seahorses, and lined seahorses. We also have found that the relative number of species depends on time of collection and/or subplot of grassbed samples. We are continuing analyses and will present further results on relative abundance of each species and predicted population sizes.

- 3:15 014.041 G **Do female dusky dolphins (*Lagenorhynchus obscurus*) have the potential to exercise active mate choice?**, Dara Orbach, Texas A&M University at Galveston; Jane Packard, Texas A&M University; Bernd Würsig, Texas A&M University at Galveston
A female's role in controlling paternity is often limited to mate selection. Females may have active or passive roles in mate choice depending on the associated costs and benefits. In exploitative scramble competition, females cannot be monopolized and males compete for a proximate position near a female during her ovulation. Among dusky dolphin (*Lagenorhynchus obscurus*) mating groups off Kaikoura, New Zealand, several males chase one female in exploitative scramble competition. We assessed if females have the potential to exercise active mate choice during mating chases. Boat-based follows of mating groups were conducted during the peak breeding season (October 2013-January 2014). Mating behaviors near the surface were video-recorded and transcribed. The two most recurrent male behaviors [Inverted Swim (n= 139), and Push-Female-to-Surface (n= 393)] and four most recurrent female behaviors [Body Roll (n= 93), Tail Slap (n= 300), Re-orientation Leap (n= 32), and Direction Change (n= 107)] were included in the zero- and first-order Markov chain analyses. Female behavioral responses immediately following male behaviors were tallied. Females responded to male behaviors differently than expected by chance ($G^2= 242.09$, $df= 3$, $n= 532$, $p= 0.001$). The female behavioral responses appeared evasive and were manifest as

maneuverability. Female behaviors could be indicators of mate preference, ovulatory state, or mechanisms to assess the fitness of potential mates. The evolution of active female mate choice may result from local ecological conditions that promote large aggregations of dolphins, spatio-temporal separation of behavioral states, and low monopolization potential of females.

- 3:30 014.042 N **Pulse-Amplitude-Modulated (PAM) fluorescence response of the seagrass, *Thalassia testudinum* Banks ex König (turtle grass) to rapid, short-term hyposalinity exposure.**, Joseph Kowalski, The University of Texas-Pan American
Hyposalinity events in estuaries following pulsed delivery of stormwater can impede photosynthetic performance in the seagrass, *Thalassia testudinum* Banks ex König (turtle grass), to the point that excess exposure to hyposalinity can lead to plant mortality. What is less certain is how this species copes with brief bursts of varying levels of hyposalinity and how these conditions affect photochemical efficiency ($\Delta F/F_m'$, or "Y"). Mesocosm greenhouse plants were exposed to 10 minute pulses at 9 experimental salinities (24 to 5), compared to a control of 28. Temperature was maintained between 22 and 24 °C. Photosynthetic efficiency was 35% greater (0.78) in dark-adapted controls compared to light adapted control plants (0.51). Salinity had no effect on any of the dark treatments, but did significantly effect light-adapted treatments for Y, alpha (efficiency), and maximum Electron Transport Rate (ETRmax). Greatest values for Y, alpha, and ETRmax occurred at about 20 psu with minimum values at highest (control) and lowest salinities (5). Results were somewhat unexpected, but may provide insight on how differences between photochemical performance (fluorometry) and metabolic techniques (oxygen evolution) may not be directly related. There was also a significant diurnal effect that entrained the light history of the previous day on the next day's photosynthetic performance.
- 3:45 014.043 N **Return to San Antonio Bay: a Second Year of Seagrass Monitoring**, Cynthia Hobson, Texas Parks and Wildlife Dept.
Seagrass beds serve as important habitat for fisheries and wildlife in Texas bays, sustaining recreational and commercial Gulf fisheries. Worldwide seagrass decline is often linked with water quality decline. As resource managers have become more aware of the ecosystem services provided by seagrasses (providing food, cycling nutrients, stabilizing sediments, etc.), the need to evaluate and monitor the condition of seagrass beds over time has come to the forefront. In 2012, TPWD launched a pilot seagrass monitoring program designed to enable the state to monitor changes in seagrass condition over large areas and

to infer causal relationships that may explain those changes. As part of that study, seagrass percent coverage and canopy height were measured at 50 probabilistically-selected sites in San Antonio Bay. In 2014, the same parameters were again measured at those 50 permanent monitoring sites. Percent coverage of *Halodule wrightii* (shoal grass), the dominant seagrass species in San Antonio Bay, was lower in 2014 than in 2012. Results demonstrate that this approach is effective at detecting change in seagrass beds in San Antonio Bay.

Implementation of a seagrass monitoring program on a coastwide and bay scale could begin to detect change in seagrass coverage over the next few years, depending on available resources.

- 4:00 014.044 U **Seagrass associated fish biodiversity along the Texas Coast**, *Andre Guy Osvaldo Brebion, St. Edward's University; Janaee Wallace, St. Edward's University; Roberta Engel, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

Seagrass beds provide critical habitats and nursery grounds for many aquatic organisms, including microbes, plants, invertebrates, and fishes. In particular, fishes rely heavily on seagrasses for food, habitat, and reproduction. Some fishes use the grassbeds seasonally, while others inhabit seagrasses for the duration of their lives. Such heavy dependence on the seagrass beds by several species of fishes raises concern for restoration and assessment of seagrass bed health, especially in Texas where seagrass habitats are imperiled and fish diversity is high. Dunton and others have assessed, provided a baseline for, and showcased a need for restoration along the Texas coast. This project speaks directly to their call for immediate action by furthering our understanding of fish biodiversity in relation to seagrass habitats in Texas. To date, fish biodiversity has been assessed in several grassbeds in the Redfish Bay near Port Aransas, Texas. In addition, seagrass diversity and physicochemical properties also have been quantified. We will present these data, along with models investigating fish diversity as a function of seagrass diversity. With this information, we plan to model critical habitat, construct life table models, and to perform population viability analyses for the most common fishes inhabiting seagrass beds along the Texas coast.

- 4:15 014.045 U **The effects of tides and currents on larval blue crabs (*Callinectes sapidus*)**, *Claire Weirich, Texas Lutheran University*

The Texas Parks and Wildlife Department has documented that the blue crab populations in the Mission-Aransas Estuary have been declining since the 1980s. The larval blue crabs (megalopae) hatch in the Gulf of Mexico and are

returned by tides and currents to the estuary through the Aransas Pass Ship Channel in Port Aransas, TX. This phenomenon could possibly be influencing blue crab abundance in the estuary. The Mission-Aransas National Estuarine Research Reserve's Citizen Science: Larval Blue Crab Monitoring Project has been collecting data for blue crab megalopae in the Mission-Aransas Reserve since May of 2012. Hog's hair collectors are used by the Citizen Science project to sample the frequency and abundance of megalopae entering the estuary. Larval blue crabs were sampled for settlement from the UTMSI pier using hog's hair collectors and were counted.

Measurements for the tides and currents were taken with a tilt current meter placed under the pier. Highest numbers of megalopae were seen on nights dominated by incoming tide. There was no direct relationship between megalopae settlement and the maximum, minimum, or mean current speed for each night. However, when comparing the abundance of megalopae to the last current speeds before sunrise, there was an inverse relationship between megalopae collected and current speed. Although there are many factors that may affect the settlement of megalopae on the collectors, this study demonstrates that tide and current activity is a critical variable to take into consideration when analyzing the income of megalopae from the ocean.

015. Science Education Oral Session II

3:00 to 4:30 pm

Gorman Center, GB 119

Science Education

Science Education Oral Session II

Participants:

- 3:00 015.046 G **Know your bioregion: A journey towards developing a personal sense of place**, *Wayne shelden, UTSA; Deepti Kharod, UTSA; christine moseley, UTSA*
Wendell Berry says that if you don't know where you are, you don't know who you are. With a sense of place, personal identity is defined – to a significant extent – by the natural features of the bioregion in which one lives. A bioregion is a unique place with its own watershed, soils, climate, plants, animals, and history. Knowing about one's bioregion can inspire and empower one to take action to preserve it or take part in its restoration. Using local resources and field-based experiences, students in a graduate environmental education course researched their bioregion and reflected upon their own relationships with it. The activities ranged from the intensely personal (reflections about a walk in their own backyard) to the immensely vast (field trips that spanned the breadth and depth of the local watershed). The range of local to global was not only in terms of physical space, but also on the scale of time (time

of day to seasons to epochs). This session will share with participants on how to discover and interpret the natural history of their bioregion through a variety of mediums, including an online bioregion module, a sense of place discovery journal, and personal sense of place digital stories.

- 3:15 015.047 G **Place Consciousness as a pathway towards campus sustainability**, *Deepti Kharod, UTSA; Wayne shelden, UTSA; christine moseley, UTSA*
How do college students define personal sense of place? More importantly, how do they develop personal connections to their college campuses, which they view as temporary habitats? Sense of place is critical in the development of an environmentally responsive citizenry for the sustainability of our natural resources. Our evolving research of college students' definitions of sense of place supports place consciousness as a theoretical framework of place. It has been argued in the literature that a connection to nature is instrumental in developing a sense of place. However, our research supports a shift from the focus on an individual's connection to the physical environment towards the importance of social and political connections to the society at large within a given environment. Elements of the biophysical, sociocultural, and political dimensions overlap as they filter through the psychological dimension and support each individual's sense of place consciousness. We argue that sense of place as seen through the lens of place consciousness, and its relationship to the sustainability of resources, then becomes a state of mind that college students should be able to take with them wherever they go, extending it from their college campuses to the entire globe.

- 3:30 015.048 G **Resaca Rangers: a school-based network to monitor resaca ecosystem health**, *Buford J. Lessley, University of Texas at Brownsville; Alejandro Fierro Cabo, University of Texas at Brownsville; Jude Benavides, Department of Chemical and Environmental Sciences, University of Texas at Brownsville; Susan Fagan, University of Texas at Brownsville*
Resacas are remnant river channels (distributaries and ox-bows) of the Rio Grande formed naturally throughout Brownsville and the Lower Rio Grande Valley before dams were built. This ecosystem has only begun to be studied, and has been largely ignored by local communities, despite playing a central role in the hydrology, aesthetics, water storage, and wildlife habitat of the region. Resaca Rangers is an innovative network of middle and high school science teachers and students, led by faculty and graduate students at the University of Texas at Brownsville, aimed to monitor and assess the ecological status of resacas. Partnering agencies

include school districts, public utilities, the City, and a non-government organization.. Periodic measurements of selected resacas include biological determinations based on the macrobenthic community and on the decomposition process, in addition to standard water quality parameters, nutrients and chlorophyll 'a'. Collected data will be uploaded into a public online database allowing students, researchers, managers and the general public to easily compare and follow the ecological status of the monitored resacas. An overall health assessment index will be developed based on selected biological and water quality metrics which will eventually be expanded for use throughout the Lower Rio Grande Valley. This network, as well as an on-going restoration effort, is awakening genuine conservation interest and a sense of pride and stewardship of this important environmental asset in the region. The network serves a predominately Hispanic community where exposure to the biological and environmental sciences is limited.

- 3:45 015.049 G **Resaca Rangers: a school-based network to monitor resaca ecosystem health**, *Buford J. Lessley, University of Texas at Brownsville; Alejandro Fierro Cabo, University of Texas at Brownsville; Jude Benavides, Department of Chemical and Environmental Sciences, University of Texas at Brownsville; Susan Fagan, University of Texas at Brownsville*
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going restoration effort, is awakening genuine conservation interest and a sense of pride and stewardship of this important environmental asset in the region. The network serves a predominately Hispanic community where exposure to the biological and environmental sciences is limited.

- 4:00 015.050 N **STEM Administrator Leadership**, *Sandra S. West, Texas State University*
The recent push for more K-12 STEM graduates requires administrative support that enhances, rather than impedes effective instruction. Factors, such as understanding the research and STEM Best Practices that includes moving instruction from concrete to pictorial to abstract, the AAAS's three principles for lesson planning, and using enhanced context that enables meeting this goal will be identified. Instituting "one size fits all" requirements such as inappropriate generalized requirements, including front-loading academic vocabulary, using a Direct Instructional model solely, lack of equipment and materials for the concrete learning experiences required for developing the depth of understanding, or substituting virtual simulations in place of hands-on experiences, allow Human Resources to dictate STEM hiring practices and hiring teachers who lack a solid STEM foundation.

- 4:15 015.051 N **The Echoes of an Adaptationist Legacy: (Not) Teaching Non-adaptive Evolution**, *Rebecca M Price, University of Washington, Bothell; Kathryn E Perez, University of Texas Pan American*
A paradigm shift away from viewing evolution primarily in terms of adaptation—the "adaptationist programme" of Gould and Lewontin—began in evolutionary research thirty-five years ago, but that shift has yet to occur within evolutionary education research or within teaching standards. Testing with three instruments that assess how biology undergraduates understand three non-adaptive evolutionary processes: genetic drift, dominance relationships among allelic pairs, and evolutionary development (evo-devo) reveals that students often explain non-adaptive phenomena incorrectly by invoking misconceptions about natural selection. We propose that increasing the emphasis on teaching non-adaptive evolution could result in a better understanding of natural selection, a better understanding of non-adaptive processes, and a better overall understanding of evolution.

016. Systematics and Evolutionary Biology Oral

Session II

3:00 to 4:30 pm

Bonilla Science Hall, BSH 129

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Oral Session

II

Participants:

- 3:00 016.052 G **A comprehensive revision of the New World genus *Metaparia* (Coleoptera:Chrysomelidae)**, *Clayton Sublett, Sam Houston State University; Jerry L. Cook, Sam Houston State University*
The genus *Metaparia* Crotch, 1873 (Coleoptera:Chrysomelidae:Eumolpinae) is a small New World group extending from the southwestern United States to Costa Rica. With the exception of two broad revisions of Eumolpinae in Central America (Flowers 1996) and North America north of Mexico (Schultz 1970), the taxonomy of this group has largely been ignored. This study revises the genus using morphological characters, and is the first to include characters from females. Two new species will be described, *M. prosopis* and *M. mandibuloflexa*, and three new combinations will be made: *M. fulvicornis* and *M. thoracica* will be moved to *Spintherophyta* and *M. distincta* will be moved to *Brachypnoea*.
- 3:15 016.053 U **A tale of two species: comparative phylogeography and genetic diversity of *Pomacea canaliculata* and a putative cryptic congeneric in the Rio de la Plata Basin**, *Lourdes Sofia Campos, Southwestern University; Cristhian Clavijo, 2del Museo de Historia Natural, Montevideo, Uruguay; Fabrizio Scarabino, Museo Nacional de Historia Natural; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA*
The Wallacean shortfall refers to the fact that the biogeography of most known taxa remains unresolved, especially for invertebrates. Phylogenetic studies give insights to interspecific genetic diversity and may reveal cryptic species, whereas phylogeography studies can provide a clearer understanding of how and why intraspecific diversity is distributed across the geographic landscape. High diversity and abundance combined with presumed wide distributions make *Pomacea* species good candidates for the study of comparative phylogeography. To examine population structure of *Pomacea canaliculata* and a newly discovered congeneric (Hayes unpublished), we collected individuals from 23 sites across their native range within Uruguay. We sequenced COI from 56 of these samples and conducted phylogenetic analyses with previous published data to identify species. Haplotype networks were constructed for both species to examine the distribution of intraspecific genetic diversity and population structure. Preliminary results indicate that historical marine incursions in the Rio de la Plata

region may have played a role in shaping the population structure and distribution of both these species. These data also indicate that *Pomacea canaliculata* exhibits higher intraspecific genetic diversity than *Pomacea* sp., but further analyses are needed to verify this pattern. Although substantial analyses remain to be completed, we hypothesize that *P. canaliculata* and *P. sp.* established their current ranges in Uruguay following marine incursions from their southern and northern refugial populations, respectively. Continued analyses and additional sequence data should provide more detailed support for these patterns and reveal insights into the evolution and biogeography of these two abundant species.

- 3:30 016.054 G **Determining morphometric and genetic variation among relationships of eight breeds of Ethiopian camels (*Camelus dromedarius*)**, Christopher Dale Dunn, Texas Tech University; Yoseph Legesse, Jijiga University; Robert D Bradley, Texas Tech University
Ethiopian camels (*Camelus dromedarius*) historically have been a domesticated and closely guarded economic staple to indigenous peoples located throughout the country's territorial states. Eight breeds were selected and seventeen morphometric variables were utilized to determine intra-species variation within the groups. In addition, DNA sequences from the mitochondrial cytochrome-b locus and seven nuclear microsatellite loci will be used to examine the relationship of the various aforementioned breeds, which will detect possible genetic variation among the selected individuals. Exomorphic variation has been detected in several of the breeds using principle component analysis and linear discriminant function analysis. The data for 524 individuals were analyzed and indicated three distinct groups in the *C. dromedarius* from Ethiopia.

- 3:45 016.055 G **Does evidence exist for the exclusion of *Isthmomys* from *Peromyscus*?**, Megan Keith, Texas Tech University; Robert D Bradley, Texas Tech University; Roy N. Platt II, Texas Tech University
Several studies have attempted to resolve phylogenetic relationships among *Peromyscus* and closely affiliated genera, yet despite the wealth of knowledge available for this group of rodents many of these issues remain unresolved. The major phylogenetic conflict within this group concerns the treatment of closely related genera including *Peromyscus*, *Habromys*, *Isthmomys*, *Megadontomys*, *Neotomodon*, *Osgoodomys*, and *Podomys*. This study focuses on the taxonomic status of *Isthmomys*. Several studies have recovered a sister relationship between *Isthmomys* and *Reithrodontomys* and these genera were basal

to *Peromyscus*; however, none of these studies indicated statistical support for this relationship. If *Isthmomys* is more closely related to *Reithrodontomys*, then the definition of *Peromyscus* should be re-evaluated. To determine if *Isthmomys* should be recognized as a genus independent of *Peromyscus*, the mitochondrial cytochrome-b gene was examined phylogenetically for all species of peromyscine rodents available on GenBank (n = 1063). In order to examine a dataset of this size, two datasets of one thousand maximum likelihood trees were generated. The first dataset had no topological constraints, whereas the second dataset constrained all trees so that *Isthmomys* was included in *Peromyscus*. For each dataset, the distribution of likelihood scores was examined to assess the confidence of the two phylogenies.

- 4:00 016.056 U **Fighting with swords: genital combat as an alternative explanation for same sex mating in a coercive livebearer (*Gambusia affinis*)?**, Julian Alejandro Rios, St. Edward's University

The two major components of sexual selection, intra- and intersexual competition, have been characterized as selecting for two different types of male traits that increase reproductive success: weapons (also called armaments; e.g. genital structures) via male-male competition, and ornaments (e.g. elaborate plumage) via female mate choice. Sexual selection theory, however, does not explain the seemingly counter-adaptive nature of homosexual behavior, which is widespread throughout the animal kingdom (thus far documented in birds, mammals, reptiles, amphibians, and fishes). Homosexual behaviors often result in males using genitalia to seemingly "mate" with other individuals. However, in some cases, this behavior might be mistaken for genital combat. Livebearing fishes provide an excellent system in which to test these alternative hypotheses because of the fact that the male western mosquitofish (*Gambusia affini*) and guppies (*Poecilia reticulata*) have been shown to display same sex mating behaviors when in male-biased populations and in the absence of female conspecifics. An alternative explanation, and perhaps more plausible in some systems, is that such behaviors may be combative, whereby males use armaments (often in the form of genital structures) as weapons during aggressive or competitive encounters. Male livebearing fishes use a modified anal fin (gonopodium) to transfer sperm, compete with other males for mates, and also exhibit same sex mating. Therefore, they provide an excellent model system to tease apart these two potential mechanisms of male genital contact (same sex mating vs. combat). If males are engaging in genital combat, we expect

gonopodial scarring caused by genital contact. Whereas if males are engaging in same sex mating, we expect to see elevated levels of sperm expenditure. However, few studies have investigated same sex mating and/or the potential for alternative explanations (e.g. genital combat). These findings will have broad implications for mechanisms explaining rare behaviors in nature and should be applicable to other vertebrates, providing a more comprehensive understanding of sexual selection theory and the implications for male behaviors resulting from increased competition and aggression.

4:15 **016.057 G Insights to the evolution of the pineal eye from phylogenetics and the fossil record**, *William B Gelnow, University of Texas at Austin*

In tetrapods that have a pineal eye, it is the primary organ that provides information about light intensity to the pineal organ in the brain. The pineal organ then uses that information to entrain daily physiological and behavioral cycles to the actual day-night cycle. Evolutionary loss of the pineal eye represents a major shift in how the brain uses information from the environment. It is also one of the few such transitions that has happened enough times that we can make statistically testable associations between it and other aspects of the animal's biology. Although lots of work has been done looking at the structure of pineal eye and its taxonomic distribution, it has not previously been examined in a phylogenetic context, except as one of many characters used for cladistic analyses. I surveyed the literature and found that not only do many lineages independently lose the parietal eye in their evolution, but some also apparently regain the structure. The pineal eye was ancestrally present among early tetrapods, but was independently lost five times among amphibians and regained once, lost twice and regained twice among cynodonts, lost once in testudines, and lost and regained at least four times each in squamates. I found that there is a significant relationship between loss of the pineal eye and either fossorial or nocturnal lifestyles, as well as the formation of a bony lateral wall to the braincase. This new examination provides insights onto how ecology and morphology become integrated via sensory system evolution and how paleontology can be integrated with neuroscience.

017. Terrestrial Ecology and Management Oral Session II

3:00 to 4:30 pm

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session II

Participants:

3:00 **017.058 G Effects of shrub encroachment and shrub removal methods on South Texas coastal prairies**, *Parker Watson, University of Texas at Brownsville; Dr. Heather Alexander, University of Texas Brownsville; Jonathan Moczygemba, United States Fish and Wildlife Service*

Mesquite (*Prosopis glandulosa*) and huisache (*Acacia farnesiana*) are aggressively encroaching onto South Texas coastal prairies, causing a potentially irrevocable regime shift with implications for ecosystem function. The first purpose of this study is to determine if increased shrub cover changes understory composition and microclimate. Shrub canopy cover and understory composition were quantified in three 40-m x 40-m control plots with varying levels of shrub cover. Shrub cover effects on understory microclimate were monitored in high, medium and low shrub cover patches by installing dataloggers to instantaneously record understory soil temperature, air temperature, and light. Data are expected to show increased shrub cover leads to decreased ground cover, and shrub understory microclimates differ from grass cover microclimates, suggesting a shift from the natural state with implications for grass colonization and growth. The second part of this study assessed the relationship between shrub removal methods (mechanical, prescribed fire, and herbicide), shrub cover prior to removal, and prairie regrowth in four experimental treatment areas that utilized different shrub removal methods. Small, medium, and large bare patches – indicating shrub cover prior to removal – were identified in three blocks within each treatment. Vegetation and soil conditions were monitored in each patch every four months beginning in May 2014. Preliminary data indicates patches treated with a combination of all three removal methods show the least amount of shrub regeneration, and small patches with all three treatments show the greatest increase of prairie grass abundance, suggesting thorough shrub removal during early stages of encroachment expedites prairie rehabilitation.

3:15 **017.059 G Forest restoration and its effect on birds in the Lower Rio Grande Valley**, *John S Brush, University of Texas-Pan American; Timothy Brush, University of Texas-Pan American; Teresa P. Feria, The University of Texas- Pan American*

The riparian corridor and surrounding forests of the Rio Grande provide valuable habitat for a broad range of tropical, subtropical, and temperate-zone bird species. Extensive habitat loss has left small remnant fragments and has led to population declines and local extirpation of some bird species. The goal of this study was to evaluate the success of forest restoration (revegetation) efforts carried out by US Fish and Wildlife Service

and other agencies over the past 30-35 years. Data from 92 point-count locations showed that many common breeding species like Olive Sparrow and Brown-crested Flycatcher did not make a strong distinction between mature and revegetated habitat, indicating successful habitat restoration. Other species, like White-winged Dove and Long-billed Thrasher, were strongly associated with mature thorn-forest habitat and made lower use of revegetated habitat. Some species of concern like Northern Beardless-Tyrannulet and Gray Hawk used both revegetated and mature habitats in small numbers. Even small, isolated tracts of thorn-forest in urban areas attracted forest birds like Black-crested Titmouse and Golden-fronted Woodpecker. We suggest that future revegetation focus on thorn-forest species such as Texas ebony and coma, which should be tolerant of drought and flooding, now and in the future.

- 3:30 017.060 G **Impact of Climate Change on the Breeding Ranges of Some Tropical and Subtropical Bird Species**, *Mayra Oyervides, University of Texas-Pan American; Timothy Brush, University of Texas-Pan American; Teresa P. Feria, The University of Texas- Pan American*
Given the existence of a long-term warming climatic trend and its likely continuation, we examined the changes expected in the breeding ranges of selected bird species of tropical and subtropical areas. Occurrence data was obtained from the online databases GBIF and REMIB. A set of 19 climatic variables from WorldClim with a spatial resolution of 1x1 km for the present were used. Four different GCM (CGCM, CSIRO, HadCM3, NIES99) and 2 climate scenarios (A2A/B2A) were used for developing future projections for each species. Maxent was used to predict the species distribution based on the corresponding environmental covariates and distributional data. Ten replicates of each species model were carried out. Response curves, jackknife analysis, and the cross-validation option within the program were used. Models were generated using the average of the 10 replicates for each species. Model performance was evaluated using the area under the curve (AUC) on a receiver operating characteristic (ROC). Results of the training and test AUC values for all of the models were greater than >0.9 indicating highly accurate prediction outputs. Climate change will likely affect Lower Rio Grande Valley (LRGV) breeding bird communities. Many species have the potential to expand northward as temperatures increase. Further work is recommended to analyze the anthropogenic impact (e.g., land cover/land use) on the potential future suitable habitat for the focal species in order to plant strategies to mitigate the impacts of climate change on their populations.

- 3:45 017.061 G **Intergroup variation in estrogenic plant consumption for the black-and-white colobus monkey of Kibale National Park, Uganda**, *Kathryn Michelle Benavidez, Texas State University*

Alterations in diet have occurred throughout the evolutionary history of primates, including the *Homo* lineage. Currently, a distinct change in the modern human diet is occurring with an increase of soy consumption in many parts of the world. However, the physiological and behavioral implications of this change are unclear. Soy possesses phytoestrogens, which are estrogen mimics that are known to have effects on reproductive physiology and behavior in vertebrates, but effects on wild primates are not well understood. We observed the behavioral activities of eight black-and-white colobus monkey troops (*Colobus guereza*) living in Kibale National Park, Uganda, for one year, with a focus on dietary strategies. We analyzed staple plant foods of the monkeys to determine estrogenic activity using transient transfection assays and examined intergroup variation in the consumption of estrogenic plants across the eight groups. The percent of diet coming from these estrogenic plant items varied from 1.24 to 5.85. To test for behavioral effects of phytoestrogen consumption, we examined the relationship between percent of diet from estrogenic plants and percent of time spent grooming and self-grooming with no significant trends detected. As effects of estrogenic plant consumption occur at the individual level, future research will examine changes in hormone levels before and after consumption of the identified estrogenic plant items. By further examining variation in phytoestrogen consumption both within and across primate species, we hope to clarify the role of these estrogenic compounds in the evolutionary history of modern humans.

- 4:00 017.062 G **Neighborhood structure of the Comanche harvester ant, *Pogonomyrmex comanche*: what role does aggression play?**, *Ann B. Mayo, University of Texas-Arlington*

It is thought that ant populations are organized by aggression based on the chemical discernment of nestmates with aggression shown to non-nestmates. Some members of the ant genus *Pogonomyrmex* (Hymenoptera: Formicidae) have been shown to use aggression to defend foraging territories and nest sites resulting in a colony spatial distribution pattern that is more regular than expected. I investigated nestmate discrimination and aggression as driving factors in the organization of populations of the Comanche harvester ant, *Pogonomyrmex comanche*. I found support for a neighborhood structure weakly based on aggression. The results raise important

questions relating chemical discernment and communication to many ant behaviors, including foraging strategies, nestmate discrimination, and the organization of populations and communities of ants.

- 4:15 017.063 N **Preliminary assessment of predator-prey dynamics in an urban ecosystem**, *Troy A Ladine, East Texas Baptist University*
Five locations within a 60-trap mark-recapture grid were established with trail cameras. The objective of the trail cameras was to establish a baseline of the medium-sized mammals within the area, especially potential predators of the white-footed mouse (*Peromyscus leucopus*). A total of 14 medium-sized mammals and one large mammal (white-tailed deer; *Odocoileus virginianus*) were photographed (385 total camera days) in an urban ecosystem with an established beaver (*Castor canadensis*) pond. Raccoons (*Procyon lotor*) and beaver were the greatest number of individuals (24.7% and 23.1% of total photographs, respectively). There were nine potential predators of the white-footed mouse in the trapping grid. There were five potential prey species photographed. Estimated species richness (jackknife method of Heltshe and Forrester, 1983) of medium-sized and large mammals was $19.8 + 2.9$ species (95% C.I. = 11.6 - 28.0). Evenness of the community was 0.345 (both Simpson's Diversity and Smith and Wilson Measure). During the activity of the trail cameras, there were no captures of white-footed mice matching a pattern of captures of small mammals occurring during 10 of the previous 12 years. There were four captures of two black rats (*Rattus rattus*), one rice rat (*Oryzomys palustris*), and one southern short-tailed shrew (*Blarina carolinensis*) indicating an unbalanced ecosystem or one in which the urban-based food components have a greater impact than the non-urban components.

018. Poster Session I

4:30 to 6:00 pm

Wellness Center, Room 101

Anthropology

Anthropology Poster Session

Participants:

- 018.064 N **Estimation and multivariate comparison of the adult cranial morphology of *Australopithecus sediba***, *Keely Carlson, Texas A&M University; Darryl de Ruiter, Department of Anthropology, Texas A&M University; Kieran McNulty, University of Minnesota; Thomas J. DeWitt, Department of Wildlife and Fisheries Sciences, Texas A&M University; Lee Berger, University of the Witwatersrand*
One of the primary criticisms regarding phylogenetic interpretations of *Australopithecus sediba* concerns the late juvenile status of the type

specimen, MH1. Several commentators have argued that future developmental change between MH1's current stage of growth (second molars erupted and in occlusion) and full adulthood might be substantial enough to alter our current understanding of its morphological affinities with other hominin species. The present study uses geometric morphometric tools to empirically address this critique through developmental simulation. Landmark-based developmental vectors derived from extant apes and humans were separated by sex and applied to a synchrotron scan of the MH1 cranium to produce virtual renderings of the simulated adult cranial morphology. These simulated adult crania were then placed in a broader comparative context, along with the original juvenile cranium, using multivariate tests aimed at assessing their morphological similarities with other non-robust hominin species. The developmental changes simulated to occur appear to be strongly related to the development of secondary sexual characteristics and are dependent upon the relative degree of sexual dimorphism inherent in the extant species vector applied. Moreover, results indicated that all simulated adult *Au. sediba* crania remained more similar to one another than to any other hominin species included in the analysis. After reviewing the results of the present study, it is reasonable to conclude that the late juvenile status of this fossil is unlikely to influence our understanding of the craniofacial morphology of *Au. sediba*.

Botany

Botany Poster Session

Participants:

- 018.065 U **A study of amino acid substitution in the large subunit of ribulose biphosphate carboxylase: Implications for DNA sequence evolution and phylogenetic analysis.**, *Sucharitha Marneni, Lamar University; Randall Gene Terry, Lamar University*
Phylogenetic analysis generally assumes character state changes are independent, e. g., changes in any particular character are statistically unrelated to changes in other characters. Violations of this assumption are widely appreciated and have provided the impetus for the development of models of nucleotide state change in DNA sequence data. However, comparatively little attention has been given to amino acid substitutions in protein coding sequences and the implications that selective pressures at the protein level may have for DNA sequence evolution. In this study, we examine patterns of amino acid substitution in the large subunit of ribulose biphosphate carboxylase (RbcL), the enzyme that performs carbon fixation in photosynthesis. Several features make RbcL an ideal candidate for a comparative study of protein evolution,

including the availability of rbcL sequences from a wide variety of green plants, and the essentially complete functional and structural characterization of the enzyme subunits and holoenzyme. In this study, amino acid substitutions are evaluated in a phylogenetic context and mapped to structural and functional elements in RbcL. Implications for molecular evolution and phylogenetic analysis are explored.

018.066 U **Analysis of fungal and bacterial root microbiomes of *Carex planostachys* (Cyperaceae)**, Joe Dylan Sosa, St. Edward's University; Charles Hauser, St. Edward's University

This research was conducted to gain a preliminary understanding of the microbial communities associated with plant roots (microbiome) and the mechanisms that govern selection and activity of these communities. The root microbiome is poorly characterized in most systems and the roles of plant genetics, soil characteristics, and other factors are currently being explored for their roles in establishing and maintaining root microbiome communities. *Carex planostachys*, a member of the Cyperaceae family, is a small grass that thrives in rich, loose soil created by ash juniper leaf fall. It was chosen as the experimental system because of its ease of collection and because it was endemic to almost all of the distinct plant communities identified in the Wild Basin Creative Research Center (St. Edward's University, Austin, TX). Our working hypothesis is that subsets of the microbial populations present in bulk soil do not directly associate with plants and will be selected for within the environmental settings of different fractions of the rhizosphere (neighboring soil, rhizosphere, endosphere). Data were collected through a multi-step processing pipeline that began in the field, moved to the fractionation of collected samples, fungal and bacterial DNA isolation, and will conclude with high throughput sequencing of rDNA (454, Illumina). Preliminary PCR results confirm bacteria to be present in all fractions sampled of the root microbiome, whereas fungi have only been found in the endosphere thus far. The data collected will provide information that could be potentially used to develop strategies to improve crop production methods and ultimately create methods tailored specifically for each crop's microbial community.

Cell and Molecular Biology

Cell and Molecular Biology Poster Session

Participants:

018.067 U **Analysis of Bacterial and Fungal Root Microbiomes of *Muhlenbergia reverchonii* at Wild Basin**, Margaret Ann Walsh, St. Edwards University

Fungi and bacteria are directly associated with plant roots and their neighboring soil, and play a

major role in plant health, pathogen resistance, and nutrient acquisition. Samples of soil and plant tissue were collected from *Muhlenbergia reverchonii* at two distinct sites of the Wild Basin Creative Research Center in Austin, Texas. The soil was then fractionated into bulk soil, neighboring soil, rhizosphere, and endosphere. Total genomic DNA was isolated from these fractions allowing for selective amplification of the V3 and V4 variable regions of the 16s bacterial ribosomal RNA and the analogous 18s fungal rRNA. After sending off the samples for data analysis we will interpret the DNA read in Qiime and determine significance between the sites, samples, and fractions. This work demonstrates the ability of primer sets to amplify fungal and bacterial rRNA from the four fractions (bulk, neighboring, rhizosphere, and endosphere) allowing for validation of DNA within the samples. After using the data analysis software this research will provide unique tools to examine this vast and mostly undescribed community of organisms.

018.068 U **Characterization of Eip63E and its role in *Drosophila* axonal transport**, Diana Aguirre, Schreiner University; Brooke Bailey, Schreiner University; Emma McCormick, Schreiner University; Susan Klinedinst, Schreiner University

A critical element of the neuronal cytoskeleton is the network of microtubules that supports motility, provides structural support, and serves as a network of "highways" for the organized movement of molecules within the neuron. The microtubule cytoskeleton is not only critical for the normal functioning of the nervous system, dysfunction of the microtubule cytoskeleton appears to make significant contributions to neurological diseases including amyotrophic lateral sclerosis (ALS), Alzheimer Disease and Huntington Disease. The central focus of this project is to characterize the potential role that Eip63E plays in *Drosophila* axonal transport. Eip63E was previously identified in a large-scale genetic screen looking for molecules that interact with Dynactin, a large protein complex associated with the molecular motor dynein. The Eip63E kinase is homologous to mammalian cyclin-dependent kinases (Cdks) known as PFTAIREs. Cdks traditionally function in regulating cell cycle progression, however, some are involved in neuronal processes such as axon guidance, synaptic transmission, and membrane transport. *Drosophila* larvae with mutations in genes encoding axonal transport proteins show an increase in the number of synaptic vesicle protein accumulations throughout the segmental nerves. In order to test whether Eip63E is involved in axonal transport, we knocked-down Eip63E

specifically in neurons using RNAi, dissected third instar larvae, and then stained for synaptic vesicle proteins. We observed that neuronal knock-down of Eip63E results in an increase in synaptic vesicle protein accumulations along the segmental nerves, suggesting that Eip63E functions in axonal transport.

018.069 U Convergent Extension Epistasis of B56 α and B56 γ Isoforms in *Xenopus laevis*., Cody Austin Brannan, Sam Houston State University; Joni Seeling, Sam Houston State University

The Wnt pathway, a key regulator of tumor and cell structure formation during embryo development in vertebrate organisms, divides into two branches, the canonical (beta-catenin) and non-canonical (planar cell polarity) pathway. The Wnt/PCP (planar cell polarity) pathway involves cell structure formation (convergent extension), later forming the body axis. Protein phosphatase 2A (PP2A), which consists of regulatory-B, structural-A, and catalytic-C subunits, plays varying roles in Wnt signaling through the regulatory subunits, more specifically B56. B56 isoforms, specifically B56 α and B56 γ , negatively regulate the Wnt beta-catenin pathway by reducing beta-catenin abundance. Whole embryo data exists suggesting that B56 α and B56 γ regulate non-canonical Wnt signaling, as reducing B56 α or B56 γ expression results in embryos with short body axes. Examining when these isoforms play a role in convergent extension via epistasis experiments will aid in the understanding of their roles in Wnt non-canonical signaling. In these epistasis experiments, mutated versions of Wnt signaling proteins will be used to induce defects in animal cap explants. Extent of animal cap elongation will be compared between explants from embryos injected with mutated Wnt/PCP pathway components and either B56 α , B56 γ , or control RNA. We expect that B56 α and B56 γ will act downstream of the mutants that they rescue, but upstream of the mutants they do not rescue. In this way, the point of action of B56 α and B56 γ in the Wnt pathway can be determined. Knowledge of the point of action of B56 α and B56 γ in Wnt/PCP signaling will aid in the future design of potential cancer therapeutics.

018.070 U Defining Cancer to Defy Cancer: PA28 γ 's effect on cancer formation in MEF cells. Lance Barton, Austin College; Rose Massey, Austin College; Archit Vasan, Austin College

PA28 γ is a proteasome activator that determines the degradation of specific proteins in the cell by the ubiquitin-proteasome system. PA28 γ expression has been correlated with the stability of several key cell cycle regulators in normal cells and PA28 γ expression is increased in several

forms of cancer. To further investigate the role of PA28 γ in cancers PA28 γ ^{+/+} and -/- cell lines were mutated with MNNG and tested for properties associated with cancer. The cell line this poster examines is WT clone 2 cells, which descended from PA28 γ ^{+/+} cells. Clone PA28 γ ^{+/+} 2 cancer cells were tested for aneuploidy, mutations in key oncogenes and tumor suppressors, and for migration as an indicator of metastatic potential. Clone PA28 γ ^{+/+} 2 cancer was also treated with four chemotherapeutics: butyrate (HDAC inhibitor), vinblastine (microtubule disruptor), bortezomib (proteasome inhibitor), and PX866 (PI3K inhibitor), for 3 hours to test for sensitivity to current cancer therapies. Clone 2 cancer was found to exhibit increased aneuploidy compared to WT PA28 γ ^{+/+} cells. The clone 2 cells did not exhibit more migration than controls. The PX866 showed the highest effect on the transformed cells, decreasing viability and increasing apoptosis.

018.071 G Effect of Platinum Group Element-exposure on a gut microbiome model system *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli*, and HT29 cells. Allen Ladd White, Texas Southern University; Mariam Konate, Texas Southern University; Jason A. Rosenzweig, Texas Southern University

The presence of Platinum Group Elements (PGEs) play a role in almost everyone's day-to-day lives. PGEs are emitted from vehicles on account of their catalytic converters. What is relatively unknown is whether PGEs might affect bacterial growth. We were curious as to whether PGE could impact the gut resident flora following ingestion of house dust possibly containing PGE. To model such a scenario, we exposed *Pseudomonas aeruginosa* (a Gram-negative opportunistic pathogen), *Enterococcus faecalis* (a Gram-positive opportunistic pathogen), and *Escherichia coli* (a Gram-negative normal flora resident) to house dust (Sigma) (containing PGEs) during a co-culture with HT29 cells. HT29 cells are an epithelial human colorectal adenocarcinoma cell line sometimes used in absorption, secretion, and transport assays of gut cells. Following a 6-hour co-culture, HT29 cells were lysed with water, and viable bacteria were quantified to determine the effect of PGE on overall growth. Results suggest that there is nearly double the growth in *Enterococcus faecalis*. *Escherichia coli* similarly shows increased growth in the presence of house dust. *Pseudomonas aeruginosa* seems to not be affected significantly by the addition of house dust. Future studies will include additional replicates as well as the characterization of mixed bacterial cultures co-cultured with HT29 cells following PGE exposure, thereby better modeling the gut microbiome environment.

018.072 U Effects of Indole-3-Butyric Acid on

Arabidopsis thaliana, Kevin Chappell, University of Mary Hardin-Baylor; Andrew W. Woodward, Univ. Mary Hardin-Baylor

I am investigating a plant hormone called Indole-3-Butyric Acid (IBA), which is a form of auxin found in many plants. Generally, auxins are plant hormones that regulate most aspects of growth, including phototropism, gravitropism, root structure, and vascular development. With auxin regulating so many developmental processes, it is important that we understand more about how the various forms of auxin function. Knowing about auxin and how it interacts and works with other hormones and its surrounding we will be able to improve agricultural methods and further increase productivity. I am investigating IBA responses in the model plant *Arabidopsis thaliana*. I am characterizing mutants that do not respond to the IBA hormone; these mutants are characterized by a long hypocotyl that often curves. The goal of doing all of this is to discover what genes are controlling the pathways of IBA metabolism, transport, and signaling. Learning the function of these auxin pathways will help further our knowledge of auxin and how it patterns plants development.

018.073 G Expression of B56 in the Embryonic Gut of *Xenopus laevis*, Douja Chamseddine, Sam Houston State University; Raymond Torrecampo, Sam Houston State University; Joni Seeling, Sam Houston State University

Wnt signaling is a key regulator in embryonic development as well as tumorigenesis. This pathway is so diverse that it diverges into three different branches of Wnt signaling: the canonical Wnt pathway, the planar cell polarity pathway, and the Wnt/Ca²⁺ pathway. Our pathway of interest is the canonical Wnt pathway, due to its critical role in the regulation and development of the embryonic gut. Protein phosphatase 2A plays a vital role in regulating Wnt pathway activity through its B56 subunits. PP2A consists of a structural A, catalytic C, and a regulatory B subunit all formulating the complete holoenzyme. B56 encodes for proteins that effectively reduces Wnt-dependent transcription, suggestive of B56 α and B56 γ inhibiting Wnt signaling. Several pathways that have been shown to contribute to pancreatic cancer progression are negatively regulated by the tumor suppressor protein phosphatase 2A (PP2A). Why mentioning pancreatic cancer, rather than colon? PP2A causes activation of oncogenic kinases together with inhibition of tumor suppressors, as both are often required for development of cancer.

Comprehending B56 in gut development will lead to a better understanding of how B56 acts as a tumor suppressor and monitoring expression levels of the proteins that make up the destruction

complex, we may be able to identify the abnormally behaving protein.

018.074 U Finding genes that alter Dynactin-related motor disease using a *Drosophila* model, Soledad Diaz, Schreiner University; Ulises Zoe Jasso, Schreiner University; Susan Klinedinst, Schreiner University

Dynactin is a multi-subunit regulator of the minus-end directed microtubule motor dynein, and regulates intracellular transport from fungi to humans. While important in most cells, dynactin function in the nervous system is of particular medical significance. Mutations in the Glued subunit of dynactin are associated with multiple neurodegenerative diseases including distal spinal and bulbar muscular atrophy, Perry syndrome (a type of Parkinsonism), and familial and sporadic amyotrophic lateral sclerosis (ALS). Highly effective treatments of these diseases are not available, and dynactin's diverse and ubiquitous cellular functions make it a potentially complex target for drug development. The goal of this study is to identify genes that functionally interact with dynactin to modulate nervous system functions, focusing on fly motor neurons. As a first step, a large-scale genetic screen for dynactin-interacting mutations was performed which yielded several candidates that genetically interacted with Glued in the eye. We are most interested in the 13 mutations that improved the Glued eye morphology and are testing whether these mutations can also suppress axonal transport defects in a transport mutant background. Axonal transport is fundamental to neuronal function, therefore the restoration of impaired axonal transport could provide molecular targets for the development of therapies used to treat neurological disease.

018.075 U G1P3 Alters Redox Signaling and Induces Mitochondrial Fusion to Evade Apoptosis in Breast Cancer Cells, Kailee Johnson, Texas A&M University-Commerce; Ashjan Khaleel, Texas A&M University-Commerce; Venu Cheriyaath, Texas A&M University-Commerce

Despite antiestrogen therapy advances, 50% of estrogen receptor positive (ER+) breast cancer (BC) patients relapse from therapeutic resistance. Mechanisms for resistance are multifactorial, however apoptosis evasion is consistent. Antiapoptotic processes generating resistant BC are unclear. Therefore, this proposal aims to elucidate antiapoptotic mechanisms of G1P3, a novel survival protein targeted by estrogen and cytokine signaling. G1P3 is overexpressed in early and advanced BC, and significantly correlated with poor survival in ER+ BC patients. Furthermore, G1P3 contributed to antiestrogen therapy tamoxifen resistance in ER+BC cells.

G1P3 is localized on the inner mitochondrial membrane. Consistent with its location, we hypothesized that G1P3 produces antiapoptotic effects through redox signaling changes. This was tested by comparing total mitochondrial reactive oxygen species (mtROS) levels of MCF-7 BC cells overexpressing G1P3 and vector cells using the redox probe Mitotracker Red (CM-H2XRos). To quantify superoxide anion levels, MitoSOX red was used. Furthermore, mitochondrial membrane potential ($\Delta\psi$) was quantified with TMRM. Results showed G1P3 significantly increased total mtROS levels relative to vector (1.6x, 2.8x, 3.3x at 24, 48, and 72 hours, respectively). However, G1P3 overexpressing cells showed significantly lower superoxide anion levels (~2x and ~5x at 24 and 48 hours, respectively). $\Delta\psi$ conservation was also observed under cellular stress (22.5% and 31.4% for G1P3 and vector, respectively). Furthermore, under apoptosis inducing conditions, G1P3 induced mitochondrial fusion with significant increase in mtROS. Together, results suggest G1P3 alters redox signaling, inducing mitochondrial fusion to promote cell survival. Rebalancing redox signaling by blocking G1P3 may restore apoptotic mechanisms and therapy sensitivity.

018.076 U Genetic background affects the expressivity of EGFR pathway mutations in *Drosophila melanogaster*, Amanda Guilmette, student

The concept of the “genetic background” in which genes function has become increasingly more important. The background in which an allele is expressed can result in phenotypic variation in both humans and animals. This phenotypic variation can complicate disease diagnosis and the analysis of complex diseases. Previous research in our lab has shown that ‘background’ genetic variation in *Drosophila melanogaster* can influence the expression of certain mutations, with one background showing a ‘protective’ (lessening the effects of the mutation) effect and another background exacerbating the effect of the mutation. Here we focus on the Epidermal Growth Factor Receptor (EGFR) pathway, which in *Drosophila melanogaster* is important in eggshell patterning during oogenesis, as well as wing and eye development; in humans, mutations in the pathway are found in lung and breast cancers. Using flies from two different genetic backgrounds Oregon (Ore) and Samarkand (Sam), and four EGFR pathway mutations (*EGFR*, *spitz*, *blistered*, *Star*) we will use quantitative PCR to investigate the effects of the different backgrounds and mutations on the expression of the target gene *Broad*. Based on previously collected phenotypic data, we expect a decrease in *Broad* mRNA expression in the ovaries of

females harboring the *spitz* mutation in the Sam background. This research may contribute to our understanding of this pathway, and complex diseases that arise due to mutations in this pathway, in humans.

018.077 G MIF inhibition as novel treatment for autoimmune myocarditis and dilated cardiomyopathy, Julian Phillip Casabar, University of Texas at San Antonio Department of Biology; Saisha Nalawade, University of Texas at San Antonio; Daniel Maldonado, University of Texas at San Antonio; Yoni Adler, University of Texas at San Antonio; Thomas Forsthuber, University of Texas at San Antonio

Autoimmune myocarditis is a disease characterized by an autoreactive immune response to cardiac myocytes as a result of exposure to certain cardiotropic pathogens. This disease induces an inflammatory response in the myocardium and a recruitment of inflammatory infiltrates, such as macrophages, to these areas. The late stage of this disease frequently progresses into dilated cardiomyopathy (DCM) when fibrosis occurs in the myocarditis-induced lesions of the tissue, resulting in a weakening of the myocardium and eventually, congenital heart failure. Clinically, glucocorticoids such as dexamethasone (Dex) are used to suppress inflammation but have shown varying levels of efficacy in many patients with some patients even developing a resistance to the treatment. Macrophage migration inhibitory factor (MIF) is the only pro-inflammatory cytokine up-regulated by GCs and it counteracts the immunosuppressive effects of GCs. Using the experimental autoimmune myocarditis (EAM) disease model, we observed that MIF^{-/-} mice treated with Dex demonstrated a lower severity of EAM and lower incidence of DCM. Using qPCR methods, we also observed lower mRNA expression of CCL3 during the onset of EAM in MIF^{-/-} mice treated with Dex compared to EAM-induced WT controls, suggesting MIF’s role in recruiting inflammatory immune cells to the myocardium. We hypothesize that therapeutic antagonism of MIF would suppress its pro-inflammatory effects, enhance GC-mediated immunosuppression, and by extension, enhance the efficacy of GCs in the treatment of autoimmune diseases such as autoimmune myocarditis and its progression to DCM.

018.078 U Optimization of fluorescent immunoblots for the detection of viral proteins, Ravaen State Slay, Stephen F Austin State University; Katelyn D DeFrates, Stephen F Austin State University; Rebecca D Parr, Stephen F Austin State University

To develop a more time and cost effective immunoblot assay, the enhanced chemiluminescence (ECL) assay previously used

in our experiments was redesigned to an ECL plex fluorescent detection system. The ECL plex does not require the processing of x-ray film, and it has been shown to have a wider linear dynamic range of detection than ECL. A human intestinal cell line was infected with rotavirus, and both rotavirus-infected and non-infected cell lysates were prepared and quantified using a protein micro-BCA assay. Two-fold dilutions of the cell lysates were added to nitrocellulose membranes in a slot blot apparatus. The concentration of both the antigen-specific primary antibodies and secondary antibodies were held constant at the dilutions that previously demonstrated a good signal in ECL assays. Two fluorophore-labelled secondary antibodies, Alexa Fluor® 546 & 647 conjugated goat anti-rabbit antibodies, were tested to determine which one showed the best signal to noise ratio using different emission and excitation spectras. The images were collected with the Typhoon 8600 laser scanner (GE Healthcare Life Sciences), and both Alexa fluor-conjugated secondary antibodies displayed high sensitivity and good dynamic ranges. Additionally, the Alexa Fluor® 647 conjugated antibodies consistently exhibited a concentration dependent signals. To further demonstrate the differences in sensitivity between the ECL and ECL plex assays, immunoblots were performed with varying concentrations of Alexa Fluor® 647 conjugated antibodies. Our data indicated that the ECL plex assay was six times more sensitive than the ECL assay.

018.079 G Phylogenetic analysis of the B56 gene family of PP2A regulatory subunits,
Lauren Sommer, Sam Houston State University;
Hyuk Cho, Sam Houston State University;
Madhusudan Choudhary, Sam Houston State University;
Joni Seeling, Sam Houston State University

Protein phosphatase 2A (PP2A) is an abundant serine/threonine phosphatase that functions as a tumor suppressor in numerous cell-cell signaling pathways, including Wnt, myc, and ras. The B56 subunit of PP2A regulates its activity, and is encoded by five genes in humans. B56 proteins share a central core domain, but have divergent N- and C-termini which are thought to provide isoform specificity. We performed phylogenetic analyses to better understand the evolution of the B56 gene family. We found that B56 was present as a single gene in eukaryotes prior to the divergence of fungi, plants, and animals, and that B56 gene duplication prior to the divergence of protostomes and deuterostomes led to the formation of two B56 subfamilies: B56alpha/beta/epsilon(B56-1) and B56delta/gamma(B56-2). B56alpha/beta/epsilon duplicated twice in vertebrates, resulting in

B56alpha, B56beta, and B56epsilon genes, whereas B56delta/gamma duplicated once, resulting in B56delta and B56gamma. These five vertebrate B56 genes were maintained in all vertebrates examined with two exceptions, frogs lost B56delta while birds lost B56beta. In frogs, the function of B56delta may be compensated for by an alternatively spliced transcript, B56delta/gamma encoding a B56delta-like N-terminal region and a B56gamma core. Further studies are necessary to determine if this is a more broadly used mechanism to maintain protein function in multigene families.

018.080 U RNA-Seq Analysis of Phosphate-Stressed *C. reinhardtii* Cells,
Isavannah Reyes, St Edwards

In algal cells, phosphorous (P) is an essential element, as well as a major component of nucleic acids and phospholipids and is present in the biosphere as the oxidized anion, phosphate (Pi). Phosphorous limitation is known to trigger a suite of “starvation responses” in most organisms including P-specific responses and general responses. The P-specific responses promote efficient mobilization and acquisition of P from extracellular and intracellular stores, whereas the general responses coordinate the metabolism of the cell to nutrient availability. Understanding how algal cells respond to phosphate stress in terms of changes in gene expression and metabolic pathway responses could provide insight into other nutrient stress responses as well as stress responses in other organisms. In this project, changes in gene expression in both wild type (wt) cells and Phosphate Starvation Response 1 (psr1) mutant cells grown in the presence or absence of phosphate was analyzed using RNA-Seq to identify the pathways affected by phosphate stress. The Psr1 protein is critical for acclimation of the unicellular green alga, *Chlamydomonas reinhardtii*, to phosphorus starvation. Based on previous work that characterized the transcriptional response of *C. reinhardtii* to sulfur deprivation, and the chemical similarity between phosphorous and sulfur, this project examined if there was cross-utilization of pathways involved in phosphate and sulfur response. The preliminary analyses indicate that sulfur-response genes functioning in mobilization (ARS1, SIR1), and as transporters (SLT1, SULP1) are differentially regulated under phosphate stress in psr1 mutant cells, whereas only one transporter examined (SULP1) is up-regulated in wild type cells.

018.081 U Requirement for the SWR1 complex and Nap1 chaperone after TBP association in *Saccharomyces cerevisiae*,
Julia Taylor, Abilene Christian University;
Tim Kang, Abilene Christian University;
Hillary Eichelberger, Abilene Christian University;
Liangqun Huang, Colorado

State University; Sarah Lee, Abilene Christian University

The regulation of eukaryotic gene expression is a complicated process that involves hundreds of proteins. Control of gene expression first occurs at the transcriptional level. Many key players in transcription are necessary for remodeling chromatin, in vivo template of transcription. Chromatin remodeling affects availability of the promoter region as well as the open reading frame to general transcription factors such as TATA Binding Protein (TBP) and RNA polymerase II (RNAPII). At some genes, TBP and RNAPII associate with promoter DNA long before transcription ensues. The mechanisms controlling these “postrecruitment regulated” genes are largely unknown, even though this method of gene regulation is seen across the evolutionary spectrum. Here, our goal was to assess the role of chromatin remodeling proteins in driving transcription at these postrecruitment regulated genes. To identify a potential function of chromatin remodelers in this process, we utilized a plasmid-based screen that tethers TBP to a reporter gene. The screen was performed in *Saccharomyces cerevisiae*, a eukaryotic organism. The screen revealed that removing the Nap1 histone chaperone and proteins that are part of the SWR1 complex results in poor reporter gene activity. Poor reporter activity occurs despite expression of TBP in these strains. Further, poor reporter activity is not due to inappropriate RNA formation, as the start site did not change when these proteins were missing. This indicates that stimulation of transcription after TBP binds is dependent on the Nap1 protein and SWR1 complex, and this dependence is largely specific within the group of chromatin remodelers tested.

018.082 U The Effects of PP2A Regulatory Subunits on Embryonic Development of *Xenopus laevis*, Grayson Hobart Means, Sam Houston State University

Wnt cell signaling is an important regulator of vertebrate embryonic development. An important component of this pathway is protein phosphatase 2A, which performs different functions within the cell based on the identity of its regulatory, or B subunit. Of particular interest to this study are B56 α and B56 δ . Previous studies have shown these regulatory subunits are important for canonical Wnt signaling, where they control the level of β -catenin degradation. However, there has been little research done on the effect these subunits have on the convergent extension portion of Wnt signaling. Preliminary evidence suggests that B56 α and B56 δ are also important in the convergent extension pathway, but their exact role is unclear. This study attempts to determine the exact role of these B56 regulatory subunits on

PP2A action within the convergent extension portion of the Wnt signaling pathway. This role will be determined by microinjecting B56 α and B56 δ morpholino antisense oligonucleotides, or MOs, which block translation of their respective RNAs. If the regulatory subunits are involved in this convergent extension pathway, then their loss of function will show a phenotypic effect in the development of the embryo. This will benefit our understanding of the cellular signaling involved in convergent extension, as well as our understanding of vertebrate development as a whole.

Chemistry and Biochemistry

Chemistry and Biochemistry Poster Session

Participants:

018.083 U Interactions between RNA and the nanomaterial Hydrotalcite studied using physical and electrophoretic approaches, Nicole Pollok, Texas Lutheran University

Prior studies on the interaction between nanomaterials and oligonucleotides have been done between DNA and the nanomaterial hydrotalcite. Studies investigating the interaction between hydrotalcite and RNA have yet to be performed. The advantageous physical and chemical properties of hydrotalcite show promising potential for gene therapy and drug delivery. Binding assays were performed with increasing concentrations of hydrotalcite and a variety of RNA molecules (ssRNA, dsRNA, RNA Loop, RNA Str8). Preliminary results support the hypothesis that binding of these RNA molecules is dependent on the quantity of charges on the molecules, and not the structure of the molecule.

018.084 U A New Means to Study Polysaccharides Hydrolysis by Voltammetry, Angela Vang, University of Houston-Downtown; Resha Shrestha, University of Houston-Downtown; Mandira Lamichhane, University of Houston-Downtown

A systematic examination of monosaccharide, disaccharide, and polysaccharide sugars using a transition metal nickel(II) hydroxide film was carried out by use of cyclic voltammetry. Cyclic voltammetry analyzes if the reaction will be reversible or irreversible by measuring the flow of current under varying conditions of a working electrode. Disaccharides such as maltose, lactose, and sucrose are formed from condensation of monosaccharides with a glycosidic bond. Polysaccharides are important in the function of plants and invertebrates. In this experiment, we used a nickel(II) hydroxide (Ni(OH)₂) film in order to detect hydrolyzed starch or hydrolyzed cellulose using cyclic voltammeter, and we explored using additional sugars such as fructose, lactose, galactose, and maltose and solutions of NaOH and HCl to verify that it does detect

disaccharides as well as hydrolyzed polysaccharides. Our results conveyed that the Ni(OH)₂ film exhibited a well-defined redox voltammetric peak with the sugars and that, therefore the Ni(OH)₂ based electrode can function as a stable voltammetry sensor for sugars and that the reactions can be reversible electron transfer reactions.

018.085 U **Analysis of VOCs emitted by *Ulmus crassifolia*, *Gladis Bahena*, *St. Edward's University*; *Mary Ann Kopecki-Fjetland*, *St. Edward's University***

Volatile organic compounds (VOC) are of great significance because plants release them to facilitate interactions with the environment including: attracting pollinators and seed dispersers, protecting themselves from pathogens, parasites, and herbivores. Apart from biotic factors influencing the release of VOCs, abiotic factors such as excess light, drought, and high temperature stress can also influence VOC emissions. While there has been some research done in this area, additional research could lead to a greater understanding of what factors allow particular vegetation to survive extended periods of drought. Such research can warrant the modification of other non-drought resistant plants to enhance their survival in areas affected by drought. Our research will be focusing on the impact of drought on VOC emissions, but will be taking into consideration stress caused by increased temperature. Our goal is to analyze VOCs released by drought resistant vegetation, specifically that of *Ulmus crassifolia* known as cedar elm, to identify possible similarities in the VOC patterns. VOCs will be isolated and analyzed using solid phase micro-extraction and gas chromatography coupled with mass spectroscopy. Preliminary results indicate the presence of hexanal and 2-hexanone in the VOC emissions of cedar elm. Data also shows the possibility of sabinene and β caryophyllene being emitted but have not been confirmed. There also seems to be a change in the emissions pattern that correlates with an increase in temperature. Future work includes further analysis of VOCs and a comparison of VOCs to other drought resistant vegetation.

018.086 U **Analysis of crude oil degradation by bacterial co-cultures under halophilic conditions**, *Mary M Bailey*, *Hardin-Simmons University*; *Zachary K Boswell*, *Hardin-Simmons University*; *Jennifer Hennigan*, *Hardin-Simmons University*; *Richard Garner*, *Hardin-Simmons University*

Bioremediation of salt-contaminated wastes produced in hydraulic fracturing can prove difficult because the high salinity often inhibits the growth of the microorganisms. While many

individual species have been identified that degrade crude oil, more research must be done to identify microbial communities that work together at high salt concentrations to degrade the diverse alkanes in crude oil. In this work we analyze the effectiveness of a suite of bacteria (*Pseudomonas aeruginosa*, *Vibrio natriegens*, and *Acinetobacter calcoaceticus*) in degrading crude oil hydrocarbons in slightly to moderately halophilic conditions. Species of both *Vibrio* and *Acinetobacter* genera have been implicated in oil degradation previously, but quantitative studies of oil degradation by these two species in halophilic conditions have not been completed. We analyzed hydrocarbon spectrum of *P. aeruginosa*, *A. calcoaceticus*, *V. natriegens*, and combinations thereof produced after 10-20 days of growth with crude oil in varying salt concentrations. Our preliminary gas chromatography data show the degradative potential of these species and co-cultures.

018.087 U **Design and synthesis of potential acetylcholine esterase inhibitors**, *Lauren Dennis*, *UIW*; *Sebastian Hickmann*, *UIW*; *Tracy Nguyen*, *UIW*; *Julian Davis*, *University of the Incarnate Word*; *Donald Sikazwe*, *UIW Feik School of Pharmacy*; *Frank Wood*, *UIW*

Acetylcholine esterase inhibitors currently have a number of medical applications, including symptomatic treatment of cognitive impairments. We report the preparation of a series of compounds we hope will show promise as acetylcholine esterase inhibitors. Each compound was prepared starting with ethyl nipecotate or ethyl isonipecotate. Following N-benylation with benzyl chloride, each ester was first hydrolyzed under basic conditions and then converted to the acid chloride using thionyl chloride. The acid chloride was then coupled with a variety of amines. Reduction of the resulting amide functional group produces an additional analog.

018.088 U **Effect of trifluoromethyl group on the ground and excited state properties of a new ruthenium(II) polypyridine complex**, *Jasmen Hale*, *University of the Incarnate Word*; *Robert N Garner*, *University of the Incarnate Word*

The complex [Ru(tpy)(bpy)(4-CF₃py)]²⁺, where tpy = 2,2',6',2''-terpyridine, bpy = 2,2'-bipyridine, and 4-CF₃py = 4-trifluoromethylpyridine, was synthesized and the effect the electron withdrawing trifluoromethyl group has on the ground and excited state properties of the complex was investigated and compared to a previously synthesized complex, [Ru(tpy)(bpy)(py)]²⁺, where py = pyridine. A detectable blue shift is observed in the electronic absorption and emission spectra of [Ru(tpy)(bpy)(CF₃py)]²⁺ as compared to [Ru(tpy)(bpy)(py)]²⁺. These data show that the

electron withdrawing trifluoromethyl group located in the para position of the pyridine ring has a slight stabilizing effect on the Ru t_{2g}-type orbitals.

018.089 U Electrochemical study of prussian blue in sensory chemistry, *Charles Korah Punnathara, University Of Houston- Downtown*
The electrochemical study of Prussian Blue (PB) was carried out in its film characterization. This classic molecule has found many applications in dye, medicine, and nuclear chemistry. In this work we report a novel deposition of PB onto cost-effective substrates for sensing application. The PB film formation were found to be successfully fabricated by either chemical spontaneous deposition or electrochemical in situ reduction preparation. The latter displays a controllable nature. Conventional stationary pencil leads were used to host the PB compound, and we found the resultant film promising in sensing application. The optimal operation condition for PB is potassium-containing supporting electrolyte. Biochemical intermediates and environmental waste residues were tested for the sensing screening. Acetaminophen, thiocyanate, thiosulfate, hydrogen peroxide, calcium chloride, were found electrocatalytically oxidized onto the newly made PB detectors. Our study adds new analytical aspect of PB in its traditional application arena.

018.090 U Geared motion: The study and synthesis of molecular motors, *Erik B Gentzel, Austin College; Stephanie Gould, Austin College*
The purpose of this research is to synthesize and characterize molecular rotors, as well as study the mechanical motion of the coordination-complexed rotors. Organic metalloporphyrin caps with coordinated bidentate pyrazine ligands, and 1,4-ethynylbenzene rotors provide an ideal dyad to form surface-mounted porous coordination polymers. These complexes will then be characterized, and used to study geared motion at a nanoscale level. Synthesis of a meso-substituted dipyrromethane is supported by proton NMR. The synthesis of meso-substituted A3B aryl porphyrin was carried out via the Lindsey method. Contained within this paper is evidence of successful porphyrin synthesis, as well as zinc insertion. Future work includes coordination of the ligand, as well as cross-coupling to form the final dyad, and characterization of the rotor with X-ray crystallography, and solid-state NMR.

018.091 U Identification of *Alternaria* fungal strain VOCs isolated from *Atriplex canescens* using SPME and GC-MS, *Ivana Garza, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University*
The Fourwing Saltbush (*Atriplex canescens*) is a plant native to the United States and is currently

the main browsing source for big game. Several species of fungi, such as *Alternaria*, *Cladosporium* and others, have been found to colonize and form a symbiotic relationship with *A. canescens*. It has been previously suggested that volatile organic compounds, VOCs, released by these fungi species may contribute to the animals' plant preference. The overall goal of this research is to isolate and identify VOCs emitted by those fungal species using Solid Phase Micro Extraction (SPME) and Gas Chromatography coupled to Mass Spectroscopy (GC-MS). The fungal strain currently being analyzed is *Alternaria*, for which VOCs are collected within the first fourteen days of growth. Future studies include extending the growing time beyond fourteen days and then collecting potential VOCs emitted.

018.092 U Identifying Volatile Organic Compounds Released by Bacteria on Decomposing Rat Carrion and Their Attractiveness to *Nicrophorus* Burying Beetles, *Lillian Manley, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University; Donald Wharry, St. Edward's University*
The *Nicrophorus carolinus* is a very close relative to the endangered carrion beetle, *Nicrophorus americanus*. Both beetle types use chemical signals to find carcasses so that they might have a stable food source for their offspring and brood ball formation. Research has shown that the period of decay seeming to attract most beetles is between 4 to 7 days. The goal is to identify VOCs produced by bacteria present on the decaying rat that are important in the attraction of the *Nicrophorus* beetles. In hopes that we might isolate the particular volatile organic compounds (VOCs) that attract the beetles to the carcass, we have focused our study on the VOCs released by bacteria that are present on decaying rat carcass over a period of 2 weeks. In order to identify types of bacteria, we isolated DNA over varying time periods for subsequent sequencing. We then conducted VOC analysis of decaying rat carrion by means of solid-phase micro-extraction and gas chromatography coupled with mass spectroscopy. Sample test runs of SPME-GCMS were conducted on decaying rat every 2 days for a period of 20 days. Future analysis of VOCs emitted by individual bacterial strains will be conducted using these same methods. Chromatograms will be compared to those from decaying rat tissue in hopes that we can identify VOCs emitted by bacteria that grow on decomposing carrion and illustrate their importance in the attraction of *Nicrophorus* beetles.

018.093 U PEGylation of Bacterioferritin, A Protein Scaffold for Delivery of Toxic Iron to Cancer Cells, *Christopher Kennedy, University of Texas at San Antonio; Emily Boice, UTSA;*

Donald Kurtz, UTSA

In previous work an iron storage protein scaffold called bacterioferritin (Bfr) was adapted for a novel approach to cancer therapy. Tumor-targeting peptides (TTP) were fused to the 24 subunits of the protein shell, and 12 zinc protoporphyrin IX (ZnPPIX) photosensitizer molecules were inserted into the protein shell. The TTP-ZnPPIX-Bfr was then loaded with ~1,000 ferric irons. After binding to cancer cell receptors, photo-excitation triggered release of ferrous iron to generate a flux of toxic hydroxyl radicals. One problem with using this system for cancer therapy is that the immune system may recognize TTP-ZnPPIX-Bfr as a foreign protein. In order to mask TTP-ZnPPIX-Bfr from the immune system and increase its diameter to aid in circulatory retention time, we conjugated long polyethylene glycol chains (PEG) to cysteine residues substituted on the exterior of the protein shell at residue 81 (E81C). In these experiments, the gene encoding the cysteine-substituted protein, E81C-Bfr, was synthesized and inserted into an *Escherichia coli* expression plasmid. The E81C-Bfr was readily expressed and purified by standard methods. The purified E81C-Bfr was reacted with 5-kilodalton PEG containing a maleimide functional group, which attaches to the cysteine sulfurs on the protein shell. Conjugation of the PEG (PEGylation) to the cysteine residues was assessed using sodium dodecylsulfate-polyacrylamide gel electrophoresis and size exclusion chromatography. These experiments demonstrated quantitative PEGylation (one PEG on each of the 24 subunits). Further experiments are underway to test whether the PEGylation of E81C-Bfr alters its iron loading and photochemical iron delivery properties.

018.094 U **PVOCs as a potential attractant or deterrent to browse preferences of *Odocoileus virginianus***, Lauren Garcia, St. Edward's University; Mary Ann Kopecki-Fjetland, St. Edward's University

Diospyros texana and *Quercus fusiformis*, more commonly known as Texas Persimmon and Texas Live Oak, respectively, are both plants native to the southwestern region of the United States. Texas Live Oak is known to be highly palatable to the species *Odocoileus virginianus* or White-tailed deer while Texas Persimmon is amongst the least preferred of their browse preferences. This research aims to identify phytochemical volatile organic compounds (PVOCs) emitted by the plants as a potential source of attraction or deterrent to the white tailed deer. PVOCs will be isolated and identified using SPME coupled with GC-MS. PVOC profiles will then be compared for potential variations in patterns that may contribute to attraction or deterrence. Currently,

samples from both plants are being analyzed for comparison of VOCs emitted. Potential identified PVOCs include 2,5 dimethylfuran, methyl salicylate, and tricyclene. Future work involves investigation of whether or not plant maturity impacts PVOCs emitted.

018.095 U **Preliminary testing of N-benzyl isonipecotate derivatives as a potential acetylcholine esterase inhibitors**, Tracy Nguyen, UIW; Lauren Dennis, UIW; Steven Garza, UIW; Sebastian Hickmann, UIW; Greiman Tristyn, UIW; Veronica Acosta, UIW; Julian Davis, University of the Incarnate Word; Donald Sikazwe, UIW Feik School of Pharmacy; Frank Wood, UIW

Neurodegenerative disorders such as Alzheimer's disease are characterized by lower levels of acetylcholine in the brain. Acetylcholine esterase inhibitor drugs are used to mitigate cognitive decline by stabilizing acetylcholine levels. In this research, several new structurally similar compounds have been synthesized by the coupling of N-benzyl isonipecotate with a variety of amines. Analysis of the hydrochloride salts of these compounds is being conducted using the regenerating model system *Lumbriculus variegatus*. Acetylcholine esterase inhibition is being evaluated using the Ellman test, which measures the 5-thio-2-nitrobenzoate produced in the secondary reaction between thiocholine and dithiobis-nitrobenzoic acid.

018.096 U **Salt formation of potential acetylcholine esterase inhibitors**, Julian Davis, University of the Incarnate Word; Sebastian Hickmann, UIW; Tracy Nguyen, UIW; Lauren Dennis, UIW; Donald Sikazwe, UIW Feik School of Pharmacy; Frank Wood, UIW

Several compounds (in the free base form) with potential acetylcholine esterase inhibitory effects have been previously synthesized. These compounds were converted into salts in order to make them water-soluble and in an attempt to resolve enantiomers present in a racemic mixture of one of the compounds. Hydrochloride salts were prepared by dissolving the free base in sufficient volume of 0.5 M HCl in anhydrous isopropanol to contain 1.5-2 equivalents of HCl, chilling the solutions to maximize precipitation of the salt, and collecting the salt by pressure filtration under argon. Several of these compounds have more than one amine group that could be protonated. The number of equivalents of hydrochloric acid present in each compound was verified by potentiometric titration with sodium hydroxide. Attempts are currently being made to prepare salts of the chiral compounds with different stereoisomers of tartaric acid and dibenzoyl tartaric acid. Salts (and filtrates) were analyzed by ¹H-NMR and HPLC.

018.097 G Synthesis and Characterization of Biodiesel Mixtures via Clay-Catalyzed Transesterification, *Lauren N. Williams, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University*

With the desire for cleaner and more environmentally friendly fuel sources, biodiesel has gained much attention as an alternative renewable resource to petroleum-based diesel fuels. The production of biodiesel is affected by several factors, one of which is the type of catalyst used. One potential catalyst for the production of fatty acid alkyl esters (FAAE) is a clay-based catalyst. Clay-based catalysts are attractive because of the low cost, high quantity, ease of handling, and potential for recovery and reuse. A variety of FAAEs were synthesized by the esterification of various saturated and unsaturated fatty acids along with methanol or ethanol. A variety of different acid-activated clays of differing cation exchange capacity (CEC) values were used to catalyze the reaction. The initial clay SHCa-1 had a relatively low CEC value and yielded mixed results in producing FAAEs. Thus, a clay with a higher CEC value (SAz-1) was used. The SAz-1 clay showed better results in converting the fatty acids into FAAEs. The ¹H-NMR spectra of the product mixtures showed distinct peaks in the 3.50 – 3.80 ppm region. These peaks are good evidence of the presence of fatty acid alkyl ester products, based on comparison with authentic samples of such esters produced via the traditional Fischer esterification method. Attempts to extend the clay-catalyzed esterification protocol to be able to synthesize biodiesel samples from triglycerides and alcohols have not been successful. Continued efforts in this area are ongoing.

018.098 U Synthesis and functional verification of quorum signaling lactones for studies in interkingdom communication, *Brian Garcia, University of the Incarnate Word; Julie Cavazos, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*

Bacterial communities coordinate gene expression and regulate behaviors involved in pathogenicity, virulence, and symbiosis using a chemical communication system called quorum sensing or quorum signaling (QS). This type of communication has been demonstrated not only between bacteria but also between bacteria and their eukaryotic hosts or symbionts and between bacteria and competing microbial organisms such as algae and protists. One important class of quorum signals are the homoserine lactones (HSLs) produced by a number of important pathogenic bacteria of medical and agricultural interest. In preparation for studies on quorum communication between unicellular algae and

bacterial pathogens, several HSLs have been synthesized, confirmed spectroscopically, and functionally verified using well-known QS reporter assays. These compounds will be used as controls for the activation or inhibition of QS in future studies.

018.099 U The Use of Microwave Heating for Biodiesel Synthesis via K₂CO₃-Catalyzed Transesterification, *Amanda L. Raley, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University*

Green chemistry is on the rise with growing support for alternatives to petroleum-derived diesel fuels. One such alternative is biodiesel. In this study, microwave heating was used to produce biodiesel mixtures starting from triglycerides and alcohols (e.g. methanol and ethanol). A mild base (potassium carbonate) was used to catalyze the transesterification reaction. The reaction was able to be completed in 5-10 min using microwave heating. Subsequent analysis using ¹H-NMR and IR spectroscopy showed nearly complete conversion of triglyceride to mixed fatty acid alkyl ester products.

018.100 G The Use of Microwave Heating for Biodiesel Synthesis via NaOH-Catalyzed Transesterification, *Daniel G. Kushaney, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University*

In the near future, there will be a heightened necessity for a renewable resource that provides similar energy capacity to that of petroleum-based diesel fuel. There are many alternatives to petroleum-based diesel fuel. These include wind power, solar power, and fuel cell technology, but they are all fairly expensive. Biodiesel fuel provides an exciting alternative to those choices because it is renewable, has a low-impact on the environment, and is low-cost in comparison. Biodiesel fuel involves the transesterification reaction between triglycerides, a catalyst, and a low molecular weight alcohol. In this study, biodiesel samples were synthesized via the base-catalyzed transesterification of various triglycerides with C1-C4 low molecular weight alcohols (methanol, ethanol, propanol, isopropyl alcohol, and tert-butyl alcohol) using a lab-based microwave reactor and batch preparation methodology. Extra-virgin olive oil, sunflower oil, corn oil, canola oil, coconut oil, peanut oil, vegetable oil, beef tallow, and pork lard were used to prepare biodiesel mixtures. The base catalyst used was NaOH (KOH yielded similar results). The samples were characterized using ¹H-NMR and IR spectroscopy. The results showed successful conversion of triglycerides to fatty acid alkyl ester mixtures. Microwave heating of the reaction mixture enables the conversion to be carried out in 5-10 min, whereas normal heating

methods require at least one hour of heating.
Computer Science
Computer Science Poster Session
Participants:

018.101 U **robo-roach: Biologically-Inspired Robots using the Lego Mindstorm EV3**, Erik Coronado, University of the Incarnate Word; Michael Frye, University of the Incarnate Word; Sree Nair, University of the Incarnate Word
The application of biologically inspired engineering is of growing interest because of its potential applications in biology, engineering, education and other disciplines. Our robo-roach is a biologically-inspired Lego EV3 robot that exhibits behavior observed from its natural counterpart by utilizing an algorithm created from analyzing the behavior of real roaches. In the study of biological complex systems, the “bottoms-up” approach towards complexity is an effective tool for understanding how emergent behavior manifests itself through the swarm intelligence of a group of organisms. This approach lends itself to helping understand how an individual, unsophisticated organism can exhibit rudimentary behavior whereas a group of individuals can exhibit sophisticated emergent behavior. We have performed an analysis of insect behavior, such as foraging and navigational behaviors, to determine significant behavioral patterns and routines. With these behavioral patterns, we have constructed a simple algorithm that accurately represents the behaviors observed in our previous analysis. This algorithm is being written using the MATLAB/Simulink Program and then transferred to the Lego Mindstorm EV3 which allows the robo-roach to behave like their natural counterparts. We anticipate observing similarities in emergent behavior between the robo-roach and the regular roaches. We will integrate data using our algorithm obtained from the collected qualitative data to build a biologically-inspired robot that emulates roach behavior.

Conservation Ecology
Conservation Ecology Poster Session
Participants:

018.102 U **Analysis of Fungal Community Structure of Wildfire Burned Soils in Bastrop, Texas**, Dylan Fox, St Edward's University
Fire poses as a potential abiotic disturbance to dramatically alter ecosystems. Although there has been extensive research aimed at the effects of burn on above ground species, fewer studies examine the effects of fire on microbial populations in soil communities. Bastrop State Park provides an ideal test setting as the Bastrop Complex fire in September 2011 had devastating effects on local species. Using USDI burn severity classifications, research will be

conducted to determine if there is a connection between soil fungal communities and burn severity. Past research suggests that diversity and abundance of mycorrhizae will decrease with increasing burn severity. In addition, a species or genus may emerge with a r-selected life history. If so, this species may benefit from reduced competition resulting in higher abundance post-fire. The Illumina sequencing of fungi was accomplished by sequencing the fungal ITS1-4 region from soil samples collected at sites of varying burn severity. The sequence reads were clustered at 97% similarity and assigned taxonomy by using the QIIME data analysis pipeline with the Silva fungal ITS database. Preliminary principal component analyses (PCoA) using UniFrac distance metrics reveals that the majority of the variation in fungal diversity across soil samples could be attributed to burn severity. Future analysis will (1) characterize the communities associated burn severity and association site metadata, (2) reestablishment of fungal communities post-fire, (3) and implications for reforestation efforts.

018.103 G **Distribution and Taxonomy of the Texas gartersnake (*Thamnophis sirtalis annectens*)**, Kayla N Key, The University of Texas at Tyler; Andy Gluesenkamp, Texas Parks & Wildlife Department; Marsha Williams, Department of Biological Sciences. The University of Texas at Tyler, Tyler TX; Josh Banta, The University of Texas at Tyler; John S Placyk, Jr., The University of Texas at Tyler
The distribution, taxonomy, population biology, and natural history, in general, of the Texas gartersnake (*Thamnophis sirtalis annectens*) are poorly known. It was described in the 1950's as one of the 12 currently recognized subspecies of the common gartersnake (*T. sirtalis*) based solely on morphological data. Since its initial description, its behavior, ecology, and systematics have not been examined and it remains one of the more enigmatic of the 12 subspecies. Recently, it was given a conservation rank of S2 (imperiled) in the state of Texas and those that are familiar with it have suggested that its numbers are dwindling. Using ecological niche modeling and mtDNA sequence data we begin to understand the natural and evolutionary history of *T. s. annectens*. Our ecological niche modeling results provide insight as to what areas are important to *T. s. annectens* as well as what environmental variables are determining its optimal habitat. When including *T. s. annectens* in a comparative niche model, it primarily occupies distinctly different habitat than the other two subspecies of *T. sirtalis* that occur in Texas (i.e., the red-sided gartersnake, *T. s. parietalis*, and the eastern gartersnake, *T. s. sirtalis*). Similarly, our genetic data indicate that

T. s. annectens can be differentiated from *T. s. parietalis* and *T. s. sirtalis*. Our work indicates *T. s. annectens* is distinct both genetically and ecologically and provides conservation managers with niche models that will assist in locating the optimal habitat required by this subspecies.

018.104 G Influence of recreation on water quality in the San Marcos River, *Rachel Erin Byrne, University of Houston Clear Lake; George Guillen, University of Houston Clear Lake*

The San Marcos River is a spring fed river that originates from the Edwards Aquifer in central Texas. Due to its unique environment the river hosts a variety of endemic species. The crystal clear water, beautiful setting and abundant wildlife also attract many recreational users annually. Common forms of recreation include swimming, tubing, kayaking/canoeing, and angling. Such activities potentially influence water quality factors like turbidity and suspended solids in the river. These water quality variables are of interest because they are thought to affect the federally endangered aquatic plant Texas Wild-rice (*Zizania Texana Hitchcock*). Texas Wild-rice is a rare plant never found naturally growing anywhere but the San Marcos River. Before excessive anthropogenic alterations and encroachment of the river, Texas Wild-rice was described to be very abundant. During the mid-1980s its population reached an all time low, but since then conservation efforts have encouraged growth of this species. In order to enhance and evaluate recovery efforts, research into the effects and management of continual stressors like recreation is necessary. We employed a variety of methods both spatially along the river and temporally throughout the year to determine the relationship between recreation and water quality variables. Game cameras were installed to document recreational activity. Water quality sondes were used to measure variations in turbidity and other water quality variables. Sediment samplers were used to analyze sediment deposition rates. Preliminary analyses are presented that evaluate the relationships and correlation between recreational activity and critical water quality variables affecting Texas Wild-rice. This information will help define specific water quality requirements of Texas Wild-rice and improve conservation recommendations in the future.

018.105 U Model of the respiratory requirements of the Meganisoptera, *Adam Hawbaker, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*

The largest known insect fossils belong to the order Meganisoptera. This extinct order of insects is thought to be an ancestor of modern Anisoptera. Most Meganisoptera specimens found

are only slightly larger than modern dragonflies, but some organisms attained wingspans of over 60 cm. The largest fossils are found in the Upper Carboniferous Period (ca. 320 to 300 Mya) and Lower Permian Period (ca 300 to 270 Mya). It is hypothesized that the increased atmospheric oxygen levels in these periods allowed griffinflies to attain such large sizes. Although oxygen concentration has some influence on size, other factors, such as atmospheric density and predation, must also be taken into account. Generally, griffinflies appear to be primitive dragonflies, though they lack specific morphological traits characteristic of Anisoptera. Thus, it is assumed that many biological traits of griffinflies, such as metabolism, are similar to those of dragonflies. Taking into account climatic differences between the Holocene Epoch (11,700 years ago to present) and the Upper Paleozoic Era (ca. 360 to 250 Mya), modern dragonflies can be examined and derived models can be scaled up to approximate energy consumption of ancient griffinflies. Based on experiments involving the extant species *Erythemus simplicicollis*, the metabolic rate of the largest fossilized organism, *Meganeuropsis permiana*, is estimated to be approximately 34.11 W.

018.106 U Preliminary biodiversity survey of mammals on a ranch in Runnels County, *leslie Ann Morrell, Hardin Simmons University; Darby Thornton, Hardin Simmons University; Anthony W Kocher, Hardin Simmons University; Wendi Wolfram, Hardin-Simmons University*

Biodiversity defines species variation among plants and animals and their intraspecific and interspecific interactions. Surveys on the biodiversity of various landscapes and ecosystems provide important tools to understanding organismal relationships. These findings can then be further used to implement land management strategies designed to balance both human use and biodiversity preservation. In this study, a preliminary biodiversity survey of mammals was conducted on a ranch in Runnels, County. The biodiversity of Runnels County is important as it is an area in which very little is known about species variety as well as being an area where three different ecosystems converge to include the Rolling Plains, the Cross Timbers, and the Edwards Plateau. This study included a preliminary biodiversity survey to identify the mammals of this region using camera traps, box traps, and visual observation. Preliminary results identify approximately 12 different mammal species consisting of both large mammals and small mammals.

018.107 G Testing whether ecological differentiation supports the taxonomy of three hibiscus species in Northeast Texas, *Melody*

Page Sain, *The University of Texas at Tyler*;
Lance Williams, *The University of Texas at Tyler*;
Marsha Williams, *Department of Biological
Sciences, The University of Texas at Tyler, Tyler
TX*; John S Placyk, Jr., *The University of Texas at
Tyler*; Randall Small, *The University of Tennessee
- Knoxville*; Josh Banta, *The University of Texas
at Tyler*

Ecological and evolutionary theory state that sympatric species should be differentiated from each other ecologically if in fact they are truly different species. We tested whether the nomenclature of three congeneric and co-occurring herbaceous perennial marsh plants (*Hibiscus dasycalyx*, *Hibiscus moscheutos*, and *Hibiscus laevis*) is supported. Specifically, we used ecological niche modeling methods to test for ecological non-overlap among the species. One of these three species, the Neches River Rose Mallow (*H. dasycalyx*) has recently been listed as a threatened species under the Endangered Species Act by the US Fish & Wildlife Service, so determining whether it is, in fact, a unique entity is of special interest. Our study provides another tool besides phylogenetic analysis to help biologists and conservation managers make decisions about species delimitations.

018.108 G Using Maximum Entropy Modeling to Predict Suitable Habitat for *Sistrurus catenatus tergeminus* and *Sistrurus catenatus edwardsii*, The Western and Desert Massasauga, Steven R Hein, *University of Texas at Tyler*

Massasaugas are a small crotaline species of snake comprised of three recognized subspecies. Two of these subspecies, the western massasauga, *Sistrurus catenatus tergeminus*, and the desert massasauga, *S.c.edwardsii*, are found in Texas. Western massasaugas can be found from Central to North Central Texas, whereas the desert massasauga occurs in two separate, disjunct populations; one in south Texas and another that spans a narrow belt from Western to Central Texas. In recent years both subspecies found in Texas have suffered population declines and are in need of possible protection, a privilege awarded to the subspecies in other states. As with other snakes, these declines are often attributed to habitat alteration such as overgrazing and habitat fragmentation. In order to protect the massasauga in Texas it is important to understand what habitat requirements are needed for each of the two subspecies to thrive. The niche modelling software MAXENT was used to create models that highlight the areas of Texas most likely to provide suitable habitat for both western and desert massasaugas. These models can be used to help in conservation efforts.

Environmental Science

Environmental Science Poster Session
Participants:

018.109 U A Population Study of Feral Hogs in Hill And McLennan Counties, Texas – A Comparison of Deer Feeder Practices, Tracina N Maiden, *McLennan Community College*
Feral hogs have been documented in 39 states and four Canadian provinces. The estimated feral hog population in Texas (2012) was 2.6 million, with densities ranging from 1.3 - 2.4 hogs/square mile. Agricultural damage due to feral hogs exceeds \$52 million annually. Feral hogs can spread diseases and parasites to other animals, including domestic pigs and household pets. The objective of this study was to determine the latency to first detection (LTD) for feral hogs and to determine population densities for feral hogs in Hill County and the Waco Wetlands in McLennan County. The Hill County study sites included three established feeder stations and the Waco Wetlands had no feeder stations. Trap cameras were used to monitor the study areas. The LTD was 9 days. A minimum of 904 adult hogs were estimated in Hill County and one at the Waco Wetlands. Feral hogs in Hill County comprise 2% of the estimated Texas population. Though the two study regions are only about 35 miles apart and have comparable ecological conditions, the Hill County sites showed considerably higher densities. Feral hogs were regularly observed at all monitored deer feeder stations. The regular practice of feeding deer may be contributing to increases in feral hog populations. A significant number of other species, including as many as 30 raccoons/night, regularly used feeder stations. Further studies examining population density and relative abundance of species using feeder stations could illuminate the role of deer feeding practices on wild populations.

018.110 G Atmospheric Particulate Matter Monitoring in Houston Using a Portable Aerosol Monitor, Bianca Hayes, *Texas Southern University*; Hyun-Min Hwang, *Texas Southern University*

Particulate matter (PM) is a mixture of small particles and water droplets that can consist of metals, dust particles, and organic chemicals. In this study, PM10, PM2.5, PM4, PM1, and total suspended particles were measured at various distances from the highway during four different time periods. Measurements were taken at 50 m, 100 m, and 150 m from the South Sam Houston Parkway in Houston during morning rush hour, daytime, evening rush hour and night time. At each sampling location, concentrations of PM were measured with a portable aerosol monitor. Data was collected starting at the sampling site closest to the roadway and was measured for five minutes before moving away from roadway to the next sampling site. A total of three cycles was

recorded for each sampling time period. Site 1 measurements were 0.053 mg/m³ for PM₁, 0.054 mg/m³ for PM_{2.5}, 0.055 mg/m³ for PM₄, 0.059 mg/m³ for PM₁₀, and 0.087 mg/m³ for total suspended particles. Site 2 measurements ranged between 0.053 mg/m³ for PM₁, 0.054 mg/m³ for PM_{2.5}, 0.055 mg/m³ for PM₄, 0.058 mg/m³ for PM₁₀, and 0.073 mg/m³ for total suspended particles. Site 3 measurements ranged between 0.053 mg/m³ for PM₁, 0.054 mg/m³ for PM_{2.5}, 0.053 mg/m³ for PM₄, 0.059 mg/m³ for PM₁₀, and 0.092 mg/m³ for total suspended particles. The results in this study indicate that other factors influences the PM levels with varying distance. Further research is needed to better assess the effects of distance and PM levels, and different time periods and PM levels.

018.111 U Atmospheric particulate matter pollution and platinum (Pt) in soil, road dust, and plants in Houston, Texas, Donyeil Hoy, Texas Southern University; Laura Lay, Michael E. Debakey High School for Health Professions; Tan Nguyen, Texas Southern University; Jay Saynonh, Texas Southern University

This research focuses on the environmental fate and transport of platinum (Pt) emitted from catalytic converters in Houston, Texas. Highway road dust and soil samples were analyzed using an inductively-coupled plasma mass spectrometer (ICP-MS). Platinum concentrations ranged from 1.25 to 21.4 ng/g in surface soil, 18.2-149 ng/g in road dust samples, and 1.03-2.15 ng/g in core soil samples. In surface soil and road dust, Pt concentration increased with decreasing particle size. Road dust showed a higher Pt concentration than surface soil, possibly indicating a correlation between Pt contamination and proximity to highways. In core samples, Pt concentration decreased sharply within 5 cm and remained at background level below that layer. This is likely due to recent contamination and an organic rich top soil layer that behaved as a barrier for infiltration. Plant samples, which included *Helianthus annuus*, *Poa pratensis*, and *Cyperus esculentus*, were also analyzed and Pt concentrations were found to range from 6.82 to 11.5 ng/g, giving a bioconcentration factor (BCF) of 6.87 or lower. Atmospheric particulate matter (PM) deposition rates varied from 48.2 to 411 mg/m²/day with no differences between weekdays and weekends, indicating that PM deposition rates were likely affected by local weather, not by traffic volume. PM₁₀ concentrations ranged from 61.6 to 104 µg/m³; these measurements are below National Ambient Air Quality Standard (150 µg/m³) but exceed California EPA standard (50 µg/m³), indicating that there may be health risks associated with atmospheric PM.

018.112 G Cellulose digestion by the higher attine fungus gardening ant *Trachymyrmex septentrionalis*, Alexandria DeMillo, University of Texas at Tyler

Fungus gardening ants exhibit a unique interaction with specific fungi in an obligatory symbiosis; ants feed and prune their fungal symbiont in exchange for nourishment. While recent studies show that leaf-cutting (*Atta* and *Acromyrmex*) ants' fungus is unable to digest cellulose, there has been little or no comparison to the other higher attine (family Myrmecinae) fungus gardening ants. Colonies of *Trachymyrmex septentrionalis* were fed two different diets to assess the ability of the symbiosis to digest plant-based carbohydrates. Fiber digestion techniques were used to evaluate the differences in cellulose, hemicellulose and lignin content of *T. septentrionalis* diets before and after assimilation in the fungus garden. The results suggest that higher attine fungus of *T. septentrionalis* ants are more readily able to digest cellulose compared to leaf-cutting ant fungus.

018.113 G Characterization of ambient water quality in natural and created wetlands of the Texas coast, Natasha Zarnstorff, University of Houston Clear Lake; George Guillen, University of Houston Clear Lake

The United States Environmental Protection Agency (EPA) has expressed interest in creating water quality criteria and standards specific to coastal and inland wetlands. When established, these standards would be incorporated into various agencies decision making processes. Environmental agencies and professionals have long recognized the fundamental difference in ambient water quality between open water systems and wetlands, and the need to develop specific standards for each system. Saltwater wetlands provide a variety of ecosystem services, but little research has been done on water quality of these marshes. In addition to uncertainty regarding the annual trends in saltmarsh water quality, there have been no studies examining water quality differences between open water, created marshes, and natural marshes. The preliminary results of our study document the range of water quality conditions and modifying factors in Texas coastal wetlands. During our study we measured surface water quality of an open water site, a natural marsh, and a created marsh for three bays in the Galveston Bay system. Surface water quality was measured every other month with a handheld YSI monitoring device and collections of grab samples that were analyzed for nutrients and bacterial content. Deployable water quality monitoring devices were also used to measure dissolved oxygen, temperature, and conductivity for three days prior to water sample collection. Based on preliminary results, considerable seasonal

variability in selected water quality variables existed within and between sites. The influence of contributing factors is discussed and will be further analyzed upon completion of the entire study.

018.114 G Distribution, Abundance, and Habitat Use of the Saltmarsh Topminnow (*Fundulus jenkinsi*), *Josi Robertson, University of Houston-Clear Lake; Stephen Curtis, Environmental Institute of Houston; George Guillen, University of Houston Clear Lake*
The saltmarsh topminnow, *Fundulus jenkinsi*, occurs sporadically along the coast of the Gulf of Mexico and is listed as a species of concern by many gulf coast states. Currently, the US Fish and Wildlife Service is evaluating the status of this species. *Fundulus jenkinsi* utilizes the edge of the saltmarsh and prefers low to mid- salinity water. Little is known regarding *F. jenkinsi*'s range or abundance within Texas. Land development, levee and canal construction, sea-level rise, land subsidence, and pollution all threaten the availability of *F. jenkinsi*'s habitat and, consequently, its abundance. Given the limited knowledge regarding the extent of the minnow's range, it is important to document the population and occurrence of the saltmarsh topminnow in order to better understand the extent of *F. jenkinsi*'s range into Texas and determine their habitat needs. The preliminary results of our study to document the range and habitat use of *F. jenkinsi* within the Galveston Bay and Sabine Lake watershed is presented. Tidally influenced and generally mesohaline sites were chosen to evaluate the influence of salinity gradients that have been reported in the literature as being preferred by *F. jenkinsi*. Fish communities were sampled using seines and Breder traps. Water quality variables and dominant vegetation cover was measured at each site. When collected, specimens of *F. jenkinsi* were identified, counted, and measured. To assess reproductive ecology, average gonadosomatic indices (GSI) will be calculated and plotted by month to compare reproductive condition by season for both male and female *Fundulus jenkinsi*. In addition, total fish community abundance (N), species abundance (N), relative abundance (%), catch-per-unit-effort (CPUE), richness (S), diversity (H') and evenness (J') will be calculated for each site. Habitat and conspecific fish species data will be used to identify environmental and biological factors that influence spatial and temporal trends in *F. jenkinsi* across sites.

018.115 G Effect of changes in hydrochorous behavior of seeds on the future vegetative community, *Anna Boeck, University of Texas at San Antonio; J K Haschenburger, The University of Texas at San Antonio; Janis Kathleen Bush, UT*

San Antonio; Katherine Elliott, USFS, Coweeta Hydrologic Laboratory, Southern Research Station

Riparian zones are some of the most diverse, complex, and dynamic habitats on the terrestrial Earth and are particularly sensitive to environmental change. One factor that contributes to high plant species diversity in riparian zones is periodic disturbance caused by floods. However, this disturbance is thought to facilitate invasive plant species establishment, which can threaten biodiversity and impact the ecosystem as a whole. How changes in the hydrologic regime, due to climate change, may impact the seed bank within the riparian zone, and consequently plant diversity, is not well understood. The overall goal of this research is to forecast the potential impacts of climate change on the native and invasive vegetation along meander bends. One aspect, presented here, is to examine how seed dispersion can differ based on seed characteristics and changes to the flow velocity. A modified version of the Wolman method was used at three inner and outer positions of meander bends on the Little Tennessee river to measure the grain size of the channel boundary in order to quantify how channel roughness may influence the flow velocity and consequently seed dispersal due to differential seed characteristics. The seed shape factor of three common native and invasive species was calculated using Mohsenin's equation. Channel roughness ranged from 0.0089 – 0.101. Seed shape factors ranged from 0.24 – 0.70. It is predicted that seeds with large shape factors will have lower settling velocities and will require faster flow velocities to remain suspended in the water column.

018.116 U Effects of Flooding and Drying Soil on the Uptake of Arsenic in Rice, *Alison Bray, Texas Lutheran University; Rhaya Johnson, Texas Lutheran University; Sioned Kirkpatrick, Texas Lutheran University; Chad Ladewig, Texas Lutheran University; Nicole Pollok, Texas Lutheran University*

Rice is unique in that it is the only major crop that is grown anaerobically, under flooded conditions. Traditionally rice field flooding has been used as non-chemical method of preventing weeds. However, this can be problematic, because rice is particularly efficient at taking up some forms of arsenic which are generated under anaerobic conditions. Under reduced conditions, as replicated by flooded fields, As (III) is the predominant species of arsenic and tends to assimilate into plants through phosphate transport pathways. The purpose of this study was to evaluate the uptake of arsenic under flooded and unflooded conditions through the plants life cycle. Plant material, soil, and water were collected and

analyzed for arsenic and other mineral content. Overall the plant growth appeared very stunted in both flooded and unflooded samples. No plants reached maturity. Preliminary data also suggests that there is not a significant difference in total plant mass (dry weight) between flooded (14.4mg \pm 3.05) and unflooded controls samples (16.8mg \pm 13.0).

018.117 U Iron Concentrations of the Scarborough Creek in Stream Bed Sediment, *Philip James Webster, Student*

To maintain water quality, it is important to monitor ground and surface water for nutrients and understand how they are transported through groundwater surface-water zone interactions. Excess nutrients can create eutrophication in streams and lakes. In a recent study (Thompson and McFarland, 2010), an overabundance of phosphorus was found in the sediment of the Scarborough Creek river bank. It was concluded that the sediment containing the sharp increase in phosphorus corresponded with water table fluctuations and thus oxidation state. Phosphorus is often bound to iron compounds; this study will examine concentrations between amorphous iron (II) and phosphorus compounds in cores along Scarborough Creek. Higher concentrations of iron in the sediment will increase the amount of phosphorus that can be sorbed due to ligand exchange reactions. Sediment samples will be oven-dried; the iron will be extracted from the sediment using a citrate-dithionite procedure. Iron concentration will be analyzed with a spectrophotometer.

018.118 U Nature vs. Nurture: Examining the Impact of a Manipulated Environment, *Allison Nicole Frando, Saint Edward's University; Fidelma O'Leary, St. Edward's University*

For all organisms including humans, the interaction of phenotype with environment plays a major role in development, fitness, and social behavior. In humans, Neuropeptide Y Receptor-1 (NPY-1) influences social behavior. Human NPY-1 is analogous to Neuropeptide Receptor-1 (NPR-1) in the nematode *Caenorabditis elegans*, which controls social behaviors including aggregation while foraging/feeding. Thus, *C. elegans* are useful model organisms in which to examine the physiological impacts of manipulated social environments. Three strains were used: N2 (wildtype), AX 301 (solitary feeders with increased NPR-1), and SD 1891 (social feeders with decreased NPR-1). All strains were raised in their preferred environment, and the transgenic solitary and social feeders were also raised in manipulated environments (solitary strain forced into social feeding circumstances by food placement, and social strain forced into solitary feeding circumstances by isolation). Lifespan and

fertility assays were conducted for all four treatments (environments). The data indicated the manipulated environments had a negative effect on lifespan, especially for the solitary worms forced into groups (50% reduction in lifespan). This suggests that the manipulated environment was highly stressful to the worms. The fertility data indicated the manipulated environment had a negative effect on number of eggs laid per hour (10/hr eggs social/social versus 0 eggs/hr social/solitary). Furthermore, social worms in their preferred environment were more fertile than the wildtype strain (10 eggs versus 7 eggs/hr). These results suggest that manipulating the preferred social environment for foraging/feeding comes at a cost in terms of lifespan and reproductive ability. These findings are relevant to humans as signaling mechanisms influencing social behaviors are largely conserved across these species.

018.119 U Phosphorous Retention in the riverbanks of the Bosque River and the Paluxy River, *Kimberly Marie Hogan, Tarleton State University*

Phosphorous is a nutrient that often causes eutrophication when above normal abundance. This can be a major problem, as can be seen in a Texas case: Lake Waco and the City of Waco sued dairies in and around the Stephenville, TX area for excessive nutrients, which caused eutrophication and produced a negative economic impact. In Scarborough Creek, a stream in the Bosque River watershed, Thompson and McFarland (2010) found high total P concentrations in streambank sediments. The current hypothesis is that water flowed laterally from the stream into the banks, carrying with it the phosphorous that was then sequestered into the soil. If soil erodes from the banks, it could become a source of instream phosphorous. The goal of this project is to expand the current knowledgebase and determine if the same process is occurring in larger streams. Ascertaining the extent to which P exists in the riverbanks of various sizes of streams could expand the understanding of phosphorus transport and occurrence in watershed systems. Soil samples will be taken using a push probe from 2 different rivers' banks. One set of 9 will be taken from the Bosque River in Stephenville, and the other set of 9 will be taken from the banks of the Paluxy River at Dinosaur Valley State Park. 3 samples will be taken at the banks' toe of slope, 3 at the midbank, and 3 at the top of the bank. Each will be analyzed for total phosphorous, water-soluble phosphorous, soil pH, and texture.

018.120 G Relative Abundance of Herpetofauna in Response to the Season of Burn in a Southern Appalachian Forest, *Tyler Jay Seiboldt, University of Texas at San Antonio; Cathryn Greenberg, USDA Forest Service; Janis*

Kathleen Bush, UT San Antonio; Fernando A. Martinez, UTSA; Matthew J Gdovin, University of Texas at San Antonio

Prescribed fire has long been used to meet land management objectives and has primarily been conducted in the dormant season due to more predictable environmental conditions. Fire severity may differ between dormant and growing season applications because of differences in ambient temperature, humidity, and fuel conditions. In turn, differences in post-fire forest structure (tree mortality) between dormant and growing season burns could differently affect ground dwelling wildlife. The response of herpetofauna to dormant season burns has been studied, but no studies have addressed herpetofaunal response to growing season burns versus dormant season burns. A study was conducted within the Bent Creek Experimental Forest in North Carolina to examine the effects of growing season versus dormant season prescribed fire treatments on the relative abundance of herpetofauna. From May to August 2014, herpetofauna were sampled over a period of 7, 992 trap nights using drift fence arrays. Treatments or control were randomly assigned to each of nine 3-ha units. Results suggest that some herpetofaunal species were found to be significantly more common than others ($P < 0.001$) across both treatment and control sites. Results also demonstrated that there was a significant difference ($P = 0.0360$) in the relative abundance of any reptile or amphibian species among the treatments in which they were captured.

018.121 G Road Dust Activated ERK in Lung Epithelial Cells *in vitro*, Nkem Azu, Texas Southern University; Shishir Shishodia, Texas Southern University

Automobile catalytic converters release the Platinum Group Elements (PGE), platinum (Pt), Palladium (Pd), and Rhodium (Rh) during driving in the form of nano-sized particles. Significant concentrations of rhodium, palladium, and platinum have been reported in tunnel dusts and surface road dusts in Houston area. Humans can be exposed to these metals through inhalation of airborne particulate matter (PM) that may provoke respiratory diseases and other adverse effects. Exposure to atmospheric PM is known to induce many respiratory diseases especially in susceptible populations such as children. But it is not clear which constituents of atmospheric PM are responsible for the observed health effects. Although chemically inert, platinum, like other transition metals exist in several different forms having different oxidation states. It is well known that bioavailability and toxicity of metals are linked to their chemical species. Recent studies on

PGE toxicity and environmental bioavailability indicated that once entering environment, anthropogenic PGE might easily be mobilized and transformed into more toxic forms under the actions of various biogeochemical processes, and thereby, enhanced their bioavailability and posed potential health risks to human beings through food chain. Very little is known about the mechanism and biomolecular response pathways of mammalian cells to PGE. We investigated the effect of road dust with PGE on the extracellular signal related kinase (ERK) and P38 mitogen activated protein (MAP) kinase pathway in lung epithelial cell lines. The MAP kinases are serine/threonine protein kinases that play pivotal roles in a variety of functions in several cell types.

018.122 U The Effects of Wetting and Drying Cycles on Phosphorus within Streambank Sediments, Erica Saucedo, Tarleton State University

Nutrient enrichment in a body of water is a major environmental problem because it can cause eutrophication. Eutrophication increases algal production; when there is an overabundance of algal blooms, it can cause problems for aquatic life, such as decreased dissolved oxygen concentrations, as well as for humans. An excess of phosphorus has been shown to already be a problem in Texas rivers and streams. Thompson and McFarland (2010) found high total P concentrations in streambank sediments of Scarborough Creek, a stream in the Bosque River watershed. The phosphorus appeared to have moved laterally from the stream into the sediments during periods of high flow. There are several questions that need to be addressed regarding the sorbed phosphorus; this study will address two of them. How does oxidation state affect phosphorus mobility? How long does it take to build up the concentrations of phosphorus seen in soils? This study will use tube experiments of native soils where repeated wetting and drying cycles will be alternated. We seek to determine how wetting/drying inhibits the phosphorus mobility and how much sorbs to the soil. Soil samples will be taken from field cores at intervals known to have low total phosphorus. The tubes will be inundated and allowed to dry out to mimic storm conditions. Two tubes will have frequent wetting and drying cycles, while two other tubes will have longer periods in between wetting and drying cycles. Water samples for soluble and total phosphorus will be analyzed using inductively coupled plasma (ICP) spectroscopy. Soil samples for extractable and total phosphorus will also be analyzed with ICP.

018.123 G The effect of fire severity and hillslope gradient on the relationship between soil pH and soil depth after wildfire., Andrea

Russie, University of Texas San Antonio; Janis Kathleen Bush, UT San Antonio; J K Haschenburger, The University of Texas at San Antonio

Fire can modify soil properties that will alter post-fire microhabitats for soil microorganisms.

Following fire, soil temperature gradients occur from the surface downward into the soil profile, which alters soil pH as a function of depth after fire. The magnitude of change, however, is dependent on fire severity. Ammonia oxidizing bacteria (AOB) are sensitive to changes in pH and may change as a result of fire severity. This study examines the post-fire soil pH conditions as a function of depth to evaluate the effect of fire severity and hillslope gradient on post-fire environments in ponderosa pine forest soils. The study was conducted in the Valles Caldera National Preserve, New Mexico, after a wildfire. Eighty six soil core samples were collected from sites with different fire severity (low and high) and two hillslope gradients (low and moderate) one month after the fire and pH analyzed in two cm depth increments down to ten cm. A control site (no fire) was also sampled. The pH increased with decreasing depth for high severity sites for both low gradient slopes ($r = -0.67$, $P < 0.0001$) and moderate gradient slopes ($r = -0.56$, $P < 0.0001$). For low severity slopes, there was no relationship between soil pH and depth for low gradient slopes ($r = -0.10$, $P = 0.3806$); however for moderate gradient slopes pH decreased with increasing depth ($r = -0.20$, $P = 0.05$). Further analysis of pH conditions one year after the fire and the relationship to AOB abundance will be analyzed.

018.124 U **The effects of the pesticide imidacloprid on physiological and neural functions of the non-target organism**

Caenorhabditis elegans, Cynthia Marie Tapia, St. Edward's University; Jordan Elise Villemaire, St. Edwards; Fidelma O'Leary, St. Edward's University

This project tested the hypothesis that imidacloprid adversely affects physiological and neurological functions of non-target organisms such as *Caenorhabditis elegans*. Using wild-type *C. elegans* (N2) exposed to imidacloprid for 72h via their food source (*E. coli* OP50), assays for fertility, chemosensory ability, and lifespan were conducted. Two concentrations of imidacloprid were tested: low (LI: 3.129×10^{-8} mol/L) representing field application levels; high (HI: 5.2×10^{-7} mol/L) representing spillage or repeated usage; and the food source alone was used as a control (C). For the fertility assay, ten five day old hermaphroditic worms per treatment group were allowed to lay eggs for four hours. The eggs were then counted, and this count was confirmed by a

larval count 24h later. The chemosensory assay utilized a naïve aversion to an odorant (0.01% benzaldehyde in 100% ethanol). Ten five day old worms per treatment group were put on plates with a hair that had been soaked in the odorant and the time until reversal was recorded. For the lifespan assay, ten worms per treatment group were observed every 12 hours from egg stage throughout the duration of the lifespan to find the LC₅₀, the point and concentration at which 50% of the organisms had died. To date, results suggest that imidacloprid adversely affects fertility, chemosensory ability, and lifespan, in a dose-dependent manner. When additional, ongoing experiments are completed, data will be analyzed by a one-way ANOVA.

018.125 U **Comparison of abundance of small mammals in areas disturbed by controlled burning during the growing season versus the dormant season.**, Christopher Edward Adkison,

University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio

Christopher Adkison^{1,*}, Cathryn H. Greenberg², Fernando Martinez¹, Tyler J. Seibold¹
¹Department of Environmental Science, University of Texas at San Antonio, San Antonio, TX 78249, United States ²USDA Forest Service, Southern Research Station, Bent Creek Experimental Forest Asheville, NC 28806, United States In the southern Appalachian Mountains of western North Carolina, recent human development (last century) has resulted in a suppression of natural forest fires due to it's unappealing after effects. We investigated the effects of prescribed fire during the dormant season, growing season, and a control group on the abundance of small mammals in the southern Appalachians. Three replicates of each treatment containing a 60 m x 100 m grid was formed with individually labeled Sherman live traps with 10 m spacing between each trap. Small mammal sampling was conducted between June 24 – 30, 2013 for the growing season burn and control only, the dormant season burn did not occur until 2014. Small mammal data for 2014 was collected between June 17 – 29. Data collected from the mammals includes; mass (g), length (cm), sex, identification of genus and species, weather conditions on day of capture, age class (juvenile or adult) and a tag number administered in the left ear. Based on capture rate only, the total captures in 2013 (77 small mammals) decreased in 2014 (25 small mammals). This may be due to experimental conditions, or natural fluctuation small mammal populations. Further analysis is required.

Saturday, March 7

025. Biomedical Oral Session I

8:00 to 9:30 am

Ila Faye Miller Nursing Building, NB 214

Biomedical

Biomedical Oral Session I

Participants:

8:00 025.126 U **Associations between obesity and osteoarthritis in the knee joints of participants in the Trans Pecos Area**, *Kassandra Hernandez, Sul Ross State University; Christopher M Ritz, Sul Ross State University*

Obesity is a growing major public health problem associated with increased risks to one's health and well-being. Individuals can be classified as obese by determining their body mass index (BMI), which is used to sort individuals as normal, overweight, or obese based on height and weight. Being obese can cause excessive weight loading on the knee joints which can lead to symptoms such as joint pain, stiffness, crepitus with pain, and altered function, all symptoms associated with knee osteoarthritis and limitations to range of motion. The question is raised, which BMI range has the most positive correlation with joint pain and low range of motion in the knee? This study was designed to gather participants to categorize their BMI and test for any associations between BMI and symptoms, lifestyle choices, or risk factors that lead to knee osteoarthritis. A total of 75 participants were asked to sign a consent form and complete a questionnaire, and then were weighed and measured to gather BMI. Participants had both knees assessed with a goniometer to determine their range of motion, and then tested for any signs of crepitus along with pain. After analyzing all results from the questionnaire and knee assessments, results proved significant in participants classified as obese having lower knee range of motion as well as very different results in other various lifestyle choices as determined from the questionnaire when compared to those classified as normal or overweight. This study concluded that obesity is associated with limited range of motion in the knees, knee injuries, less exercise, and more sedentary lifestyle choices.

8:15 025.127 G **Identifying prognostic biomarkers in multiple sclerosis using a chronic progressive murine model of experimental autoimmune encephalomyelitis**, *Carol Ann Chase, University of Texas at San Antonio; Niannian Ji, University of Texas at San Antonio; Erica Saenz-Trevino, University of Texas at San Antonio; Itay Raphael, University of Texas at San Antonio; Thomas Forsthuber, University of Texas at San Antonio*

Multiple sclerosis (MS) is an inflammatory autoimmune disease of central nervous system (CNS), characterized by demyelination and lesion formation. It is the most common debilitating

neurological disorder in most western countries, afflicting over 400,000 Americans and 2.5 million individuals worldwide. Despite extensive research, there is a lack of sensitive laboratory tests to determine sub-clinical progression and to predict the transition from the relapsing-remitting form of MS to progressive MS. We recently developed a novel proteomic technique to measure changes in the CNS-proteome during experimental autoimmune encephalomyelitis (EAE), the murine model of MS. Our statistical analysis indicates a strong correlation between the expression of several key CNS-specific proteins and the varied stages of the disease in monophasic EAE. Thus, we hypothesize that these expression changes will be detected in serum and can potentially be used as biomarkers to measure and predict disease progression. Using a progressive EAE model, we found that levels of several CNS-specific proteins were detectable in mouse serum and correlated with disease progression. Our study could lead to development of biomarkers to predict not only disease progression, but also better evaluate the efficacy of novel treatments.

8:30 025.128 G **New cyanide antidote (sulfur donor X) and its pH dependence for oral formulation efficacy**, *Reny Jacob Roy, Sam Houston State University*

The ability of cyanide (CN) to engage in π -bonding enables it to form stable complexes with many transition metals causing its toxicity. The present therapy of sodium thiosulfate (TS) requires rhodanese (Rh) to convert CN to SCN efficiently. However, the inorganic TS has limited cell penetration capability and it cannot easily reach the endogenous Rh, therefore there is a need to develop more efficacious, more lipid soluble sulfur donors (SD) as CN antidotes. The present candidate test molecule (SDX) has high lipid solubility and it reacts with CN with high efficiency even without Rh, therefore it is expected to be a superior CN antidote over the TS. This study is focused on its applicability for oral administration. Calibration curve for SCN detection, the pH dependence of SCN formation by SDX with or without Rh, and the SCN formation as a function of Rh concentration were carried out by checking the absorbance of FeSCN^{2+} at 464nm. The results underlined that the reaction of SDX with CN was pH dependent and the rate of SCN formation increased with increased pH between 6 to 8, and no SCN formation was detected below pH 6. Addition of Rh to the reaction mixture enhanced the CN conversion, and this underlines the dependence of SCN formation on the Rh concentration. The Rh activity showed a pH optimum at 7.5. Based on our results, SDX is not recommended for oral administration for

scavenging CN in the stomach, unless the pH is increased by administering NaHCO₃.

026. Cell and Molecular Biology Oral Session I

8:00 to 9:30 am

International Conference Center, International Conference Center Auditorium

Cell and Molecular Biology

Cell and Molecular Biology Oral Session I

Participants:

8:00 026.129 U **Biochemical and Structural**

Dissection of the Coat Nucleoporin

Interactions, *Samantha Parsons, na*

Massive proteinaceous channels, called nuclear pore complexes (NPCs), provide the sole conduit between the nucleus and cytoplasm by tightly regulating bidirectional nucleocytoplasmic transport. The NPC is extremely large with a mega assembly of ~1000 protein chains. Because of the size and flexibility, it has been difficult to yield high-resolution structures using standard techniques such as electron microscopy (EM) and X-ray crystallography. In order to determine the structure of the NPC, independent complexes are investigated and put together to create a model of the NPC. This project focuses on the biochemical and structural characterization of the interaction between three coat nucleoporins: Nup120, Nup145c and Nup85. This contributes to the complete structural characterization of the Nup84 complex. We focused initially on determining the minimal interaction regions between these three nucleoporins and are now trying to crystallize different sub-complexes that constitute the Nup84 complex "triskelion".

8:15 026.130 U **Can variation in dietary protein levels affect the severity of Parkinson's disease symptoms in *Drosophila melanogaster*?**

Maria Nathalie Eguiza, Biology

Parkinson's disease is a neurodegenerative disorder that results from the death of dopamine-generating cells and is characterized by the formation of Lewy bodies comprised of α synuclein. Levodopa, a medication that is used to treat Parkinson's is known to be absorbed less efficiently with a high protein diet. Therefore, we question whether altering protein levels in *Drosophila melanogaster* diet could ameliorate the symptoms of Parkinson's disease regardless of whether Levodopa is being administered. Based on previous studies, we hypothesized that flies fed a high protein diet will display a climbing deficit. Alpha-synuclein, the protein found in Lewy bodies in human Parkinson's patients, is not present in the fruit fly; however, previous studies show that the expression of human α synuclein in fruit flies leads to the formation of Lewy bodies, neurodegeneration, and behavioral deficiencies

including defective climbing ability which will be assayed in this study. Flies expressing α synuclein pan-neuronally, were raised on food with high, normal, and low protein content; flies were then tested for their climbing ability at ages 4, 7, 14, 21, and 28 days. For the duration of the 28 days, lethality was also monitored, as a reduction in lifespan is known to accompany Parkinson's disease in both flies and humans. Data suggest that flies fed a high protein diet, regardless of genotype, show higher lethality and defective climbing ability; further experimentation will be necessary to determine whether altering dietary protein could be a beneficial therapy for Parkinson's patients.

8:30 026.131 U **Development of an Initial Culture Procedure that May Eventually Decrease the Time for Chromosome Analysis of Tumor Cells**

Kajal Bhakta, Temple College

The goal of this project was to develop a procedure that would decrease the amount of time it takes to culture, harvest, and analyze patient tumor cells for chromosome analysis. The cell line CCRF S-180 II (ATCC® CCL-8™) from the organism *Mus musculus* is a tumor cell line that is usually cultured in flasks but can also be cultured on coverslips. Coverslips allow for the production of clones of cells from which chromosome analysis can be performed. In order to obtain colonies of cells that will produce a karyotype, the appropriate cell concentration had to be determined for this cell line. An initial concentration of 50 cells/ml was used and it was gradually increased to 6000 cells/ml. Once the cells formed visible colonies, colcemid was added to the media to stop the cells in metaphase of mitosis. The cells were then subjected to various hypotonic solutions that would produce chromosomes with optimal spreading. Several trials had to be performed to determine the appropriate hypotonic solution to acquire a set of chromosomes that would produce G-bands. A fixative solution was added to the coverslips to stop the spreading of the chromosomes. The coverslips were dried, attached to a microscopic slide, baked overnight in a 65°C incubator, and stained using a G banding procedure. A general culture and harvest procedure was developed that produces chromosome spreads in a shorter amount of time than the flask method. The procedure has been sent to the Cytogenetics Lab at Scott and White for further development.

8:45 026.132 N **Development of genetic tools to study the Lumbricolid central nervous system as a model for wound healing and regeneration**

ROBERT MIRANDA, UNIVERSITY OF THE INCARNATE WORD

There is a wide range across multicellular organisms in their ability to regenerate and restore

tissue function after traumatic injury. For example, many invertebrates, such as planarians and hydra, display a remarkable ability to regenerate lost body parts while vertebrates, especially mammals, have limited regenerative abilities which can lead to the formation of non-functional scar tissue. The ability to regenerate even varies within animal phyla. In annelids for instance, leeches do not regenerate while the aquatic oligochaete *Lumbriculus variegatus* has the ability to regenerate a whole animal from as few as three segments. The underlying mechanisms regulating regeneration and why some animals have lost this ability are important topics of study in evolutionary and developmental biology. Using *L. variegatus* as a model system, our lab aims to understand the cellular and molecular mechanisms that regulate wound healing and regeneration within the central nervous system. This species possesses the unique ability to recover both structure and function along the anterior-posterior body axis. To date proteomic and genomic studies have been limited in this novel model system. Therefore, we are working to identify gene sequences encoding proteins that are believed to mediate regeneration in *Lumbriculus* and develop a real-time quantitative PCR assay to evaluate the expression of these gene transcripts. Results using this assay will give us a better understanding of regenerative mechanisms utilized by *Lumbriculus* and ultimately could help to identify cellular and molecular mechanisms mediating regeneration that have been conserved across animal phyla.

- 9:00 026.133 U **Effects of hydroquinone on S17 murine stromal cells**, *Jeremy D Kotin, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*
 Primarily a hematological disease of the elderly, myelodysplastic syndrome can also develop after benzene exposure. People can be exposed to benzene by working in the petroleum industry, by working directly with benzene, and by smoking cigarettes. The bone marrow (BM) microenvironment has been shown to play an essential role in normal hematopoiesis as well as hematological disease development. Therefore, this study sets out to investigate the effects of benzene exposure on the BM microenvironment. S17 murine BM stromal cells were used as a representative of the BM microenvironment and were treated with various concentrations (0, 0.625, 1.25, 2.5, 5, 10, 25, 50 and 100 μM) of hydroquinone (HQ), a metabolite of benzene. After exposure, the viability of the S17 cells and their ability to support hematopoietic cells were assessed. Using MTT assays, high concentrations of HQ (50 μM and 100 μM) were found to be cytotoxic to S17 cells while the result from 1.25

μM and 10 μM HQ treatments signify an increase in proliferation of the S17 cell compared to the untreated control. In a preliminary co-culture experiment, S17 cells treated with 1.25 or 10 μM HQ had a reduced ability to support murine BM cells when overlaid for 4 or 8 days. Based on these findings, S17 cells seem to be affected by HQ treatment at both high and low doses. Additional studies of the effects of HQ on S17 cells will be performed including further co-culture experiments.

- 9:15 026.134 U **Purification of components from *Inula helenium* (elecampane) which are cytotoxic to the 4T1 murine breast cancer cell line.**, *Thomas Evan McElwan, Wayland Baptist University; Sarah C. Kelly, Wayland Baptist University; Ashley M. Rivera, Wayland Baptist University; Jessica Rose Kenneson, Wayland Baptist University; Robert T. McCutcheon, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam J. Reinhart, Wayland Baptist University*

The plant *Inula helenium* (elecampane), is a medicinal plant that is found widely throughout England. It has been used as a diuretic, antiseptic, skin cream and has been used in treating pulmonary diseases. Previous studies in our laboratory have shown elecampane to be toxic to 4T1 murine breast cancer cells. Powdered elecampane root powder was refluxed in dichloromethane for 1 hour, the dichloromethane was distilled off and the extract was resuspended in ethanol. The resulting ethanolic extract was size fractionated on a Sephadex LH20 column with 75% ethanol as the mobile phase and initially analyzed through absorbance at 280nm. Fractions from the column were assayed for cytotoxic effects on 4T1 cells. Cytotoxic fractions were further characterized using HPLC (solid phase: C18, mobile phase: 0-75% methanol gradient over 30 minutes). One peak was identified through HPLC from the most cytotoxic fraction. This peak was collected and further characterized using mass spectroscopic analysis (MALDI TOF). Based on the mass spectroscopic analysis, the most likely size of the cytotoxic molecule isolated through this study was determined to be 440g/mol. Further research is ongoing to identify this cytotoxic component of elecampane.

027. Conservation Ecology Oral Session I

8:00 to 9:30 am

Bonilla Science Hall, BSH 129

Conservation Ecology

Conservation Ecology Oral Session I

Participants:

- 8:00 027.135 U **A Multi-year Analysis of Wing Loading in the Monarch Butterfly During the Fall Migration: Effects of Habitat Loss on**

Migrants., Joshua Shayne Huckabee, Temple College/University of Mary Hardin-Baylor; Jason Locklin, Temple College

Monarch butterflies (*Danaus plexippus plexippus*) are well-known for their annual migrations across North America. In the last 20 years, migratory monarch populations east of the Rocky Mountains have declined as much as 90%, and habitat loss along their migratory route in the United States and wintering site in Mexico have long been the leading hypothesis to account for the decline. The U.S. Fish and Wildlife Service is currently conducting a status review of the butterfly under the Endangered Species Act; therefore, it is essential to better understand the migration dynamics in order to aid in their conservation efforts. Herein we present fall migration monarch wing load and census results (our proxies for monarch condition) from a multiyear (2010-2014) study in central Texas, one of which (2011) includes a historical drought. In all years except 2011, monarch wing loads decreased through the course of the migration, i.e. those arriving early each year in central Texas had heavier wing loads than those arriving towards the end. In 2011, however, wing loads were consistent and relatively light. The migrants also arrived two weeks later in 2011 than in other years. The drought of 2011 likely contributed to the lack of wing load variability and delayed arrival that year as it affected the distribution and abundance of nectaring and host plants needed to fuel the migration. While our study focuses on a short term environmental stressors, it highlights the association of the effects on migrating monarch condition and habitat loss.

8:15 027.136 U **Anuran Population Response to Artificial Wetlands**, Alan Lizarraga, University of Texas at Tyler

John Bunker Sands, an artificial wetlands in central Texas, was surveyed for its anuran populations from 16 May to 31 October 2014. There were no introduced anuran populations at this location. In this time frame, precipitation, high and low temperature, relative humidity, and moon phase were also collected from the nearby airport. During this project, two patterns emerged about the anuran populations' reproductive calling: (1) certain species that were normally found in local habitats were not calling (2) some species ended their reproductive calling season early, with some species stop calling 2-3 months before normal end of season.

8:30 027.137 U **Dispersal of the Georgetown salamander (*Eurycea naufragia*) within two spring sites**, Areli Micol Gutierrez, Southwestern University; Benjamin Allen Pierce, Southwestern University
Eurycea naufragia, the Georgetown salamander,

is a neotenic, permanently aquatic salamander found only in Williamson County, Texas. Although listed as threatened under the Endangered Species Act, little is known about its ecology. Using photographic recognition, we studied movement of individual salamanders at two spring sites over a 20-month period, comparing dispersal rate and movement within and between the two populations. We found a significant difference in rates of movement between gravid and non-gravid individuals, but no significant difference between the two populations. In contrast to some other headwater spring salamanders, *Eurycea naufragia* displayed no directional bias in its movement. Knowledge about dispersal provides important information needed for developing comprehensive conservation strategies for the species and a better understanding of their ecological requirements.

8:45 027.138 U **Effects of Facial Stripes on Attacks in Snake Models**, Jacob Scribner, Stephen F Austin State University; Matthew A Kwiatkowski, Stephen F Austin State University

The role of facial coloration and patterns in animals has been debated for many years. One type of facial pattern, contrasting stripes, has been found to function in myriad ways for different animals, including social signaling, aposematic warnings, and glare reduction. Facial stripes are prominent in some snake taxa, especially vipers, yet little is known about their function. In our study, we tested the hypothesis that facial stripes are used as a warning to potential predators using plasticine snake models. We constructed models to have a similar body shape to two common viper species found in east Texas: copperheads and cotton mouths. A total of 120 models were placed in a natural environment, 60 with facial stripes and 60 without. Clear attacks occurred on 17 models: 15 with facial stripes and 2 without. The number of attacks was compared using a binomial test and a significant difference was found ($P = 0.002$). Interestingly, the results of the study did not support our original hypothesis that facial stripes act to warn potential predators; the models with the facial stripes were attacked more than the models without. A possible reason for these results may be that some animals are known to actually attack animals perceived as a threat; this may explain why the models with the facial stripes were attacked more.

9:00 027.139 U **Effects of dynamic species ratios and densities on interspecific mating in the endangered *Gambusia nobilis* and its invasive congener, *Gambusia geiseri***, Brittini Broca, St. Edwards University

The Pecos gambusia (*Gambusia nobilis*; Family Poeciliidae) is a federally endangered species, endemic to western Texas and southeastern New

Mexico(1,2). As this species has been endangered since 1970, invasive largespring gambusia (*Gambusia geiseri*) provides the threat of extinction to the Pecos gambusia. Pecos gambusia inhabits spring-fed pools restricted to the Pecos River basin. This has clear implications in conservation because as numbers of *G. geiseri* increase, this changes both density and species ratio in the natural system. Therefore, it is necessary to test how differential specific densities impact mating success of both species. In this study, we ask the following questions: 1) Will the two species mate with heterospecifics (different species)? 2) In what capacity will they choose to mate with heterospecifics over conspecifics? 3) How do dynamic sex ratios and densities affect male mating? Thus, the primary purpose of this research is to ascertain the mechanisms by which *G. geiseri* and *G. nobilis* choose to mate with heterospecifics. To do so, I will vary the amount of male and female heterospecifics from each species in a controlled environment and observe frequency of matings toward the heterospecific. I predict that male mating frequencies will increase toward the heterospecific as both density of available females increases and species ratios become biased toward heterospecifics.

9:15 027.140 U **Habitat complexity as a predictor for female oviposition preference in two gulf coast gobies**, *Clint Stephen Morris, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

In mating systems in which the fertile female chooses oviposition sites based on quality of male territory, the female's preference ultimately dictates offspring fitness due to the eggs' adhesion to the spawn site surface. Thus, maternal spawn-site preference directly affects the female's reproductive success and subsequent offspring survival. Such female habitat preference is influenced by multiple environmental attributes, including habitat complexity, presence of predators, and surface area available for oviposition. Although much research has focused on habitat preference in relation to presence of predators/total available surface area, less is known about the effect that habitat complexity has on maternal spawn-site preference. The naked goby (*Gobiosoma boscii*) and darter goby (*Ctenogobius boleosoma*) are important model systems for studies in territoriality and aggression because males compete heavily for access to high quality territories, and thus, higher quality females. In result, research in this system has largely focused on males, and paid little attention to female reproductive behaviors and mate/habitat preferences. Thus, I will test the effect of varying habitat complexity in relation to

habitat preference and mate choice, using the presence of a landmark as an added measurement of complexity. Preliminary data show gobies prefer more complex oyster habitats, regardless of sex or species. This study will be the first to document interaction between fertile G. boscii and C. boleosoma females and varying levels of habitat complexity. Further, elucidating female preferences for oviposition sites will lend information to conservation efforts of substrate-dwelling species inhabiting the rapidly declining Texas sea grass beds.

028. Freshwater Science Oral Session I

8:00 to 9:30 am

AT&T Center, AT&T 121

Freshwater Science

Freshwater Science Oral Session I

Participants:

8:00 028.141 U **Cling On Me: Impacts of settlement of invasive *Limnoperna fortunei* (Dunker, 1857) on the native *Pomacea canaliculata* (Lamarck, 1822) in Uruguay**, *Averi Harp Segrest, Southwestern University; Cristhian Clavijo, 2del Museo de Historia Natural, Montevideo, Uruguay; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA*
 When exotic species invade, new interspecific interactions may yield negative impacts on native species. *Limnoperna fortunei*, a bivalve native to Southeast Asia, was first recorded in South America in the early 1990s. This highly invasive bivalve usually settles on hard, stationary substrates, but recent studies confirmed settlement on living gastropods. Field observations in Uruguay found that *L. fortunei* settle on *Pomacea* species, but implications of settlement have not been investigated. Given the likelihood of overlapping ranges for these spreading species in native and exotic habitats, we examined potential impacts of bivalve attachment to shells of *P. canaliculata*. We conducted experiments to determine if adult *P. canaliculata* altered activity frequencies (feeding, mating, lung ventilation, and resting) when *L. fortunei* were attached. We attached *L. fortunei* shells filled with sand (to simulate weight of live bivalves) to male and female *P. canaliculata* shells (3 each per trial) and observed changes in activity relative to paired controls with no bivalves. Trials (N=5) were conducted from 21 December 2014 to 04 January 2015 in Maldonado, Uruguay. Trials lasted 48 hours with 30 minute observations every four hours. Preliminary results indicate that snails with bivalves attached exhibit reduced non-mating activities, which may have implications for fecundity as less time foraging may reduce reproductive output. While reduced fecundity may

not significantly impact prolific reproducers like *P. canaliculata*, other less fecund gastropods might experience dramatic negative impacts when *Limnoperna* invade. Future work will examine other species with *Limnoperna* attached to determine if there are parallel interactions.

- 8:15 028.142 U **Cued In : Adult and hatchling *Pomacea maculata* behavioral responses to predator chemical cues**, Allie Watts, Dr. Burks, Southwestern University, Georgetown, TX; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA
Chemical cues from predation influence behavioral interactions in aquatic communities. Predators release chemical cues, termed kairomones, into the water where prey can sense them. Prey respond through movement away from the predator and such responses often depend on identity of the predator, especially depending on prey size. We investigated the prey response of hatchlings and adult apple snails (*Pomacea maculata*) when exposed to kairomones from crayfish and redear sunfish. We determined prey response by movement of snails by measuring the distance traveled. Snails may either seek to bury themselves in sediment or crawl out of the water. Behavioral response experiments lasted between 30 and 60 minutes with three observations where we marked locations. We started a “pre” cue versus “post” cue experiment that investigated whether exposure to kairomones (crayfish or crayfish and fish) influenced movement of hatchlings and if pre-cued hatchlings showed more movement to kairomone exposure than post-cued hatchlings. Pre-cued hatchlings received exposure to crayfish kairomones 24 hours before while post-cued hatchlings experienced exposure to kairomones only during the experiment. In agreement with our predictions, we saw general trends of increased movement in pre-cued hatchlings. In the future, we will repeat the “pre” cue versus “post” cue with adult snails and examine if differing pH levels alter kairomone response. Behavioral responses to predatory cues have been demonstrated in the pond snail *Physella gyrina*, but not yet for the apple snail *P. maculata*. This study gives evidence for similarities in the anti-predator movement of *P. maculata* to *Physella gyrina*.

- 8:30 028.143 G **Determining viable host-fish species for *Fusconaia askewi*, *Potamilus amphichaenus*, and *Pleurobema riddellii* of East Texas**, Ein Bertram, University of Texas at Tyler; John S Placyk, Jr., The University of Texas at Tyler; Lance Williams, University of Texas at Tyler
Freshwater Unionid mussels provide some of the most important ecosystem services in fresh water systems, yet are the most imperiled group of organisms in North America. In addition to

anthropogenic and natural disturbances that contribute to their decline, the absence of their obligate host-fish species is also a cause of their diminishing diversity and abundance. The Texas Pigtoe (*Fusconaia askewi*), the Texas Heelsplitter (*Potamilus amphichaenus*), and the Louisiana Pigtoe (*Pleurobema riddellii*) are state threatened species of Texas with no known host-fish species on record. There have been various methods used to test for host-fish species including artificial infestations in lab studies and by collecting naturally infested fish from the field and examining the gills and fins for glochidial encystment. This study aims to determine naturally occurring and viable host-fish species for three state threatened mussel species by collecting naturally parasitized fish from the wild and collecting fully metamorphosed juvenile mussels that have naturally dropped off. These juveniles are being identified to species through DNA sequencing with amplification of the ND1 gene. The sequences are compared to an adult molecular key that has been created for all 37 mussel species that occur in East Texas. The predicted outcomes of this study is to confirm host-fish species for state threatened freshwater mussels in accurately representing the fish-mussel interactions that occur in nature, while also aiding in implementing conservation methods for fresh water mussels of East Texas.

- 8:45 028.144 G **Flow-dependent competition between the endangered *Gambusia nobilis* and invasive *Gambusia geiseri***, Kelbi Dayne Delaune, Sam Houston State University
The desert-spring fish, *Gambusia nobilis* was once distributed widely throughout the Pecos River drainage from Texas into southern New Mexico. However, water withdrawal and habitat alterations within this system have reduced the distribution of *G. nobilis* to ~6 regions throughout the drainage. Specifically, The San Solomon Spring complex near Balmorea, Texas currently supports the largest natural *G. nobilis* population globally. However, populations in this area continue to face threats of extirpation because of habitat loss associated with agricultural irrigation in the area. Moreover, *G. nobilis* populations may be further stressed by the presence of an invasive congener (*G. geiseri*) that may compete with *G. nobilis* for resources. This is supported by recent population estimates showing that the invasive *G. geiseri* out numbers *G. nobilis* by as much as 20 to 1. Additionally, an analysis of gut content data and stable isotope data show high-diet overlap between *G. nobilis* and *G. geiseri*, suggesting that competitive dominance of *G. geiseri* may be a principal cause driving down *G. nobilis* population size in these localities. In order to test these predictions, a competition study with varying

density treatments was conducted in the summer of 2012 but showed equal competitive interactions between the two congeners. However, we predict, based on field observations, flow may play an integral part in competitive interactions in this system. Herein, I will report on the results of a second competition study where flow was the key variable tested to determine competitive interactions. These data will be useful for modeling community dynamics necessary to adequately manage populations of the endangered *G. nobilis* throughout its range.

- 9:00 028.145 N **Healthy watershed approach to managing streams: Role of science, stakeholders, education and partnerships**, *Tom Arsuffi, Texas Tech University Llano River Field Station*

Watershed is a productive scale to evaluate streams to perturbations. Such disturbances affect stream flow and water quality. To manage and maintain the ecological integrity of the Upper Llano River, Texas using a partnership approach, the TTU Llano River Field Station, Texas A&M Water Resources Institute, Texas Parks and Wildlife Department are working with the South Llano Watershed Alliance to develop and implement a Healthy Watershed Protection Plan (WPP) through a federal Clean Water Act 319(h) grant from the Texas State Soil and Water Conservation Board and U.S. Environmental Protection Agency. We characterize complexity of the watershed ecosystem through an integrated assessment of the landscape and biotic condition, abiotic parameters, critical watershed functional attributes and water yield from implementation of best management practices (BMP). The WPP uses a stakeholder process for decision-making on issues; economics of BMPs; landowner concerns; types of treatment measures needed/recommended; and implementation. Watershed education includes public workshops and curriculum for K-12 students. Agency partnerships, stakeholder/landowner involvement and education should be considered resistance and resilience components of watersheds that promote stability by increasing capacity to absorb disturbances.

- 9:15 028.146 U **Possible correlation between cardiac malformations within Plains Leopard Frogs (*Rana blairi*) in the Texas Panhandle and concentrations of environmental pollutants**, *Enrique Vargas, University of Texas at Austin; Travis J. LaDuc, The University of Texas at Austin; Mary Poteet, The University of Texas at austin*
- Developmental malformations in amphibians and mammals have been attributed to environmental pollutants that act as endocrine disruptors. Although environmental pollutants have been

shown to affect development of the cardiovascular system in laboratory animals, no studies have evaluated the possibility of population level impacts of pesticides on cardiac defects in amphibians. The use of certain pesticides that can act as endocrine disruptors has risen with increasing urbanization and agriculture. Amphibian larvae are susceptible to these pollutants because of the contamination of necessary aquatic environments during development. We tested the prevalence and severity of cardiac malformations through time by using museum specimens of metamorphosed *Rana blairi* collected within a 60 mile radius of Lubbock, Texas between 1950- 1988. The frogs were dissected and examined for specific cardiac malformations including atrial septal defects (ASD), ventricular septal defects (VSD), and formation of extra vessels. If a defect was present it was ranked by severity of the abnormality. Pesticide use for this area was estimated using databases from USGS, EPA and the National Pesticide Information Network. A total of 40 frogs were dissected from the years 1952 through 1988. The number of frogs with cardiac deformities and the severity of those deformities increased significantly during this time period along with the application of certain agricultural and urban pesticides. Although based on a small sample size, these results suggest that amphibians may be experiencing a significant increase in cardiac malformations over time with environmental pollutants as one possible causal factor.

029. Physics Oral Session I

8:00 to 9:30 am

Bonilla Science Hall, BSH 223

Physics

Physics Oral Session I

Participants:

- 8:00 029.147 G **Experimental Probe of Ionizing Radiation from Superconductors Predicted by the Hole Theory of Superconductivity**, *Hamilton Carter, Texas A&M University*
- In 2007, Hirsch reported that the hole theory of superconductivity predicts the emission of ionizing radiation from superconductors as they transition (quench) from the superconducting to the normal state (J. Phys.: Condens. Matter 19, 125217 (2007)). An experiment has been constructed to test this prediction. A Pb sample is quenched to its normal state by a pulsed magnetic field with a magnitude everywhere greater than H_c , while a NaI scintillator is used to detect the ionizing photons. We will present the experimental design, and its limitations; report the experimental results, and discuss their implications.

030. Science Education Oral Session III

8:00 to 9:30 am
Gorman Center, GB 119
Science Education

Science Education Oral Session III

Participants:

- 8:00 030.148 N **University-Community Partnership and Underrepresented Minority Students Engagement in Science Technology Engineering and Mathematics (STEM) Education**, *Mamta Singh, Lamar University*
According to U.S. Census Bureau projections, racial and ethnic minorities are expected to comprise more than half of the national population by 2050 (Sobowale, 2012). This demographic shift means that minority students will make up an increasingly larger percentage of students in the national education system and STEM talent pool. Yet, relatively low rates of success among minority students in STEM education persist (Palmer, Maramba, & Gasman, 2012; Nathan & Bolton, 2010; Eisen et al. 2005; National Science Board, 2010). Thus, understanding how to maximize success among racial and ethnic minorities in STEM education is ever more critical (Sobowale, 2012). To address this issue with the knowledge demands of the 21st century, there is a growing recognition that university education needs to engage in partnerships with the community and industry. The aim of this paper is to explore the establishment of such partnership. The study presents partnerships development among university, faith based organizations, and local school system to enhance student interest in STEM, a brief discussion of the context in which these partnerships was established and maintained, structure and functions of partnerships. The paper also addresses various level of student development from class room behavior improvement, school attendance to increase students' interest in the foundations of STEM education, undergraduate students' involvement in STEM education as informal educators.
- 8:15 030.149 G **A Female Hispanic's Mission to Obtain a STEM Degree: Esperanza's Persistence in the Face of Adversity**, *Michele J Mann, University of Texas; Jair Aguilar, The University of Texas at Austin*
Science, technology, engineering and mathematics (STEM) degrees are not equally accessible to all people. Less than 20% of the Hispanics that begin college as a STEM major in 2004 completed a STEM degree by 2009. Thus, there is a need to have a better understanding of the challenges faced by Hispanic students and how the development of a science identity increases the likelihood of completing a STEM degree. This case study of a Hispanic female

addresses this issue. It looks at the connection between her developing a science identity and her pursuit of a STEM degree. Parental support, science extracurricular activities, and being part of a science community are all ways that students can build their own science identity however these factors are more likely to be absent for students from underrepresented groups. For our participant it was found that the practice of science, as opposed to doing school science, proved critical for her development of an identity. She was also a part of a science research community. Such communities are not always present in schools. It will be important to foster such communities in order to support the development of scientific identities among underrepresented minorities.

- 8:30 030.150 G **Beyond Individual Difference: Exploring School Effects on Scientific Literacy in PISA 2012 using Hierarchical Linear Modeling**, *Hye Sun You, University of Texas at Austin*
Schools' inequality in achievement remains a persisting challenge for U.S. education. This study focuses on schools, and how characteristics and the structure of U.S. schools influence variation in students' science achievement. To explore school effects related to social distribution and resources on science achievement, this study used large and nationally representative 2012 PISA data set and most appropriate statistics techniques: hierarchical linear modeling (HLM). The findings reveal that the substantial proportion of the variation in student achievement lies within schools, not between schools in the null model, however, given that school effects of MEANESCS, school type, size, and quality of resources in the final model, we found that a good deal of variability across schools was observed and between school variation has more impact on students' science achievement than students' characteristics. At the school level, only school mean ESCS and school types were the important predictors which influence mean science scores. The findings from this study demonstrate distinct school differences in the relationships between MEANESCS, school type and science achievement. This study makes a contribution a better understanding of schools effects in U.S.15-year-olds students' science achievement and point to policy-driven reforms to enhance school equity for all students.
- 8:45 030.151 G **Effects on Self-Efficacy and Self-Regulated Learning**, *Christopher Golubski, University of Texas at Austin; Michele J Mann, University of Texas*
We studied a cohort of entering freshmen who declare themselves as biology majors at a large, competitive public university in the South to determine if prior rigorous study of advanced STEM subject matter had a significant effect on

self-efficacy and performance in an introductory biology course. We used results from the Advanced Placement examinations in several different areas to measure traits of self-regulated learning and the results of the Motivated Strategies for Learning Questionnaire (MSLQ) to measure self-efficacy both at the beginning at the end of the semester. Results indicate significantly higher self-efficacy for students who did better on AP exams than those who did not.

031. Terrestrial Ecology and Management Oral Session III

8:00 to 9:30 am

Mabee Library, Library Auditorium

Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session III

Participants:

8:00 031.152 G **Serosurvey of Marfa Plateau Coyotes (*Canis latrans*) for Canine Distemper**, John Timothy Stone, Sul Ross State University; Christopher M Ritzi, Sul Ross State University; Sean Graham, Sul Ross State University
Canine distemper (CD) is a highly virulent member of the family Paramyxoviridae that affects a wide range of terrestrial carnivores. It is a disease that has threatened biodiversity both domestically and abroad. When a disease has the potential to impact biodiversity it is dangerous to be ignorant of its potential presence in the landscape when making management decisions. In order to obtain baseline estimates of seroprevalence of CD, sera samples were obtained from coyotes (*Canis latrans*) in the Marfa Plateau region of the Trans-Pecos. Thirty nine samples were collected: 10 from aerial gunning, and 29 via hunter harvest. The sera samples were analyzed via indirect enzymatic immunoassay (indirect ELISA) for presence of antibodies to CD. Forty six percent (n=18) of the sampled sera tested positive for antibodies to CD. We also recorded age classes for the 29 coyotes samples obtained via hunter harvest. Twenty of the collected coyotes were identified as juvenile and 20% of these individuals (n=4) tested positive for antibodies for CD. The other 9 coyotes were identified as adults and 66% (n=6) of these individuals tested positive for antibodies for CD. Although further surveillance is needed, these results indicate that CD is enzootic in the Marfa plateau region and the high prevalence of CD in this area should be considered when making ecological management decisions regarding carnivores in the area.

8:15 031.153 G **Sexual Dimorphism and Intersexual Niche Divergence in *Nerodia rhombifer***, Steven R Hein, University of Texas at Tyler
Sexual selection is the most commonly relied upon causal explanation for sexual dimorphic

traits. The niche divergence hypothesis offers an alternative explanation predicting the driving force in some sexual dimorphic traits is a reduction in intersexual competition. The trophic niche and sexually dimorphic feeding structures have received the greatest deal of attention in relation to niche divergence. Snakes provide an excellent study system for the niche divergence hypothesis as sexual dimorphism is common place in feeding structures (skull, mandible, teeth). We used mandible length as a measurement of overall head size and feeding capability in the water snake *Nerodia rhombifer*. We found a significant degree of sexual dimorphism in mandible length with females being larger, although only after sexual maturity. We hypothesize that this trait may have arose as a sexually selected characteristic, however is now maintained via niche divergence. We plan to continue our research in the lab comparing feeding efficiency between male and female snakes.

8:30 031.154 G **Spatial ecology of Western Screech-Owls (*Megascops kennicottii*) in the Davis Mountains of West Texas**, Corin M Olivas, Sul Ross State University; Andrew Kasner, Wayland Baptist University; Christopher M Ritzi, Sul Ross State University

Western Screech-Owls (*Megascops kennicottii*) are small, nocturnal owls that occur year-round throughout most of the Trans-Pecos region in West Texas, associated with deciduous woodlands and riparian habitats. Roadside nocturnal callback surveys were established along six well-defined trails within the Davis Mountains Preserve, and took place from May until August (2013-2014) to ascertain the relative abundance of *M. kennicottii* within the property. Abundance indices (birds detected/visit/station) were calculated for both survey seasons. Based on criteria for suitable screech-owl habitat previously defined in the literature, several models were then created within ArcGIS to compare against the field data, and to help predict areas of occupancy within the property. Geocoordinates for the call stations were collected via GPS during the study. Occupancy models with detection probabilities were also created using Program PRESENCE based on collected presence-absence data. Thirty one point stations were sampled in 2013, with a total of 127 individual owls responses recorded. In 2014, 29 stations were visited, resulting in a total of 107 responses. Owl abundance averaged 1.05 owls/point in 2013, and 0.82 owls/point in 2014

8:45 031.155 N **Status of the subtropical tamarisk beetle (*Diorhabda sublineata*) as a saltcedar (*Tamarix*) biocontrol agent along the Río Grande and its impact on a non-target species, *Tamarix aphylla***, Anne Marie Hilscher, Sul Ross State University; Christopher M Ritzi, Sul Ross

State Univesity

Saltcedar (*Tamarix spp.*) is a deciduous shrub or small tree that was introduced into the United States from Eurasia in the early 1800s to stabilize riverbank erosion and to serve as a windbreak and ornamental. However, due to a high reproductive potential, saltcedar has become invasive on many river systems in the western United States. Some of the worst tamarisk infestations occur in the southern areas of the Rio Grande, and in an attempt to control this plant by biological means, the USDA released several species of tamarisk leaf beetle (*Diorhabda spp.*) in southern Brewster and Presidio counties in Texas. The suitability of the species was evaluated, and data suggested that the Tunisian Subtropical species (*D. sublineata*) was best suited to this region. Observations also indicated that the tamarisk leaf beetles were capable of establishing on the non-target athel tree (*T. aphylla*). Six sites along the Rio Grande River, from Lajitas, TX to Candelaria, TX, routinely are monitored to determine the long-term impact on the saltcedar and on the non-target athel trees in the region. Although defoliation remained steady during the previous years, significant defoliation events were not observed until September and October of 2014.

- 9:00 031.156 U **The Role of Microhabitat Suitability in Plant Competition**, *Michelle Victoria, St. Edward's University; Stephanie Yelenik, U.S. Geological Survey Pacific Island Ecosystems Research Center; Susan Cordell, U.S. Forest Service, Institute for Pacific Island Forestry*
Our study explored the relationship between two shrubs species among different microhabitats in abandoned pasture areas in Hawai'i but are subject to erosion. We measured the percent cover, species richness, and number of shrubs on high, medium and low suitability plots that were dominated by either the exotic grass or native shrub. In addition, we measured four abiotic variables that relate to resource availability in all plots. Finally we measured the C:N ratio of foliage of both species to understand the uptake of resources. There were no differences in the percent cover of dominant species, or overall species richness among microhabitats in the *D. viscosa*-dominated plots. In contrast, species composition differed among microhabitats in the *C. clandestinus*-dominated plots. Surprisingly, the percent cover of *C. clandestinus* was highest in the medium suitability microhabitats. On plots that were in *C. clandestinus*-dominated areas, *D. viscosa* shrub abundance was significantly higher in low suitability microhabitats, potentially due to low cover of *C. clandestinus*. We found a positive correlation between open space and average *D. viscosa* shrub cover in *C. clandestinus*-dominated

microhabitats. In sum, we found that *C. clandestinus* may be responding to abiotic factors, but that competition for space and light play more of a role for *D. viscosa*. Medium-suitability *C. clandestinus* microsites, which occur on flat terrain, are candidate sites for fast regrowth after training disturbance. This research also suggests that high-suitability microsites lead to high competition from invasive species which may complicate restoration efforts.

032. Cell and Molecular Biology Oral Session II

10:00 to 11:30 am

International Conference Center, International Conference Center Auditorium

Cell and Molecular Biology

Cell and Molecular Biology Oral Session II

Participants:

- 10:00 032.157 U **Sequencing and determining the ETOH-sensitivity of *b1101* mutation in *Danio rerio***, *Courtney Brock, St. Edward's University; Johann Eberhart, University of Texas*
Zebrafish provide a useful model for studying the effects of prenatal ethanol exposure upon craniofacial development. Genetic screens were performed to identify ethanol-sensitive craniofacial mutants. The original screen demonstrated that zebrafish with the *b1101* mutation have a truncated ethmoid plate and lack pectoral fins. The mutation has an autosomal recessive inheritance pattern. The phenotype in untreated *b1101* mutants strongly resembles those in *extosin 2 (ext2)* mutants, suggesting *b1101* is an allele of *ext2*. Primers were designed for the 15 exons in the *ext2* gene, and PCR was performed using pooled wild-type (+/+, +/-) and mutant (-/-) DNA from 80 5 days post fertilization (dpf) zebrafish embryos. PCR amplicons are currently being sequenced. ETOH-screenings also suggest that the *b1101* mutation is ethanol-sensitive. Groups of zebrafish embryos were exposed to 1% ethanol embryo matrix for different windows from 4 hours post fertilization (hpf) to 5 dpf. Initial data suggests that the sensitivity window for *b1101* is from 4-24 hpf. Zebrafish *ext2* is involved in chondrocyte morphogenesis, and is an ortholog of human *EXT2*. In humans, mutations in *extosin* genes confer a disease called Hereditary Multiple Exostoses (HME), which affects 1 in 50,000 among the general population. Characterization of the *b1101* mutation will improve understanding of the role *ext2* plays in development, and may provide a useful model for further HME studies.
- 10:15 032.158 G **The Role of B56γin canonical Wnt signaling in *Xenopus laevis***, *Osama Qureshi, Sam Houston State University; Joni Seeling, Sam Houston State University*
Protein phosphatase 2A (PP2A) is heterotrimer consisting of A (structural), B (regulatory), and C

(catalytic) subunits and regulates the Wnt pathway. B56, a type of B subunit, is comprised of a five member gene family that either inhibit or are necessary for canonical Wnt signaling. The Wnt signaling pathway itself is important not only in dorsal-ventral axis patterning in embryogenesis, but also in cancer. In fact, previous research has demonstrated that the loss of function of B56 has been found in several cancer types including lung, breast, and colon cancers. This project will functionally analyze one of the paralogs of B56, B56 γ , by carrying out a series of microinjections on *Xenopus* embryos to determine if B56 γ inhibits Wnt, a dorsalizing factor, in vivo, exhibits ventralizing activity, where it acts within the Wnt pathway, and if it is specific only to the Wnt pathway. The microinjections will take place either on the dorsal or ventral midlines of stage 3 blastulas and will be examined three days hence for expected phenotypes. We hypothesize that B56 γ will inhibit Wnt signaling by blocking the formation of a secondary axis that would be expected to be induced via ventral ectopic microinjection of xWnt-8, exhibit ventralizing activity when microinjected in the dorsal midline of an early blastula, will act on a unique substrate on the Wnt pathway, and is specific for Wnt. The elucidation of the role of B56 γ will provide insight into the mechanisms behind carcinogenesis and lay down foundational research needed for possible treatments.

033. Chemistry and Biochemistry Oral Session I

10:00 to 11:30 am

Mabee Library, Library Auditorium

Chemistry and Biochemistry

Chemistry and Biochemistry Oral Session I

Participants:

- 10:00 033.159 N **An Overview of Recent Biodiesel Research Activity at Stephen F. Austin State University**, *Russell J. Franks, Stephen F. Austin State University*
 Research into the synthesis and characterization of biodiesel fuels has been conducted by undergraduate and graduate students at Stephen F. Austin State University over the past several years. Biodiesel mixtures have been synthesized using acid- and base-catalyzed transesterification methods. Once synthesized, the mixtures have been analyzed calorimetrically and viscometrically. More recently, however, our efforts have been focused on improving the transesterification reaction. The acid-catalyzed method along with traditional heating has yielded cleaner mixtures that have been easier to purify and analyze. The primary disadvantage of the acid-catalyzed method is that the reaction is slower. We have, however, been able to achieve good conversion using microwave heating for

only 5-10 min. This has enabled us to use basic catalysts for the transesterification. We have been able to get good conversion without contamination from saponification side reactions. In addition, we have been studying the use of various types of acidic clays as catalysts for the transesterification reaction. We have been able to use clays to catalyze the synthesis of fatty acid alkyl esters from the corresponding fatty acid and alcohol in a process that is akin to traditional Fischer esterification. Extension of this methodology to the biodiesel synthesis is ongoing.

- 10:15 033.160 U **Challenges in visualizing RecA-DNA interaction in chemiluminescent electrophoretic mobility shift assays**, *Jessica Rose Kenneson, Wayland Baptist University*
 A high-end DSLR camera was employed for analysis of protein-DNA interaction using chemiluminescent electrophoretic mobility shift assays (EMSAs) in order to study binding affinity of DNA repair protein, RecA, and selected *Mycobacterium tuberculosis* oligomers. This alternative method for EMSA visualization offers a low-cost benefit over using a phosphorimager with radioactively labeled DNA. Mini-format chemiluminescent, fluorescent, and large-format chemiluminescent EMSAs were used to determine percent RecA binding. Decrease in free DNA signal indicates RecA did bind to DNA, though a bound DNA band was not resolved in any of the three types of EMSAs. Future research will involve further examination of this protein-DNA interaction in order to determine why the complex is not migrating into the EMSAs.
- 10:30 033.161 U **Did the Bastrop Wild Fire affect the phosphorus quantity in the soil?**, *Mohammad Abu-Esba, Student*
 On September fourth 2011 the most destructive fire in the history of Texas hit the Bastrop County Park. Two people were killed by the fire while it destroyed 1,673 houses. The fire left \$325 million in property damages. Many physical differences from before and after the fire are readily visible. However, the chemical changes are much harder to see. Fires cause many chemical changes to soil but there has not been much study on this subject and even less on specific chemical compounds effected by fires. Nitrogen, phosphorus, and potassium are essential nutrient elements obtained in soil. This research will compare how these nutrients have been effected by the Bastrop fire. Phosphate was the first nutrient that we studied. There will be a comparison of the phosphate concentration between different Burn severities and Horizons. With these and further results, we can better understand the affect that the fire has on the soil nutrients currently and how it will affect the nutrients' cycles in the future.
- 10:45 033.162 U **Morphological Control of Film**

Structure in Perovskite Solar Cells, *Christopher Jackson, Saint Edward's University*

In the search for cleaner sources of energy, sunlight is arguably the most viable source of renewable, low cost power with minimal negative impact on the environment. To take advantage of this, recent research to improve the efficiency of solar cells has focused on perovskites, semiconductor materials that adopt a crystal structure of ABX₃. Certain perovskites, particularly those synthesized with methylammonium lead iodide, have shown significant light harvesting properties and power conversion efficiencies approaching 20%. Because the degree of crystallinity appears to be the limiting factor in improving perovskite solar cell efficiency, it is critical to produce more highly crystalline films. This study was able to determine ideal deposition parameters, including solution preparation methods, spin-coating conditions, and levels of air exposure. These perovskite thin films were then analyzed using microscope imaging, UV-Vis absorption, and X-ray diffraction measurements. Ultimately however, the shear forces acting upon the film during spin-coating limit the degree of crystallinity given by this technique. Therefore, this research also explores a novel solution-shearing process, which offers the possibility of depositing more highly aligned, crystalline perovskite thin films.

034. Conservation Ecology Oral Session II

10:00 to 11:30 am

Bonilla Science Hall, BSH 129

Conservation Ecology

Conservation Ecology Oral Session II

Participants:

- 10:00 034.163 U **Organic compound analysis red wolves** (*Canis rufus*) vs. coyotes (*Canis latrans*), *Lauren Renee Spindler, Hardin Simmons University; Hannah Jones, Hardin-Simmons University; Kylie Donch, Hardin Simmons University; Erin Ray, Hardin Simmons University; Wendi Wolfram, Hardin-Simmons University*

Urine is used by multiple animal species as a means of communication to other conspecifics and includes information such as age, physical fitness, sex, reproductive status, and territorial boundaries. Multiple studies reveal recurring volatile organic compounds found between species and especially within the family Canidae. In this study the stir-bar sorptive extraction method was used in correlation with gas chromatography-mass spectrometry to isolate the volatile organic compounds in the urine samples of red wolves (*Canis rufus*) and coyotes (*Canis latrans*). In 1992, hybridization between critically endangered red wolves and coyotes became the

primary threat to red wolf breeding programs. We analyzed the similarities and differences between these volatile organic compounds to explain potential reasons for hybridization. In identifying organic compounds that could impact hybridization, our study can be used to reevaluate breeding programs in order to protect the purity of red wolf reproduction.

- 10:15 034.164 N **Population density and habitat associations of the seaside sparrow at Laguna Atascosa National Wildlife Refuge, Cameron County, Texas**, *jacqueline ferrato, The Nature Conservancy; Randy Simpson, Texas State University; Michael Small, South Carolina Department of Natural Resources; Joseph Veech, Texas State University; Mark Conway, South Texas bird banding*

In 2000, a resident population of Texas Seaside Sparrows (*Ammodramus maritimus*) was identified at Laguna Atascosa National Wildlife Refuge on the lower Texas coast, extending its known breeding distribution further south than previously described. I studied this breeding population of Texas Seaside Sparrows on the Laguna Atascosa National Wildlife Refuge to obtain population density estimates and describe habitat associations. I estimated seasonal density during one year using a distance sampling approach. I identified plant species and estimated percent ground cover using a 20x50 cm frame placed systematically along bird survey transects. Seaside Sparrow density estimates by season were 3.49/ha (CV = 8.27) for spring 3.59/ha (CV = 18.16) for summer, 4.07/ha (CV = 9.69) for fall, and 1.91/ha (CV = 21.92) for winter. The dominant plant species along the intertidal zone transect where Seaside Sparrows were detected include Saltwort (*Batis maritima*), Saltgrass (*Distichlis spicata*), and Sea oxeye daisy (*Borrchia frutescens*). Previous studies indicated cordgrasses (*Spartina* spp.) to be a dominant plant species strongly associated with Seaside Sparrows and a predictor of nest success. However cordgrasses were absent from the intertidal zone where Seaside Sparrows were detected during my study. Habitat associations should be revised to include the plant community found in this study.

- 10:30 034.165 N **Survey of (north)east Texas bat reports: connecting the dots...**, *David Brooks, East Texas Baptist University*

Bat surveys outside of cave habitats are notoriously lacking. Primarily because caves have more individual bats, it is much easier and more enjoyable to observe these cave colonies. Searching the forest for occasional bats doesn't have the same dramatic flair as wandering, Indiana Jones-style, through cave systems. Additionally, rare bats are usually found in cave-like habitats so funding is skewed toward cave studies. There are

magnificent caves in the hill country of Texas and in the Ozarks of Arkansas, but East Texas is rather devoid of caves. When East Texas forests have been surveyed, they tend to be in the National Forests of the (south)East Texas region. The area from Texarkana south to east of Carthage is missed by the cave studies to the north and west, and the netting studies of national forests to the south. Within this no-man's land sits the Caddo Lake wetlands. Caddo Lake is a wonderful wetland habitat situated on the border between Texas and Louisiana. Caddo Lake is home to one the largest cypress forests in the world and is an international RAMSAR wetland. Bat reports are represented on distribution maps as dots and squares depending on method of reporting. Connecting the different reports together will give a better understanding of the bats of the area. This presentation will attempt to connect the dots of the various reports to give a more precise picture of bats of the Caddo Lake wetlands.

10:45 034.166 G **Territoriality and 'dear enemy' recognition between heterospecific pupfishes (genus *Cyprinodon*)**, Christopher Brooks, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University
Territorial animals are aggressive towards other individuals, but territorial aggression can vary among species or based on the identity of the competitor. Some territorial species exhibit "dear enemy" recognition; where lower levels of aggression are directed at neighboring, territorial individuals compared to intruders or unfamiliar individuals. The sheepshead minnow, *Cyprinodon variegatus*, is more aggressive than and has been shown to outcompete some closely related species. Territorial males of this species also exhibit 'dear enemy' recognition among neighbors. Recently, *C. variegatus* has been introduced into the home range of *Cyprinodon rubrofluviatilis*, leading to hybridization between the species. We examined territorial formation between heterospecific neighbors and evaluated if heterospecific neighbors express 'dear enemy' recognition towards each other. We also tested the hypothesis that territorial males of these two *Cyprinodon* species differ in expression of 'dear enemy' recognition. We found that territorial male *C. rubrofluviatilis* in conspecific groups and both *C. rubrofluviatilis* and *C. variegatus* in heterospecific groups do show more aggression towards non-territorial males. Territorial males also reduce aggression over time. Energetically expensive aggressive acts (bites and chases) towards territorial neighbors decreased while aggression towards non-territorials remained unchanged. Less energetically expensive behaviors (displays) increased towards territorial

males while no displays were shown towards non-territorials. Increasing displays allows for more energy to be used for foraging and courting females. This is the first example of 'dear enemy' recognition between heterospecifics in vertebrates. When aggression is decreased towards invasive species, hybridization events may increase ultimately leading to introgression with native species.

11:00 034.167 U **The impact of biometeorology on the behavior of red wolves (*Canis rufus*)**, Hannah Jones, Hardin-Simmons University; Sarah Bowen, Hardin-Simmons University; Tessa Tenczar, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University

Biometeorology focuses on the relationship between living organisms and environmental factors. Abiotic conditions such as barometric pressure, lunar phases, temperature and time of day impact both animal behavior and the chemosensory signals used by animals to communicate. These environmental factors can modify chemosensory signals and potentially alter animal behavior. Abiotic conditions in both the presence and absence of chemicals previously identified to initiate scent-marking behavior in red wolves (*Canis rufus*) were analyzed to determine the impact on wolf behavior. We used barometric pressure, lunar phase, temperature and time of day as environmental variables to determine optimal conditions for scent-marking behaviors in red wolves. Preliminary results reveal red wolves were most active during the hours of 1600-1700, in temperatures ranging from 13°C to 15°C, with barometric pressure ranging from 30.91Hg to 40.00Hg and during both the waning gibbous and waning crescent lunar phases. Understanding the influence of abiotic variables, through biometeorology, in correlation with chemosensory signaling on red wolves can provide more detailed information to identify their impact on canid behavior.

11:15 034.168 U **Using Camera Trapping Techniques to Identify the Presence of Meso-mammals and Determine Habitat Preferences within the Caprock Canyonlands of West Texas**, Trudi Cooke, Wayland Baptist University; Andrew Kasner, Wayland Baptist University

Surveying was done from April 2014 to November 2014 and will continue through the spring of 2015 to identify the presence of Meso-mammals and determine habitat preferences using camera trapping techniques on a 1,200 ha privately owned site located in Briscoe County outside of Quitaque, Texas. Eight camera areas of approximately 150 ha were monitored for a total of 12 trap events over 386 trap nights (TN) with an overall meso-mammals trap success rate of 3.26 per 100 TN. Preliminary results show that

Erethizon dorsatum (porcupine, 19/100 TN) had the highest trap success rate, followed by: *Urocyon cinereoargenteus* (gray fox, 0.82/100 TN), then *Lynx rufus* (bobcat, 0.27/100 TN) and *Procyon lotor* (raccoon, 0.27/100 TN). Trap success increased with near proximity to creek beds and with distance from roads. Creekbed length was measured within a buffer with a 250m radius using GIS, raccoons (0km/0.62km² buffer) showed the least association with creek beds, followed by: fox (0.22km/0.62km² buffer), porcupine (0.24km/0.62km² buffer), and bobcat (0.27km/0.62km² buffer) with the greatest association with creek beds. Road length was also measured within a 250m radius buffer resulting in bobcats (0/0.62km² buffer) with the least amount of road length followed by: fox (0.31km/0.62km² buffer), porcupine (0.38km/0.62km² buffer), and raccoon (0.53km/0.62km² buffer).

035. Freshwater Science Oral Session II

10:00 to 11:30 am

AT&T Center, AT&T 121

Freshwater Science

Freshwater Science Oral Session II

Participants:

10:00 035.169 U **Spread of Invasive *Pomacea maculata*, Perry, 1810 (Ampullariidae) in the Southeastern United States**, Carson Elizabeth Savrick, *Southwestern University; Romi L. Burks, Animal Behavior Program, Southwestern University, Georgetown, TX, USA; Kenneth A. Hayes, Department of Biology, Howard University, Washington DC, USA*
 Invasive species impact ecosystems by competing with native taxa, altering habitats and facilitating establishment of other species (e.g. parasites). *Pomacea maculata* is a rapidly spreading invasive species of freshwater snail impacting native biodiversity, agriculture and public health in the southeastern United States. Previous work indicates two introductions of *P. maculata* from South America into the United States, initially Florida and Texas, from populations in Brazil and Argentina, respectively. Recent data indicate that the snails have spread to Alabama via Florida, but the origins of more recently established populations in Louisiana, Mississippi, and Georgia remain uncertain. To test the hypothesis that these recently established populations are the result of spread from populations located in geographically close states (Florida or Texas), we sequenced a portion of the cytochrome c oxidase subunit I gene from more than 205 individuals across 15 sites from Texas, Louisiana, Mississippi, Georgia, Florida and Alabama. Phylogenetic analyses were used to verify the identities of all individuals, and haplotype networks constructed to evaluate the patterns of

spread and population structure across the invaded range. Although exact routes of spread have yet to be determined, it is hypothesized that recreational boat traffic along with the aquatic plant trade and the aquarium industry are major contributors. To better understand the possible human health impacts, future work will include screening all samples for rat lungworm, *Angiostrongylus cantonensis*, which causes angiostrongyliasis in humans. These data will contribute to our understanding of the continued spread and potential impacts of *P. maculata* and congenics.

10:15 035.170 U **The Effect of Alternative Mating on Sperm Competition in Coercive Livebearing Fish**, Alenka Versi Cardenas, student; Raelynn Deaton Haynes, *St. Edward's University*

The objective of the experiment was to determine if exposure to males of different sizes would lead to alternative reproductive strategies associated with sperm plasticity in the coercive mosquitofish, *Gambusia affinis*. This study provided a unique opportunity to investigate the evolution of ejaculation as a result of sperm competition because males vary substantially in body size and, as a result, exhibit alternative mating strategies. In a previous study on species *Xiphophorus nigrensis*, commonly known as swordtails, it was confirmed that alternative mating tactics result in sperm plasticity. However, it was unknown if alternative reproductive strategies effect sperm plasticity in western mosquitofish, *Gambusia affinis*, that mate coercively regardless of body size. In order to measure sperm plasticity three treatment groups were exposed to males of varying sizes, and after several days sperm was collected from each focal male. The data collected from the study has not yet been analyzed. We predict that larger males will show an increase in the number of sperm produced when placed around other large males. We also predict that small parasitic males will increase the number of sperm produced when placed around a larger male. Future studies will aim at determining if the properties of the sperm are dependent on competition, and the physiological mechanisms by which sperm plasticity can be achieved.

10:30 035.171 G **Trends in land-use and Texas lotic fish communities**, Michael Lane, *University of Houston - Clear Lake; Mustafa Mokrech, University of Houston - Clear Lake; Stephen Curtis, Environmental Institute of Houston; Oakley Jenny, University of Houston - Clear Lake; George Guillen, University of Houston Clear Lake*
 Spatial patterns in Texas lotic fish communities have been influenced and restructured by anthropogenic modification. These modifications and pursuant changes are well documented in the literature. The need for a statewide (and national) assessment to evaluate the status of freshwater streams using fish communities and their habitats

was most recently addressed by the EPA National Rivers and Streams Assessment (NRSA). During the summers of 2013 and 2014, the Environmental Institute of Houston (EIH) used a probabilistic sampling design to survey various reaches of rivers and streams across Texas, sampling fish at nearly all sites through electrofishing. Utilizing GIS software (ArcMap), watershed analysis was conducted relative to these sites. We examined the relationship between major river basins, drainage basin size, and fish community metrics (abundance, richness, and diversity). Land-use was analyzed relative to each sample site and observed fish community composition. When feasible, further analyses are being conducted to evaluate temporal trends in land-use and fish community composition.

- 10:45 035.172 N **Use of Side-scan Sonar to Identify and Count Alligator Gar: Potential for Evaluating Population Density from Sonar Imagery**, *Paul Fleming, Texas Parks and Wildlife Department; Daniel J. Daugherty, Texas Parks and Wildlife Department; Nathan G. Smith, Texas Parks and Wildlife Department; Michael Baird, Texas Parks and Wildlife Department*
 Declines in the abundance and distribution of the Alligator Gar *Atractosteus spatula* have spurred the initiation of many management and research efforts to conserve remaining populations. However, inefficient sampling gears and low abundance in many systems, often hamper the collection of sufficient data to inform management. We tested a consumer-grade, side-scan sonar system to determine if it could serve as an efficient, non-invasive means to identify and count Alligator Gar. We first conducted a replicated pond experiment in which six ponds were stocked with known numbers of Alligator Gar and other large-bodied fishes to determine if Alligator Gar could be accurately identified and enumerated. We then conducted a field-based evaluation by comparing abundance estimates derived from side-scan sonar images to those derived from mark-recapture sampling of a small isolated riverine population of Alligator Gar. In pond experiments, Alligator Gar density based on sonar image interpretation was consistently underestimated (52% - 92% of true abundance) and other fishes were seldom falsely counted as Alligator Gar (7% of possible occasions). Side-scan counts from the river population (mean = 70 fish, range = 59-77) were remarkably close to the mark-recapture population estimate of 76 fish (95% CI = 43-149). We concluded that side-scan sonar has much potential for efficiently identifying and enumerating Alligator Gar with minimal effort. The technology may also prove useful for evaluating Alligator Gar habitat association and improving sampling efficiency

using traditional gears.

036. Mathematics Oral Session I

10:00 to 11:30 am

Bonilla Science Hall, BSH 223

Mathematics

Mathematics Oral Session I

Participants:

- 10:00 036.173 U **Behavior of Soliton Solutions to the Korteweg de Vries equation**, *Erica Renee Johnson, University of the Incarnate Word*
 The Korteweg de Vries equation is a nonlinear integrable partial differential equation that models shallow water waves. This presentation focuses on the visualization of soliton waves using a matrix-valued solution to easily identify properties of the individual wave. We consider the motion of a single wave as well as the interaction of multiple waves and discuss how the properties of each wave change in these cases. Included is a discussion of the limitations of computer algebra systems associated with the interaction of a large number of waves.
- 10:15 036.174 N **Diastolic function measured as left ventricular pressure (LVP) dynamics in humans diagnosed as normal.**, *John A Ward, Brooke Army Medical Center; K. W. Brown, San Antonio Military Medical Center; H. M. Coke, San Antonio Military Medical Center; B. J. Rubal, San Antonio Military Center*
 In current clinical practice, left ventricular (LV) diastolic function is assessed non-invasively by Doppler velocities during early diastole and atrial systole. In this study we model LV diastolic filling in patients who have undergone cardiac catheterization with high fidelity multisensor catheters. Pressure changes in the left ventricle during diastole reflect the physiologic interaction between the left atria and pulmonary venous circulation as blood reservoirs and the left ventricle as a time varying elastic chamber. Left ventricular, aortic, and pulmonary capillary wedge pressures and electrocardiograms were digitized at (500 samples/sec) from 11 patients diagnosed as having normal hemodynamics. Waveforms were obtained from the Hemodynamic Waveform Laboratory at San Antonio Military Medical Center. The nonlinear GRG algorithm in Excel Solver was used to assess LV relaxation ($P_r = P_0 e^{-kt} + P_b$) and diastolic filling pressure, $P_f = PLVEP (1 - e^{-mt})$, where the time constants of relaxation and filling were calculated at $1/k$ and $1/m$, respectively. The relaxation asymptote was limited to ≤ -20 mmHg. The results were: LV relaxation $\tau = 0.052$ (95% CI: 0.043 to 0.062) with LV Filling $\tau = 0.131$ (95% CI: 0.018 to 0.244) sec. The isovolumetric relaxation period following minimum LV dP/dt was 0.071 (95% CI: 0.042 to 0.101) sec and the diastolic nadir of LVP

was 3.6 (95% CI: -2.9 to 10.2) mmHg. In conclusion, results suggest that in normal subjects left ventricular diastolic function may be characterized by time constants of pressure changes within the left ventricle. (The views expressed here are the authors' and not those of the U.S. Government.)

10:30 036.175 N **Obtaining Sine-Gordon Surfaces Using Deformation of Parameters**, *Suleyman Tek, University of the Incarnate Word*
We obtain surfaces using sine-Gordon (SG) equation. In order to construct these surfaces we use deformation of parameters of 1-soliton solution of the SG equation. We obtain invariants of the SG surfaces such as first and second fundamental forms, Gaussian and mean curvatures. We also give a method for finding position vectors of the SG surfaces. We plot some of these surfaces.

10:45 036.176 G **Using Bayesian Methods to Analyze Small Sample Size Data**, *Christopher Golubski, University of Texas at Austin; Michele J Mann, University of Texas*
We present the use of Bayesian methods for a particular set of data collected from a cohort of freshmen biology majors at a large, competitive university in the South. The data contains scores for students on Advanced Placement exams, questionnaire results that measure self-efficacy, and final course grades for a freshman biology course. We hypothesize that student performance on Advanced Placement exams is directly related to their self-efficacy and final course grades. Some subgroups of our data have numerous violations required of frequentist methods (ANOVA). These violations are low sample size and some heteroscedasticity. We found, however, that the data was analyzed quite well using Markov Chain Monte Carlo (MCMC) methods. We compare and contrast the frequentist results with Bayesian results and demonstrate how researchers can use these methods to analyze data when assumptions for standard methods are violated. For the purposes of this presentation, we focus on analysis of the mathematics and statistical methods used.

11:00 036.177 N **What happened in Seoul didn't stay in Seoul: the 1988 Olympics**, *John T Sieben, Texas Lutheran University*
The 1988 Seoul Olympics produced highly unusual results in track and field. In fact, approximately 50% of track and field winners in Seoul would still have won 20 years later in the Beijing 2008 Olympics! The use of performance-enhancing drugs was suspected and World Anti-Doping Agency was established to enhance the reliability of anti-doping tests for the subsequent Olympics. In the April 2012 issue of the journal of Significance, Ray Stefani proposed a simple

model for predicting the rate of improvements in track and field events. In this paper I will explore the use of a more comprehensive model that will improve on Stefani's model. Specifically, I intend to use a two parameter (time and event) based least squares approach to develop exponential regression models in four categories: sprint, mid-distance and long distance events, throwing events and jumping events. I will then compare the error in this model to the error in Stefani's model and use the new model to predict the results of the 1988 Olympics, the 2004 Olympics and the 2012 Olympics.

037. Poster Session II

11:30 am to 1:00 pm

Wellness Center, Room 101

Biomedical

Biomedical Poster Session

Participants:

037.178 U **4T1 murine breast cancer cell cytotoxins in *Rumex crispus* (yellow dock)**, *Ashley M. Rivera, Wayland Baptist University; Sarah C. Kelly, Wayland Baptist University; Jessica Rose Kenneson, Wayland Baptist University; Robert T. McCutcheon, Wayland Baptist University; Thomas E. McElwain, Wayland Baptist University; Adam J. Reinhart, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University*
The plant species *Rumex crispus* (yellow dock), an herbal remedy plant used in Turkey and the Far East has been shown to possess anti-microtubulin, anti-inflammatory, antimalarial activity. It has been used in the treatment constipation, diarrhea and eczema, and has been shown to have cytotoxicity and/or induction of apoptosis in T47D, MDA-MB-231 and MDA-MB-436 breast cancer cell and a variety of other cancer cell lines. Studies in our laboratory have shown that plant species (e.g., Ginger, Turmeric, Ashwaganda) with anti-inflammatory activity have cellular components cytotoxic for 4T1 murine breast cancer cells. To our knowledge, the cytotoxicity of yellow dock against 4T1 murine breast cancer cells has not been investigated. Yellow dock root powder was subjected to dichloromethane reflux (1 hr), and the resulting extract was resolved by Sephadex LH20 chromatography (75% ethanol). Fractions were pooled based upon UV-visible spectroscopic analysis (280 nm), and assayed for 4T1 cell cytotoxicity via MTS assay. Pooled cytotoxic fractions were further characterized via HPLC (C18, 0-75% methanol gradient over 30 min), and six chromatographic peaks were identified as cytotoxic to 4T1 cells (MTS assay). None of the six peaks identified co-migrated with emodin (270.24 g/mol) or chrysophanol (254.24 g/mol) standards, known bioactive components of yellow dock. Mass spectroscopic analysis (MALDI TOF) of the six captured HPLC peaks

showed compounds of varying molar masses. Based upon MALDI analysis, none of the six peaks contained species that corresponded to emodin, chrysophanol, nepodin (216.13) or bioactive anthroquinones previously identified. Further studies are underway to characterize these cytotoxic components.

037.179 U **Can citrus juice decontaminate *Salmonella* tainted strawberries?**, Ashley Cheryl Lopez, St. Edward's University

Salmonella causes approximately 1.2 million illnesses in the United States every year. The strain *Salmonella enterica* Montevideo has caused at least 381 cases in the U.S. This study focuses on testing whether citrus juice can inhibit the growth of *S. Montevideo* on strawberries. This research tested lemon, lime and orange juices for their growth inhibition. It was hypothesized that the lemon juice, because of its low pH, would have the greatest inhibitory effect on *S. Montevideo*. Each citrus juice was first tested with the bacterium in order to see which would be most effective at reducing the number of bacteria. An overnight culture of *S. Montevideo* was added to each citrus juice for 5 minutes and incubated at 37°C. Surviving bacteria were quantified via dilution and plating on Tryptic Soy Agar plates (TSA). The average of three trials showed that the lime juice was able to reduce the number of *S. Montevideo* more than the lemon or orange. A time course was then conducted with the lime juice to determine the optimal exposure time. The results showed that the lime juice inhibited the growth of *S. Montevideo* by two logs. Future studies include testing the lime juice on strawberries that have been contaminated with *S. Montevideo*. If lime juice is effective this may prove to be a viable consumer treatment for strawberries and this can be tested on other fruit and with additional pathogens.

037.180 U **Can kombucha tea inhibit the growth of *Salmonella enterica*?**, Maria Arcelia Zamora, Student

Kombucha, a sweetened tea beverage fermented with a symbiotic culture of bacteria and yeast (SCOBY), has ancient origins and is a popular drink. The tea is thought to be beneficial for detoxification, joint care, as a digestive aid for gut health, and boosting the immune system. Probiotics have been shown to inhibit pathogens by competing for nutrients, producing antimicrobial substances and making the environment less suitable. In this study, we examined whether kombucha tea can inhibit *Salmonella enterica*. Green tea was brewed, sweetened with sugar, and then fermented using SCOBY. Preliminary testing was conducted to determine the agar type to use, and the relationship between the kombucha and the *S.*

enterica. Preliminary experiments suggested that XLD plates were best to use and that kombucha inhibits the growth of *S. enterica*. The kombucha was then contaminated with an overnight culture of *S. enterica*. The number of *S. enterica* recovered after 24 hours at 26°C by taking samples every 2 hours for 8 hours. *S. enterica* recovered from samples treated with unfermented green tea and water controls. These trials did not produce concrete results. If kombucha is able to inhibit *S. enterica* this may suggest that people who drink kombucha are less likely to get infected with *S. enterica*. This project could add to the broader research of preventing *Salmonella enterica* infections.

037.181 G **Characterization and synthesis of superparamagnetic iron oxide nanoparticles**, Antonio Eli Pena, Graduate Student; Gabriel Gonzalez, student; Mkhitar hobosyan, Graduate student; Boris Ermolinsky, Primary investigator
Superparamagnetic iron oxide nanoparticles (SPIONs) coated with dextran possess high potential for biomedical applications. The purpose of this work is to coat the iron core of the particles with a dextran layer that can be modified for site-specific nanomedical applications and at the same time prevent the degradation of iron particles in physiological conditions. Some of the biomedical applications include: computed tomography, magnetic resonance imaging, drug delivery, gene therapy, and thermal ablation of tumors. SPIONs were synthesized using chemical co-precipitation of ferrous iron (Fe²⁺) and ferric iron (Fe³⁺) in a dextran solution. Once prepared, the nanoparticles were then analyzed for average size, hydrodynamic radius, magnetic properties, chemical composition. Due to the size-dependent properties such as: surface to volume ratio, superparamagnetic characteristics, specific heat, and surface reactivity, the characterization of the particles is essential to the research in order to measure these assets. Now that we have successfully synthesized and characterized the SPIONs, the next step is to modify the surface with specific conjugates for desired biomedical application. This research will eventually be used to improve treatment of certain ailments which are difficult to treat with current medical technology by providing a less toxic alternative to current medical procedures, higher resolution for medical imaging, and site specific drug delivery.

037.182 U **Characterizing the effect of SSRI withdrawal on a serotonin-mediated behavior in the model organism *C. elegans* following a**

brief, low-dose exposure to Paxil. *Cobby Caputo, St. Edward's University; Fidelma O'Leary, St. Edward's University*

Clinical depression is viewed neurologically as a decreased level of serotonergic signaling and, as a result, is almost ubiquitously treated with selective serotonin re-uptake inhibitors (SSRIs). A concern with SSRIs is that patients can exhibit adverse reactions if they stop taking their medication too quickly or if there has been a misdiagnosis. This withdrawal creates a chemical imbalance that results in a general decrease in serotonergic signaling. The consequence of this imbalance is a myriad of psychological and possibly neurological changes collectively called SSRI Withdrawal Syndrome. An SSRI that is commonly associated with these issues is Paxil (paroxetine hydrochloride hemihydrate). It is widely prescribed, has a relatively short half-life (16 hours) and has been found to cause adverse discontinuation reactions in up to 20% of patients. In this study we seek to provide evidence of decreased serotonergic signaling following the withdrawal of Paxil from wild-type *C. elegans* after a relatively short treatment period. Worms were treated with Paxil infused (160 μ M) Luria Broth (inoculated with *E. coli* OP50) for 48 hours to elicit the down-regulation of serotonergic receptors. This dosage is analogous to 5 mg per day for humans for 60 days -- well below an average human dose of 10-20+ mg for several months. Following removal from treatment, organisms were tested to determine the strength of serotonergic signaling using a chemosensory assay testing a serotonin-mediated response. A paintbrush hair soaked in a 1:1 ethanol:octanol solution for 30 seconds was placed 1 cm in front of a forward moving worm. The time taken to initiate a body reversal in response to the octanol odorant is negatively correlated with serotonergic signaling. This reversal response was tested at 6-hour intervals for 24 hours. Data indicate that Paxil-treated *C. elegans* exhibited significantly slower 1-octanol reversal responses up to 18 hours after being transferred onto untreated plates (12.50 sec average [n=12] vs 8.79 sec in control [n=14] p = 0.002). Since this behavior is mediated by serotonergic circuitry, these results indicate a reduction in serotonergic signaling after cessation of treatment, which was most evident at 18 hours and showed signs of recovery at 24 hours. Thus a relatively brief (48hr) exposure to Paxil can adversely impact normal serotonergic signaling. Given the extreme usage and prevalence of this class of drug, it is vitally important to fully investigate all potential acute and long-term changes in serotonergic signaling. This information also supports claims that SSRIs may have unexpected, and unwanted, after-effects on

patients who have been misdiagnosed, or whose depression is unrelated to serotonin levels. Further work must be done to fully investigate the relationship between the reduction in general serotonin deficiency at 18 hours, and Paxil's 16-hour half-life.

037.183 U Characterizing the onset, progression, and mitigation of motor chorea symptoms in a transgenic *C. elegans* model of Huntington's disease. *Olivia O'Keefe, St. Edwards University; Fidelma O'Leary, St. Edward's University*

This study characterized the onset and progression of motor chorea symptoms in Huntington's disease (HD) using the HA759 strain of *C. elegans* which expresses a fragment of the human huntingtin gene with 150 glutamate repeats. Wild-type *C. elegans* (N2) voluntarily speed up movements when actively foraging, and voluntarily slow down movements when food is present. Using the HD strain, with N2 as a control, we characterized the earliest onset of motor deficit symptoms and the progression of these symptoms with age. All nematodes were cultivated in age-synchronized groups. Motor control was quantified each day throughout the lifespan (typically 14-18 days) using the basal slowing rate (BSR) analysis which assesses voluntary motor control. For each of 12 individual *C. elegans* on plates with food (*E. coli* OP50), the number of body bends in 20s were counted. Additionally, for each of 12 individual organisms placed on plates without food the number of body bends in 20s was counted. The BSR equation ($BSR = \{1 - [\text{locomotive rate with food} / \text{locomotive rate without food}]\}$), indicates that a BSR value closer to 1 represents full motor control while a BSR value closer to 0 represents no motor control. The earliest onset of HD symptoms of motor-control deficit is evident at day three of the *C. elegans* lifespan (HA759 avg. BSR=0.49 vs wildtype avg. BSR=0.84). Moreover, this difference in BSR values continues to increase as the organisms age. This study sheds light on both the onset and the progression of HD chorea symptoms.

037.184 G In vitro cytotoxicity of metal complexes containing platinum and palladium, *Jomana Alqurashi, University of the Incarnate Word; Rafael Adrian, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*

Numerous classes of metal complexes containing platinum and palladium have been studied for their potential as anti-proliferative therapeutics. In the present study, the cytotoxicity of two metal complexes, containing an isonicotinamide ligand and either platinum or palladium, has been evaluated in the breast cancer cell line, MCF-7. The isonicotinamide moiety has been investigated

in previously reported anti-cancer strategies for the inhibition of various kinases, fatty acid synthesis enzymes, and tubulin polymerization. The LC50 determined for both complexes demonstrates micromolar cytotoxicity comparable to that exhibited by the platinum compound, cisplatin (cis-diamminedichloroplatinum(II), CDDP).

037.185 U Mapping the onset and progression of neurological and physiological deficits in Alzheimer's disease: The role of insulin-degrading enzyme in restoring function, *Sasha Michel Escamilla, St. Edwards University*
Alzheimer's disease (AD) is a progressive neurodegenerative disease that causes cognitive and behavioral deficits. One of the main pathologies of AD is the formation of toxic plaques comprising the amyloid-beta peptide fragment. In previous research insulin-degrading enzyme (IDE) has been shown to break down amyloid plaque *in vitro*. To examine whether IDE treatment could also have an effect *in vivo*, a transgenic AD strain of *C. elegans* was utilized. To characterize the onset and progression of neurological deficits, the best choice was to use a chemotaxis assay, observing the time for both the AD and N2 (wild type) strains to reverse away from the odorant benzaldehyde. All populations were age synchronized. A statistically significant deficit appeared after day 3 in the AD worms, with a delayed response or no response (26.7 sec. (AD) vs 17.9 sec. (N2), $P < 0.05$, T-test, $n = 10$), suggesting that the AD strain loses its capability to sense the odorant due to increased plaque formation. In test groups of multiple ages, AD with IDE treatments showed quicker reversal times than AD without IDE treatments (16.4 sec. (IDE-AD) vs 23.1 sec. (AD) $P < 0.05$, T-test, $n = 10$). This data maps the timeline for both onset and progression of a chemosensory deficit in AD strain, and suggests that IDE treatment can alleviate these symptoms in living organisms. Such treatments may slow the progression of AD symptoms in patients, as well as prolong their lives.

037.186 U Prevalence of *Trypanosoma cruzi* in Chagas disease vectors from South Texas, *Ramiro Patino, The University of Texas- Pan American; Sergio Gonzalez, The University of Texas- Pan American; Rodion Gorchakov, Baylor College of Medicine, Department of Pediatrics, Section of Pediatric Tropical Medicine; Kristy Murray, Baylor College of Medicine, Department of Pediatrics, Section of Pediatric Tropical Medicine; Teresa P. Feria, The University of Texas- Pan American*
Chagas disease is caused by a flagellated protozoon, *Trypanosoma cruzi*, that affects more than 10 million people in the Americas.

Depending upon the *T. cruzi* genotype, chronic infection causes fatal heart disease or megasyndromes, including megaesophagus and megacolon. No vaccine or effective drug is available to date, and therefore, disease prevention is achieved by vector control. Kissing bugs (Reduviidae: Triatominae) are the main vectors for the parasite, which is transmitted through their feces. Recent distribution data indicate an increased vector occurrence in South Texas. However, *T. cruzi* epidemiological data are not available for South Texas' vectors. In this study, we tested 131 kissing bugs to assess their *T. cruzi* infection status. Kissing bugs were collected in 7 South Texas counties by residents during 2012 and 2013. DNA was extracted from the posterior abdomen of the kissing bugs. To test for *T. cruzi* infection, we amplified a repeated DNA nuclear sequence by PCR and resolved amplicons by agarose gel electrophoresis. Preliminary results show a 54 % *T. cruzi* infection rate in tested kissing bugs. This high infection rate suggests the existence of a transmission cycle in the study area. Residents of South Texas could be at an increased risk for Chagas disease, but more studies are needed to evaluate this. Informational talks about disease prevention could create knowledge among the medical and local community. Ongoing research includes blood meal analysis to identify *T. cruzi* hosts and determination of *T. cruzi* genotypes.

037.187 U Temperature sensitivity of rhizosphere bacteria associated with common plants found at Wild Basin Wilderness Preserve (Austin, Tx), *Victoria Susan Alford, St. Edward's University*
Microorganisms significantly influence the health of host organisms, for example plants. Recent research indicates that diverse communities of bacteria on plant roots (rhizosphere bacteria) promote plant growth by outcompeting plant pathogens and providing nutrients. In addition, root exudates (organic acids) supply rhizosphere bacteria with substrates for growth. This experiment investigated how a range of temperatures, representative of Texas climatic conditions, affect the growth of rhizosphere bacteria at Wild Basin Wilderness Preserve, Austin, TX. Little Bluestem Grass (*Schizachyrium scoparium*), Curly Muhly (*Muhlenbergia setifolia*), and Evergreen Sumac (*Rhus virens*) were collected at Wild Basin Wilderness Preserve. Enrichment cultures of rhizosphere bacteria were started by inoculating 10% tryptic soy broth (TSB) with roots from each plant. Rhizosphere cultures from each plant type were grown at 24°C, 28°C, and 32°C for 48 hours (27 cultures total; 3 replicates for each of the 3 plant types). Their optical density (600 nanometers) was measured

using a spectrophotometer. The percentage of gram-positive to gram-negative bacteria was found by Gram-staining aliquots collected from each of the three cultures grown at each temperature and averaging. In conclusion, rhizosphere bacteria found with Little Blue Stem, Curly Muhly, and Evergreen Sumac grow best at 32°C and all three plants have an 88.5% or higher percentage of gram-negative bacteria versus gram-positive bacteria. Future research could focus on identifying the bacterial species present within the rhizosphere and isolating these species in pure culture in order to test if they improve the growth of crops and other plants that are significant to human life.

037.188 H The effect of caffeine on regeneration and behavior in the California Blackworm, *Lumbriculus variegatus*, Ana Henriquez, The Atonement Academy; Michael J. Vallor, The Atonement Academy; Veronica Acosta, UIW

Caffeine is becoming a more heavily used chemical in today's food and diet industry. We are particularly interested in the effect caffeine may have on development. There is sufficient evidence in the literature to suggest that consumption of high doses of caffeine during development can have lasting teratogenic effects on the developing organism, including neural tube defects. There is still very little known, however, regarding the mechanisms by which caffeine acts on a developing system. We utilized regeneration, a mechanism utilized by some adult organisms to redeploy early developmental pathways, to determine the effect of caffeine on cellular and molecular mechanisms that may be involved in this developmental process. Using a regenerative model system, *Lumbriculus variegatus*, preliminary data suggest that caffeine negatively affects both the rate of segmental regeneration and the functional recovery of the nervous system.

037.189 U The impact of coconut oil supplement on cognitive function in young adults, Jacob Boos, St. Edward's University; Lauren Heller, St. Edwards University; Fidelma O'Leary, St. Edward's University

Cognitive function is the brain's ability to comprehend and process information. Maintaining optimal brain function and health is important and needed when performing cognitive abilities, especially in the elderly and those with higher risks of being diagnosed with Alzheimer's disease (AD). Previous studies suggest coconut oil is beneficial in aiding cognitive abilities in patients who have early onset AD and mild cognitive disabilities. Since improvements in cognitive function were shown in the elderly, will coconut oil benefit in aiding the cognitive abilities

in young adults? To address this question, 22 undergraduates, (12 females, 10 males) with ages ranging 18 and 25 years consumed 2000 mg of Piping Rock extra virgin coconut oil and completed three series of cognitive tasks measuring reaction speed and accuracy using the online program Luminosity. A 60-minute rest period took place between each series of tests. To measure brain activity, beta brain waves were recorded during the cognitive tasks. Speed in task completion increased by 4.1% in subjects taking the supplement ($P < 0.05$, paired t-test). The average speed score for the three tests are as follows: 84.3%, 87%, and 88.3%. Beta wave frequency increased with an overall increase of 0.7 hertz. However, only the increase in cognitive speed was statistically significant. Only the increase in performance of speed was statistically significant. Therefore using the supplement enabled subjects to maintain accuracy in their performance while increasing their speed. Thus coconut oil benefits not only the elderly with AD and mild cognitive impairments, but also young adults by speeding up their performance, without a decrement in accuracy.

Freshwater Science

Freshwater Science Poster Session

Participants:

037.190 N Bacterial diversity and abundance in freshwater snail shell biofilms, Russell Minton, University of Houston Clear Lake; Clinton Charles Creech, University of Louisiana at Monroe; Debra W Jackson, Louisiana Delta Community College

Mollusk shells provide a hard substrate for aquatic biofilm colonization. Work on biofilms with mollusks has focused on bivalve shells and grazing, though little has focused on gastropod shells and the microbes growing on them. We explored snail shell biofilms in two metagenomic studies, one focused on diversity and abundance from a single species (*Pleurocera canaliculatum*) and one comparing biofilms from *P. canaliculatum* and *Campeloma decisum*. Biofilms from fourteen *P. canaliculatum* showed that microbial diversity varied between individuals, and rarefaction suggested that 63 snails would need to be sampled to capture all of the estimated genus-level diversity. Cyanobacteria and species of *Novosphingobium* and *Methylosoma* were the most abundant taxa across all shells. A comparison of *P. canaliculatum* and *C. decisum* biofilms suggested that shells of the two species harbor very different taxa, likely due to differences in their ecology. We highlight and describe the most abundant taxa on each species, and describe how mollusk shells and their associated microbiota play an important role in shaping freshwater ecosystems.

037.191 U **Life in a container: larval competition between two container breeding mosquitoes**, Felicia Vasquez, University of Texas Pan American; Christopher Vitek, University of Texas - Pan American

Mosquitoes are vectors for a number of diseases that pose grave risks to individuals, many of which are increasing in prevalence around the world. Understanding mosquito population dynamics and being able to predict species distribution, abundance, and temporal patterns in different regions may assist in predicting potential disease outbreaks as well as increasing the efficacy of mosquito control efforts. One of the primary determinants that may affect distribution and abundance of mosquitoes is both intraspecific and interspecific competition at the larval level. Using recently colonized strains of *Aedes aegypti* and *Aedes albopictus* mosquitoes from South Texas; we examined intraspecific larval competition at two different temperatures, representing an average “cold season” temperature and “warm season” temperature. Larvae were reared at two different densities, and given either a high level of food or low level of food (to minimize or maximize the effects of larval competition). Mortality, development time (time to first pupation, 50% pupation, and 75% pupation), and size of adults at emergence were recorded as potential dependent variables. This research was conducted in conjunction with a second study examining interspecific competition. The implications of these results on seasonal disease prevalence and mosquito abundance are discussed.

037.192 G **Restoration of Quail Creek at the Texas Parks and Wildlife Nature Center, Tyler, Texas**, Brianna G Ciara, The University of Texas at Tyler; Ein Bertram, University of Texas at Tyler; Lance Williams, University of Texas at Tyler; Marsha Williams, Department of Biological Sciences. The University of Texas at Tyler, Tyler TX

Quail Creek, a headwater stream in Tyler, Texas, has been subjected to channelization and invasion by alien Golden Bamboo, *Phyllostachys aurea* (Bybee et al. n.d.). The purpose of this study was to assess impacts of *P. aurea* on Quail Creek hydrology, geomorphology, and biology through pre-removal and short- and long-term post-bamboo removal surveys. Fish, macroinvertebrate, habitat, and geomorphology surveys were conducted in fall and winter 2008-2009 before *P. aurea* removal in spring 2009. Fish and macroinvertebrate communities were reassessed spring 2010 and 2011. Long-term post-removal fish, macroinvertebrate, habitat, and geomorphology surveys occurred in fall 2014. The pre-removal data of 2008-2009 suggested a

relatively healthy stream (HQI = 22) with highest fish species richness (n = 8 and 6 respectively) and % EPT of 46.15 in 2009. However, our surveys indicated extensive channelization and erosion. The short-term post-removal data of 2010-2011 suggested an impaired system with low fish species richness (n = 4 and 3 respectively) and comparatively low % EPT (17.08 and 12.98 respectively). The long-term post-removal data suggest intermediate stream quality (HQI = 18) with the highest % EPT of 52.9, but lowest fish species richness (n = 2). However, over 50% of fish abundance (n = 50) was *Notropis atrocaudalis*, an imperiled species in Texas (Bender et al. 2005). Quail Creek habitat and biota mirror the pattern of disturbance from pre-post removal and appear to be improving. This study suggests that restoration does not provide immediate results and requires long-term monitoring to adequately assess impacts of restoration effort.

037.193 U **The Relationship between the Ingestion of Microplastic Particles and Organic Food Items in Sunfish from the Brazos River Basin, Central Texas**, Colleen Peters, Baylor University; Susan Bratton, Co-author; Kaitlyn Rieper, Co-author

Plastic microparticles, from 50 µm to 5 mm, can be found in marine, freshwater, and deep ocean environments. While substantial marine literature has quantified the ingestion of macroplastics by marine vertebrates, relatively few studies have focused on freshwater organisms or microplastics and artificial polymers, such as polyester and nylon threads. We collected 436 sunfish (Centrarchidae) – 318 bluegill (*Lepomis macrochirus*) and 118 longear (*Lepomis megalotis*) – from the Brazos River Basin, between Lake Whitney and Marlin, Texas. Of the 196 fish (45%) that had ingested plastic, the average number of items per fish was 1.78 (1.81 *L. macrochirus*, 1.75 *L. megalotis*). The majority of artificial items (96%) were threads rather than spheres or blocks. Of the 349 plastics identified; gray and blue (79.7%) were the most common. Agglomeration clustering via Wards Method, utilizing Whittakers Index as the distance measure, demonstrated that the number of ingested microplastics was unrelated to preferences of organic food items. Principal Components Analysis (PCA) demonstrated that the number of ingested microplastics was not correlated to the major categories of organic food items. While one hypothesis projects that fish mistakenly identify microplastics as prey items, the results of both the cluster analysis and PCA suggest that both *L. macrochirus* and *L. megalotis* accidentally ingest microplastics during their normal feeding events. Although the source of microplastics is not yet

known, sunfish, as suction feeders, serve as effective indicator species for microplastic contamination.

037.194 U The genetics of the visual system of pupfish, *Chelsey Price, Stephen F. Austin State University; Dr. Jennifer Gumm, Stephen F. Austin State University*

The evolution of color vision in freshwater fishes is critical for individuals to efficiently detect information from the external environment. Adaptations of the visual system to different photic environments drive visually-mediated behaviors, which include foraging, predator avoidance, and mate choice. Visual system properties influenced by lighting conditions, such as the spectral sensitivity of photoreceptor cells, are determined by the expression of opsin genes in the retina. In this study, genetic variation in opsin sequences and expression profiles was evaluated for two species of pupfish, *Cyprinodon variegatus* and *Cyprinodon rubrofluviatilis*. In preparation for real-time polymerase chain reaction (PCR), which measures the expression of opsin genes, degenerate primers were designed by comparing the mRNA sequences of the opsin genes of fish species in the order Cyprinodontiformes. RNA was extracted from the dissected retinas of both species of pupfish using an RNEasy kit. The isolated RNA was quantified to determine the quality of the samples by comparing the absorption of light at 260nm and 280nm (A260/280). This ongoing project will use reverse transcription of the RNA and PCR to sequence the opsin genes. I will present results of sequencing and real-time PCR to determine which opsins are present and if there is variation between the species of pupfish or other killifishes. Understanding the genetics behind the visual system is important to evaluate visual communication within species of freshwater fish.

Geosciences

Geosciences Poster Session

Participants:

037.195 G Evaluation of responses from handheld Gamma-Ray spectrometers: How reliable is outcrop data?, *Hunter Green, Fort Hays State University; Tim Walsh, Wayland Baptist University; Peter Holterhoff, Hess Corporation*

Outcrop gamma-ray (GR) surveys from handheld units are used to obtain information for correlation to the subsurface. Spectral outcrop GR data can be useful in determining a variety of geologic parameters but factors such as collector type, environmental conditions, calibration, stabilization methods, processing techniques, etc. may affect data quality and skew interpretations. Four outcrop GR surveys were acquired by three different handheld spectrometers from a 20-meter

Permian section in TX in order to evaluate the quality of data obtained from different types of handheld units and to examine variation in the same unit responses over time. Correlation coefficients of Total GR API for all surveys range from 0.49 to 0.95. Logs produced from simultaneous surveys were extremely consistent overall, with similar max counts, but one unit recorded a greater range of values. Responses from the same unit across a decade were also generally consistent. Some variations in these two surveys were primarily attributed to readings taken at slightly different points within the outcrop with the remainder attributed to instrument error. Experience from these and other surveys show environmental conditions (temperature) appear to be a major error source with these units. However, calibration/stabilization issues may also contribute to instrument error. Erroneous Th and U values, which were recorded by one unit, would change lithologic interpretation of the section. Evaluation of differences in unit responses can provide an insight for adjustments that may be needed during interpretation and application of outcrop GR data.

037.196 G Geochemical Analyses of Karst Springs within the Owl Mountain and Nolan Creek Provinces, Fort Hood Military Installation, Texas, *Mindy Faulkner, Stephen F Austin State University; Kevin W Stafford, Stephen F Austin State University*

The Owl Mountain and Nolan Creek Provinces within the Fort Hood Military Installation are karst landscapes characterized by plateaued outcrops of Cretaceous-age Trinity and Fredericksburg Groups including Glen Rose, Walnut Clay, Comanche Peak, and Edwards limestones and marls. Many springs and seeps exist within these provinces, potentially providing valuable information about flow paths, residence time and basic geochemistry of the fluids within the system. A suite of springs have been monitored over a twenty-four month period in order to understand spatial and temporal physiochemical variations and gain an understanding of the hydrogeologic controls and possible coupling to other parts of the military installation. The physiochemical properties of springs coupled with the proposed depositional model are the basis for developing a conceptual geochemical model for fluid migration. Permeability varies greatly across the study area; regions where Edwards and Comanche Peak formations interfinger typically have lower permeabilities than regions dominated by only Edwards deposition. Results from this study suggest that the interfingering nature of Edwards and Comanche Peak sediments has created a partitioned groundwater system where vadose and phreatic components mix in the subsurface. The interfingering formations have likely created a

semi-confined aquifer system where deeper phreatic fluids migrate upwards through low permeability strata along preferential flow paths and communicate with meteoric waters near the ground surface in response to surface denudation and climate change, attesting to a complex groundwater system that is continuing to evolve.

037.197 U Hydroclimatological and Environmental Factors Affecting Volume Fluctuation of Lake Theo, Caprock Canyons State Park, Texas, Kaylee Maureen Lawrence, Wayland Baptist University; Tim Walsh, Wayland Baptist University

Lake Theo at Caprock Canyons State Park, TX has visually fluctuated dramatically in the last fifteen years. In order to quantify volume changes, monthly Landsat imagery was analyzed for the total surface area and bathymetry was acquired using sonar with GPS. Topography of the area was acquired using basic surveying methods and all of this data was then combined in ESRI ArcGIS software to summarize the volumetric changes. Factors playing a role in the volume fluctuation may include precipitation, ground water influx, evaporation rates, and soil infiltration. Precipitation and climate history from the surrounding area were analyzed primarily with data from the Texas Tech Mesonet System. Soil type was examined to evaluate infiltration rates and all results were used to estimate ground water input. Although an obvious correlation between precipitation and lake volume is present, other factors, especially ground water contribution, play a large role in controlling lake volumes.

037.198 N Karst Development in the Northern Edwards Aquifer, Bell and Williamson Counties, Texas, Kevin W Stafford, Stephen F Austin State University; Ashley Landers, Department of Geology, SFASU; Jessica Shields, Department of Geology; Mindy Faulkner, Stephen F Austin State University

Karst development associated with the Balcones Fault Zone is extensive throughout the Edwards Aquifer of Central Texas. High karst densities are well-documented throughout the region; however, fewer karst features, including caves, sinks and springs, have been documented in northern Williamson and southern Bell counties than anywhere else within this Urban Corridor. However, several notable features have been documented suggesting aquifer compartmentalization, including Cobb Caverns and Salado Springs. Northern Williamson and southern Bell counties remain largely rural as urban sprawl from the Austin metroplex has not spread significantly north of Georgetown. Rapid population growth in the Georgetown region has resulted in the documentation of the highest

densities of karst, indicating that current data underestimates karst development throughout the Northern Segment of Edwards Aquifer. Past studies have documented significant, isolated karst development within the Northern Segment. Current research in the area indicates a dominance of epigene karst development in Edwards carbonates with paleo-phreatic passages common that have been abandoned due to stream incision and are currently being overprinted by vadose processes. Caves are heavily controlled by vertical fractures oriented near-perpendicular to the Balcones Fault Zone with lateral widening along preferential bedding planes. Field-based studies, coupled with GIS-based analyses, suggest a complex speleogenetic evolution for the Northern Segment, while archaeological data from the area indicates that this area has been a significant water resource region since at least Paleo-Indian times. Karst development is widespread and common within this poorly documented area of the Edwards Aquifer, likely the result of sampling bias.

037.199 U Results of 2014 excavations from WU-26, the first Uinta C micro-mammal fossil locality from the Uinta Formation in northeastern Utah, C. Melisa Guillot, Lamar U.; James Fairchild, Lamar U.; Christopher Sanders, Lamar U.; James Westgate, Lamar U.

The WU-26 micro-mammal fossil locality provides a unique glimpse into the mammal community which inhabited the Uinta Basin near the end of the deposition of the middle Eocene Uinta Formation. WU-26 is the first micro-mammal site discovered in the Uinta C Member of the Uinta Formation. WU-26 lies 40m below the base of the Duchesne River Formation. Uinta Formation mammals define the Uintan North American Land Mammal Age. The fauna indicates that several micro-mammal species thought to be restricted to the Uinta B Member actually continued to inhabit the Uinta Basin throughout the deposition of the Uinta C Member. In 2014, our field crew collected samples from WU-26 and two nearby localities in attempt to get a larger and more diverse fauna. The crew excavated 1350 kg of bulk sample from WU-26. We also collected 900 kg from the newly discovered H2 locality and 100 kg from WU-2, both sites are high in the Uinta B Member in Uintah County, Utah. This year we expect to increase the sample size of identifiable mammal specimens from WU-26 by up to 100 specimens. The sample size currently exceeds 500 specimens. The more common taxa are beginning to be represented by statistically significant sample sizes. Clays from WU-2, WU-26 and the H2 locality were also sampled for paleo-pollen/spore analysis. Results from a commercial laboratory in Alberta, Canada are

pending.

037.200 N Utilizing Ground Penetrating Radar for Characterization of Karst Features, *Wesley Augustus Brown, Stephen F. Austin State University; Trina Kay Melville, Weatherford; Kevin W Stafford, Stephen F Austin State University*

Ground penetrating radar (GPR) has become a popular geophysical tool for locating subsurface karst features such as cavities, conduits and solutionally enlarged fractures. In this study we examine the usefulness of GPR for identifying buried sinkholes in the Castille Formation and characterizing the sinkhole origins as either solutional or collapse features. GPR data was collected from multiple sites located in Culberson County, Texas and Eddy County, New Mexico. A Pulse EKKO 100 system manufactured by Sensors and Software Inc. with an antenna center frequency 100 MHz in the common offset technique mode was used to conduct GPR profiling. Resulting profiles showed a pattern of radar reflections which reveals a possible series of filled sinkholes. The sinkholes in the study area were both solutional and collapse forms. Analyses of the collapse sinkholes shows that they are the result of upward stopping subsurface voids, which is characterized by large electrical contrast between the unbroken host rock and the infilled collapse. The sinkholes thought to have originated due to solution, show surface disturbance on radargrams. The solutional sinkholes are epigene sinkholes and the collapse structures represent collapse into an underlying void, which may be either hypogene or epigene. A collapse sinkhole represents the surficial expression of a hypogene cave that has collapsed to the surface. The dominant process of sinkhole formation in the area is collapse of voids that are likely hypogene in origin.

Marine Science

Marine Science Poster Session

Participants:

037.201 U A behavioral study of a cleaner fish, *Bodianus rufus*, (Spanish Hogfish) and their clients, *Andrea Christine Edie, McLennan Community College*

In the Caribbean, the juvenile Spanish Hogfish has been observed cleaning the Creole Wrasse, *Clepticus parrae*; and Gag fish, *Mycteroperca microlepis*. Caribbean cleaning stations are most commonly manned by cleaning gobies, *Gobiosoma* sp., which may be assisted by the juvenile Spanish Hogfish, *Bodianus rufus*; the blue head wrasse, *Thalassoma bifasciatum*; and the plane head filefish, *Monacanthus hispidus*. This study was conducted to determine the client species and cleaning patterns used by Spanish Hogfish, *Bodianus rufus*, at cleaning stations on

the Mesoamerican Reef. Research was conducted at a total of five different dive sites off the coast of in Roatan, Honduras. *Bodianus rufus* cleaning behavior was observed and recorded every 15 seconds for cleaner behavior, client behavior, and part of the client fish being cleaned. The most frequently cleaned region of client fish was the flank. The most frequently cleaned body part was the tail. The most frequent client was the Creole Wrasse. Juvenile *Bodianus rufus* were located at an average depth of 10.8 meters. The Creole Wrasse and the Blue Tang were observed chasing Spanish Hogfish in groups until they were cleaned. Spanish Hogfish would often hide in sponges to escape the groups. Studies should be conducted to determine the closest distance observers can maintain without interfering with Spanish Hogfish behavior. Lengthening the period of the study would give a more accurate understanding of Spanish Hogfish cleaning behavior.

037.202 G Carbon and Nitrogen Dynamics in Anthropogenically Disturbed Seagrass Ecosystems, *Alison Shepherd, University of Texas Brownville; Dr. Abdullah Rahman, University of Texas Pan American; Dr. Heather Alexander, University of Texas Brownsville*

As atmospheric CO₂ concentrations continue to rise, understanding factors that influence size and longevity of carbon (C) pools within coastal and marine ecosystems (i.e., “blue carbon”) is critical. Recent research acknowledges the importance of “blue carbon” in the global C cycle, finding that these ecosystems capture up to 70% of organic C in the marine realm, rendering them one of the most efficient C sinks on the planet. Specifically, seagrass ecosystems are critically important to the global C cycle, and yet they are the least studied blue C ecosystem. This research is aimed at filling this knowledge gap by quantifying C and nitrogen (N) stocks and fluxes in turtle grass (*Thalassia testudinum*) meadows in the Lower Laguna Madre of South Texas, which have been experimentally subjected to anthropogenic disturbance from boat propeller scars. Soil and vegetation C and N pools within disturbed and nearby undisturbed areas are being estimated to determine the rate of post-disturbance changes of the historically sequestered C. Our hypothesis is that the disturbed areas would show an increased rate of C loss from soils and coincident reduction of sequestered C and N, likely due to both erosion and microbial breakdown, and that regrowth of seagrass in these areas would be insufficient to return disturbed seagrass beds to pre-disturbance C levels. This study aims to provide the information needed to strike a balance between the growing population pressures that seagrasses face with the important ecological role of seagrass ecosystems to the

global C cycle.

037.203 H Effects of salinity on primary productivity and respiration in the seagrass, *Thalassia testudinum* Banks ex König (turtle grass), from the Lower Laguna Madre of Texas., *Mary Grace Chiu, The International Baccalaureate Program at Lamar Academy; Brandon Brandon Tiu, The University of Texas-Pan American; Mandira Banik, The University of Texas-Pan American; Lauren Anctil, The University of Texas-Pan American; Hudson R DeYoe, The University of Texas-Pan American; Joseph Kowalski, The University of Texas-Pan American*

Extremes in salinity can impose an energetic cost to maintain homeostasis. The seagrass, *Thalassia testudinum* Banks ex König (turtle grass), decreased more than 50% in areal cover in the Lower Laguna Madre (LLM) following a hyposalinity associated with Hurricane Alex (2010). Texas estuaries have since encountered extended periods of drought which has induced hypersaline conditions. Both conditions cause stress. We examined how photosynthetic and respiratory rates in turtle grass were affected by conditions of hyper- (55 and 45) and hyposalinity (16, 8, and 4 psu) conditions, compared to that of a control (33) in a short term (3 hr) laboratory study. Photosynthetic rates were 13 and 30% lower under hypersaline conditions (45 and 55, respectively) and 30 and 35% lower under more hyposaline conditions (8 and 4, respectively), compared to the control (33, 53.99 mg O₂ g⁻¹ leaf hr⁻¹, ±10.44). Greatest photosynthetic rates were found between 16 and 33 psu (74.21 mg O₂ g⁻¹ leaf hr⁻¹, ±10.78). Respiratory rates of the control (0.09 mg O₂ g⁻¹ leaf hr⁻¹, ±0.08) were 81 and 86% lower than the hypersalinity treatments, respectively, and 87, 86, and 92% lower than those under hyposalinity (16, 8, and 4, respectively). These results support the hypothesis that extended hyposalinity caused the loss of turtle grass in 2010 and that hypersalinity events can be equally stressful on the growth and distribution of this species.

037.204 U Fish bite prevalence on Yellow-band diseased corals off the coast of Roatan, Honduras, *Kara Leigh Schmidt, McLennan Community College*

Yellow-band Disease affects corals of the *Montastraea* and *Orbicella* complexes, the primary reef-building corals, by attacking the zooxanthellae. Studies have implicated bacteria in the genus *Vibrio* as the potential pathogen in Yellow-band Disease, but the cause is yet to be determined. Few studies have been conducted to determine the origin of the disease or possible vectors. Many fish species display polyp-feeding or algal farming behaviors resulting in extensive

bite areas and which may transmit pathogens or increase coral susceptibility to infection from resulting wounds. If fish bites are contributing to coral disease, corals with greater fish bite area should have a greater area of coral disease. This study was conducted in May 2013 and 2014 at five locations off the west coast of Roatan, Honduras. At depths averaging 13 meters, Yellow-band Disease and fish-bite area were measured using a 0.5m x 0.5m quadrat. In 2014, Yellow-band Disease area and fish bite area were positively correlated in individual coral colonies; however, in 2013 no correlation was observed. Collective averages of fish bite area to Yellow-band Disease area at each study site showed a positive correlation in 2013, but not 2014. The 2014 data, determined from a larger sample size, may more accurately reflect the relationship between fish bites and disease area. There were increased numbers of disease bands in 2014, which suggested new infestations of Yellow-band Disease. By further studying the patterns of fish bite and disease area, researchers may identify the vector involved in the disease process.

037.205 U Growth, abundance, and characterization of anaerobic, sulfur-reducing microorganisms isolated from a salt lake, La Sal del Rey, in Deep South Texas, *Maurine Ramirez, University of Texas - Pan American; Kristine Lowe, University of Texas - Pan American*

La Sal del Rey (“the King’s Salt”) is a naturally-occurring salt lake in Hidalgo County, Texas and part of the Lower Rio Grande Valley National Wildlife Refuge. Salt lakes may contain high concentrations of oxidized sulfur compounds; thus, microorganisms may be essential to the cycling of sulfur and other elements in the lake. The research objective was to isolate and characterize halophilic microorganisms from La Sal del Rey that could grow using oxidized sulfur as an electron acceptor in anaerobic respiration. Water samples were collected from the lake; temperature, salinity, pH, and rudimentary chemistry were measured. Laboratory minimal media were prepared with salinity matching the lake water and with thiosulfate or sulfate as the only respiratory electron acceptor. Lake water was diluted and spread onto agar plates to isolate individual organisms. Most Probable Numbers (MPN) analysis was used to determine the density of sulfur-respiring halophiles present per milliliter and the growth rate of thiosulfate-halophiles was estimated using a spectrophotometer. Results showed that the water salinity was approximately 320 ppt (32%), mean water pH was 7.51, and mean water temperature was 25.2°C. Growth rate analyses showed that the organisms grew slowly in media with oxidized sulfur and 320 ppt NaCl,

and were still in exponential growth phase after 12 days. Very small colonies of microorganisms were observed growing anaerobically on solid media with sulfur. After several weeks, the cultures turned pink suggesting that haloarchaea were present. Isolated organisms were characterized phenotypically and phylogenetically by 16S rRNA sequencing.

037.206 H Leaf production, leaf fall, and decomposition of the black mangrove, *Avicennia germinans* (L.) L., from the Lower Laguna Madre of Texas., *Mandira Banik, The University of Texas-Pan American; Lauren Anctil, The University of Texas-Pan American; Brandon Brandon Tiu, The University of Texas-Pan American; Mary Grace Chiu, The International Baccalaureate Program at Lamar Academy; Hudson R DeYoe, The University of Texas-Pan American; Joseph Kowalski, The University of Texas-Pan American*

Black mangroves are found along shorelines of the Lower Laguna Madre (LLM), South Bay (SB), and the Arroyo Colorado (AC). The AC, a distributary of the Rio Grande, is now used as a municipal, agricultural, and stormwater drain. Mangroves are important estuarine habitat and sources of dissolved nitrogen (N) through leaf production, leaf fall, and decomposition. Three sites were studied in the LLM to test the hypothesis that mangroves under the influence of the eutrophic AC would be enriched in N and reflect the stable N isotope signal of the AC, compared to sites away from its influence. There was no difference in mean leaf length and width among three study sites, but leaf biomass at the SB site was 25% greater than that of the AC and 65% greater than a middle LLM site (Cullen Point, CP). The AC site had a 45% greater leaf mass production rate (22.12 mg d⁻¹) compared to the other two sites, but a decomposition rate that was more than 40% lower (45 mg d⁻¹) than the other two sites. Leaf fall was greatest at the SB (192 mg d⁻¹) and AC sites (140 mg d⁻¹), with the CP site 65 and 53% lower (SB and AC, respectively). Leaf tissue at the AC site was enriched in N (ca. 2%) compared to other sites and the δ¹⁵N of leaves from the CP site were lighter by more than one-half (+7.2) compared to values in and around the AC (mean = +14.7). The type and source of N in AC mangroves may play an enhanced role in regulation of leaf growth and influence decomposition rates there.

037.207 U Macroalgal Preferences for *Diadema antillarum* on the Mesoamerican Reef in Roatan Honduras, *Clara Valentina Hernandez, McLennan Community College*
Caribbean coral reefs have been observed to alternate between states of coral dominance and macroalgal dominance. One factor that has been

associated with macroalgal overgrowth has been the decline of *Diadema antillarum* populations after mass mortality events. Within a two year span after the die off, macroalgae such as *Dictyosphaeria cavernosa*, *Dictyota* sp., *Lobophora variegata*, *Anphiroa fragilissima*, *Jania adherens*, *Laurencia obtusa*, *Turbinaria turbinata*, and *Sargassum* sp., grew more rapidly than former dominant species. *Diadema* have been noted to control algal overgrowth of algal sp. observed in phase-shift events. A study of *Diadema* dietary preference would help illuminate the role of *Diadema* in checking algal overgrowth in phase-shift algal species. Researchers randomly selected six *Diadema antillarum* to go through acclimation period and preference testing. Algae were weighed, secured, and placed in opposite corners. After each trial period ended, the remaining algal weight was recorded. *Diadema antillarum* preferred *Dictyota* sp. to *Halimeda tuna* while *Lobophora variegata* was the least preferred algae. Previous phase shift research lists *Dictyota* sp., *Lobophora variegata*, and *Halimeda tuna* as problematic algae that have bloomed since the urchin mortality event. As *Diadema* are among the top algal grazers and have yet to significantly recover their populations, the newly appearing algae in phase shift events need to be studied to determine the role of *Diadema* on the growth rate of these problematic algae.

037.208 U Species Richness and Diversity in Coral Reef Communities off the Coast of Roatan, Honduras Impacted by Lionfish (*Pterois volitans*) Invasion, *Bradley Raymond Gravitt, McLennan Community College*
The drastic increase of the lionfish (*Pterois volitans*) in the Caribbean presents a serious threat to the coral reef ecosystem by its consumption of native fish species. The lionfish is the first invasive marine species to establish itself in the Western North-Atlantic and Caribbean Sea. Caribbean coral reef species have little experience with this predator and may be more vulnerable to predation by the lionfish. Albins and others found lionfish in the Bahamas reduced the recruitment of native reef fish by up to 80% over a five-week period. The primary purpose of this study was to determine the potential impact of lionfish (*Pterois volitans*) on species richness and diversity on coral reef communities off the coast of Roatan, Honduras. The secondary purpose was to capture *Pterois volitans* and preserve the stomach contents of collected lionfish for DNA barcoding and identification of lionfish prey species for a future investigation. Roving Diver Technique (RDT) was used to find and identify fish species at the dive sites. Shannon and Simpson biodiversity indices were used to calculate species richness and biodiversity. Based on both the Shannon and

Simpson diversity indices calculated, a diverse fish population was found on the Mesoamerican Reef in Roatan, Honduras. An inverse relationship was found between the Simpson index and Shannon indices across all study sites. Future studies should include locating high densities of *Pterois volitans* and roving dives should be conducted at these locations to better determine impact of *Pterois volitans* on species richness and diversity in coral reef communities off the coast of Roatan, Honduras.

037.209 U Which way did it go?: Directional choices in the brittle star *Ophiactis simplex*, Zachary Holt, Biology Department, Lamar University; Ana Christensen, Biology Dept., Lamar University

The brittle star *Ophiactis simplex* possesses hemoglobin (Hb) and reproduces asexually via fission. To test whether it has a preference for environmental variables, such as oxygen levels, animals were first subjected to a series of tests to determine if there was a directional preference. The distribution of brittle stars placed into petrie plates over 3-5 trials of 3 minutes each was random, indicating no directional preference (n=80). Brittle stars were placed in the middle of an oxygen gradient of ~1.5 -2 mgO₂/l difference for three trials/three minutes each (n=48). Data was analyzed for size, amount of hemoglobin (Hb) present in water vascular system, and regeneration state. The factor that appeared most to have an effect on preference was lower levels of hemoglobin (based on color): more animals that were scored white moved towards the higher oxygen side. Newly split animals moved towards the higher oxygen side, however there were only five animals in this category. In all other analyses, there were roughly equal numbers moving in either direction. Further studies will be conducted to determine if the brittle stars have a temperature preference.

Mathematics

Mathematics Poster Session

Participants:

037.210 G Breaking the rules: when creativity drives students to find an original solution for a model-eliciting activity, Jair Aguilar, The University of Texas at Austin

The study had the purpose of evaluating the creative thinking that emerged from a group of students collaborating on a mathematical task with the space, opportunity, and freedom to develop a solution for a Model-Eliciting Activity (MEA). Three graduate students were asked to work as a team for approximately 60 minutes to find a solution for an MEA. The MEA used required the students to construct a conceptual tool where simple mathematics was needed to help solve the problem of the client in the activity.

In order to obtain the data of the students' interactions and the artifacts generated during the teamwork, they were asked to write their solutions on sheets of paper that were collected at the end of the activity. In addition, students were audio and video recorded to capture their main mathematical ideas and way of interaction. The solutions proposed by the group of students went beyond what was initially asked in the activity. Although, the problem statement explicitly said to solve following specific rules, the team decided to break the rules and propose a new creative solution.

037.211 U Modeling the Dynamics of Competition and Antibiotic Resistance in Gonorrhea, Anthony Thomas, University of the Incarnate Word

Gonorrhea is a sexually transmitted disease that is caused by *Neisseria gonorrhoeae* (gonococcus). The main way treat gonorrhea is through the use of antibiotics. Decreasing the spread of gonorrhea has proven to be a difficult task because gonococcus has developed resistance to the six main antibiotics used to fight it. A mathematical model that qualitatively reproduces the dynamics of antibiotic resistance of gonorrhea can be beneficial in determining key factors in the development of antibiotic resistance. Our modeling framework is based on the assumption that the bacteria can be categorized as one of three strain: drug-sensitive, resistant with low-fitness, or resistant with high-fitness, and was as follows. A host receives a load of drug-sensitive gonococcus. The bacteria reproduce in a suitable area of the host's reproductive tract. Chromosomal mutations occur, and in a short amount of time, there are colonies of drug-sensitive bacteria and drug-resistant bacteria in the infection site. With this framework, we present a mathematical model that consists of three ordinary differential equations. First, we analyze a simple version of the original model by making the assumption that the bacteria lack efflux pumps and that they grow exponentially with no inter-bacterial competition. The dynamics of the simplified model are studied analytically by non-dimensionalizing the original model, analyzing the equilibria, and performing a local stability analysis. After, we analyze the original model to provide a better understanding of the factors that determine how antibiotic resistance emerges within an infected host.

Neuroscience

Neuroscience Poster Session

Participants:

037.212 U Age comparisons of estrogen receptor-alpha expression in the developing rat brain, Gloimai Ari'elle Cowan, Texas Lutheran University

Age comparisons of estrogen receptor-alpha expression in the developing rat brain Gloimai

Ari'elle Cowan*, Danielle D. Grove, Biology Department, Texas Lutheran University, Seguin, TX Estrogen receptor- α is a steroid receptor activated by estrogen, namely 17 β -estradiol. This receptor activates gene expression and related functions such as homeostasis, differentiation, and development. Understanding the concentration and distribution of estrogen receptors within specific regions of the brain will provide further insight regarding estradiol-induced neurological and endocrine responses. In this study, RNA was extracted from the striatum and hippocampus tissue in the developing rat brain at the postnatal ages of day 1, day 6, day 12, and adult. The RNA extract was then evaluated comparatively using reverse transcription and polymerase chain reaction experiments (RT-PCR), and ImageJ pixel density analysis from gel electrophoresis of the PCR product. Statistical analyses of repeated experiments suggest that both the hippocampus and striatum have a significant difference of estrogen receptor- α expression between postnatal day 6 (p6) and the adult (Ad) age group, where p6 has greater expression than that of Ad. Additionally, multiple experiments also suggest a significant increase in expression of ER- α in postnatal day 1 when compared to postnatal day 6 in the female striatum. Data gathered from this study has provided insight into understanding the pattern of estrogen receptor expression in specific regions of the brain during development.

037.213 U Episodes of repeated dehydration induce hypothalamic gene expression plasticity I: transient receptor potential cation channel (Trpv4) and vasopressin (Avp) transcripts., *derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University; Jake Brozek, Wayland Baptist University; Jose Vanderlei Menani, Sao Paulo State University; Laurival Antonio De Luca Jr., Sao Paulo; Silvana Chiavegatto, University of Sao Paulo*

Repeated cycles of water deprivation-partial rehydration (WD-PR) induce body-fluid balance-associated behavioral changes, such as sodium intake enhancement. We investigated the effect of repeated WD-PR on hypothalamic gene expression of Trpv4, Trpv6, Avp, and Avp (Avpr1a, Avpr1b, and Avpr2) and oxytocin (Oxtr) receptors by quantitative real-time PCR. Adult male Holtzman rats (n=6-11/group) were individually housed with chow, water, and 0.3 M NaCl. Rats were subjected to zero, one, or three cycles of 36h WD followed by 2h PR (only water available) at 7-day intervals. Sodium appetite test was performed after each cycle (2h access to NaCl and water). The hypothalamus of partially rehydrated (pr) animals was dissected at the end of cycles zero (control), one (1WD-PRpr), or three (3WD-PRpr) of repeated WD-PR. In 3WD-

PRpr, Avp transcripts were up-regulated 16 or 10 fold versus control or 1WD-PRpr, respectively (p<0.05). Oxtr, Avpr1a, Avpr2, and Trpv6 transcripts were down-regulated by -79, -70, -50, and -54%, in 3WD-PRpr versus control (p<0.05). In 1WD-PRpr, Oxtr and Trpv6 transcripts were down-regulated by -77 and -60% versus control (p<0.05). Hydrated (h) animals in which the hypothalamus was collected four days after cycles zero, one (1WD-PRh), or three (3WD-PRh) of repeated WD-PR were also evaluated. In 3WD-PRh, Trpv4 transcripts were up-regulated by 52% or 73% versus control or 1WD-PRh (p<0.05). Avp transcripts were up-regulated 1.8 fold in 3WD-PRh versus control (p<0.05). Our data suggest that repeated episodes of dehydration in male rats induce plastic responses in hypothalamic genes coding for osmotic pressure regulation (Avp, Avpr1a, Avpr2, and Trpv4).

037.214 U Episodes of repeated dehydration induce hypothalamic gene expression plasticity II: voltage-gated sodium channel, rabaptin, jun proto-oncogene, and interleukin 1 alpha.

derderiand@wbu.edu DTB Pereira-Derderian, Wayland Baptist University; Catherine Wiechmann, Wayland Baptist University; Ashlyn Westerman, Wayland Baptist University; Jose Vanderlei Menani, Sao Paulo State University; Laurival Antonio De Luca Jr., Sao Paulo; Silvana Chiavegatto, University of Sao Paulo

Repeated cycles of water deprivation-partial rehydration (WD-PR) induce body-fluid balance-associated behavioral changes, such as sodium intake enhancement. We investigated the effect of repeated WD-PR on hypothalamic gene expression of Ptn, Ddn, Tac3, Grm4, Syt9, nNOS, Nmu, Ntrk1, Plat, Crh, Crhr2, Il3ra, Il1a, Il6, Scn1a, Scn1b, cFos, FosB, Rabep2, Jun, Ywhag, and Ywhaz by qPCR. Adult male Holtzman rats (n=4-11/group) were individually housed with chow, water, and 0.3M NaCl. Rats were subjected to zero, one, or three cycles of 36h WD followed by 2h PR (only water available) at 7-day intervals. Sodium appetite test was performed after each cycle (2h access to NaCl and water). The hypothalamus of partially rehydrated (pr) animals was dissected at the end of cycles zero (control), one (1WD-PRpr), or three (3WD-PRpr) of repeated WD-PR. In 3WD-PRpr, Rabep2 and Jun transcripts were up-regulated by 6% and 42% versus 1WD-PRpr, respectively (p<0.05). Rabep2, Ptn, nNos, Plat, Syt9, and Crhr2 transcripts were changed by 72%, -91%, 61%, 21.4 fold, and 1.9 fold in both 3WD-PRpr and 1WD-PRpr versus control (p<0.05). Hydrated (h) animals in which hypothalamus was collected four days after cycles zero, one (1WD-PRh), or three (3WD-PRh) of repeated WD-PR were also evaluated. In 3WD-PRh, Il1a and Scn1a transcripts were up-regulated

by 150% and 45% versus both 1WD-PRpr and control ($p < 0.05$). Grm4 transcripts were down-regulated by -36% in 3WD-PRh and 1WD-PRh versus control ($p < 0.05$). Our data suggest that repeated episodes of dehydration in male rats induce plastic responses in hypothalamic genes coding for neuronal excitability, survival, and inflammation.

037.215 U Evaluating the quality of life and functional outcomes in patients with diffuse axonal injury post TBI, Jonathan Siktberg, Baylor University; Mayur B. Patel, Vanderbilt University

Diffuse axonal injury (DAI) is broadly associated with poor outcomes in the traumatic brain injury (TBI) patient; however, this relationship is not well understood. In this study, we aim to identify survivors of TBI with DAI who were admitted to Vanderbilt University Medical Center for care between January 1, 2000 and June 30, 2013. We will evaluate their long-term quality of life and functional outcomes as compared to a matched control population of TBI survivors without evidence of DAI who were admitted during the same time period. Analysis of this data, obtained through electronic medical record review and telephone interview, may allow us to determine a relationship between severity or location of DAI and long-term functional outcomes, which could aid the clinician in the care of patients with TBI and radiographic evidence of DAI.

037.216 U Hyperglycemic-induced circadian gene expression alterations in three brain regions of a rat model of human type 2 diabetes mellitus, Carlos A. Garcia, The University of the Incarnate Word; Elizabeth P. Gutierrez, The University of the Incarnate Word; Jessica Ibarra, The University of the Incarnate Word

Diabetes affects the CNS. Pathophysiological abnormalities including cognitive impairments are well documented in diabetics. Amygdala and hippocampus are brain regions that regulate vital neurocognitive functions while the hypothalamus links the brain to the endocrine system. Evidence suggests deregulation of circadian function affects metabolic processes. Studies have examined clock gene expression in the brain of animal models of human type 1 diabetes mellitus, however few have examined clock genes in type 2 diabetes mellitus (T2D). The purpose of this study was to test the hypothesis that hyperglycemia alters circadian genes in the brain of a rat model of T2D. Age and sex-matched rats were separated into two groups, control and Zucker Diabetic Fatty rats (ZDF), an animal model of human T2D. Three months after onset of hyperglycemia in ZDF rats, amygdala, hippocampus and hypothalamus of both rat groups were dissected using the atlas of Paxinos

and Watson. Tissues were homogenized and the RNA precipitated. The RNA concentration was measured and used to synthesize complimentary DNA (cDNA) by polymerase chain reaction. cDNA was used to measure gene expression of circadian genes BMAL1, Clock, Period 1 and Cryptochrome 1 by RT PCR. Results indicate four genes significantly decreased ($p < 0.05$) in the hyperglycemic hippocampus and amygdala while Period 1 significantly decreased in the hypothalamus. Findings include: i) core clock transcripts decreased in diabetic brain areas tested, ii) changes in gene expression may contribute to cognitive deficits seen in human diabetics and iii) decreases in gene expression in hypothalamus may contribute to hormonal deregulation.

037.217 N Oxidative damage is correlated with mitochondrial autophagy, George Perry, The University of Texas at San Antonio; EA Perry, Harvard Dental School; Paula Isavel Moreira, University of Coimbra; Sonia Correia, University of Coimbra; Rudolph J. Castellani, University of Maryland School of Medicine; Xinglong Wang, Case Western Reserve University; Hyoung-gon Lee, Case Western Reserve University; Xiongwei Zhu, Case Western Reserve University

Alzheimer disease (AD) and aging are marked by oxidative damage and mitochondrial abnormalities. Since mitochondria can play a critical role in oxidative damage, we conducted this study to identify the relationship of oxidized RNA, 8-hydroxyguanosine (8OHG), and mitochondrial DNA (mtDNA) accumulation in AD and aging individuals. Abnormalities were examined by using densitometry of hippocampal pyramidal neurons: mtDNA accumulation as a marker of mitophagy and oxidative damage by 8OHG. Among aging individuals, oxidative damage and mtDNA were highly correlated ($r_2 = 0.86$). While both 8OHG and mtDNA were at higher levels in AD individuals, they were uncorrelated ($r_2 = 0.06$). In contrast, as we found before, oxidative damage was inversely correlated with amyloid; it was unrelated in normal aging individuals. These results suggest that oxidative damage is directly related to mitophagy in aging individuals. With the onset of AD, amyloid plays a strong antioxidant role. These findings indicate that the onset of AD is marked by a pleotrophic change in oxidative stress, one characterized by a change from mitochondria to amyloid dependency.

Physics

Physics Poster Session

Participants:

037.218 G Cell Interaction Effects due to Surface Coatings on Highly Fluorescent Nanoparticles, Francisco Javier Pedraza, The University of Texas at San Antonio; Dhiraj Sardar, The University of Texas at San Antonio;

Andrew Tsin, The University of Texas at San Antonio; Lawrence C Mimun, UT San Antonio; Julio Avalos, The University of Texas at San Antonio; Brian Yust, University of Texas Pan American

Fluorescent nanoparticles (NPs) such as KYb2F7:Tm³⁺ have shown potential in biological applications due to their ability to absorb and emit within the biological window, where near infrared light is less attenuated by soft tissue. This results in less tissue damage and deeper tissue penetration making it a viable candidate in biological imaging. Another important factor in determining their ability to perform in a biological setting is the surface chemistry. Biocompatible coatings, including polyethylene glycol (PEG), polyvinylpyrrolidone (PVP), pluronic and folic acid are commonly used because they pose several advantages such as ease of functionalization, dispersion, and higher cellular uptake. To study the effects of the NP surface chemistry, KYb2F7:Tm³⁺ a solvothermal method using PEG, PVP, pluronic acid, and folic acid as a capping agent, followed by thorough optical characterizations. Optical changes were thoroughly studied and compared using absorption, emission, and quantum yield data. Cell viability was obtained by treating Rhesus Monkey Retinal Endothelial cells (RhREC) with KYb2F7:Tm³⁺ and counting viable cells following a 24 hour uptake period. The work presented will compare the optical properties and toxicity dependency on the surface chemistry on KYb2F7:Tm³⁺. The results will also indicate that KYb2F7:Tm³⁺ nanoparticles are viable candidates for various biomedical applications.

037.219 G Multifunctional Near Infrared Emitting Luminescent Nanocrystals for Biomedical Imaging, *Lawrence C Mimun, UT San Antonio; Chris Rightsell, UT San Antonio; G.A. Kumar, UT San Antonio; Francisco Javier Pedraza, The University of Texas at San Antonio; Teja Guda, UT San Antonio; Vinayak P Dravid, Northwestern University; Dhiraj Sardar, The University of Texas at San Antonio*

The development of multimodal nanomaterials for medical imaging applications has recently gained much interest in biomedical community. Utilizing the biological window where low scattering and low absorption occur, many researchers have developed nanomaterials such as fluorophors, metal nanoparticles, and other organic molecules that would improve current imaging techniques, but are usually limited to two modalities. In this project, we are developing near infrared(NIR) based nanocrystals (NCs) as contrast agents with multimodal features comprising of strong NIR fluorescence, X-ray fluorescence and magnetic properties by utilizing the superparamagnetic

features of Gd³⁺, the high X-ray excitation cross section of Lu³⁺, and the NIR fluorescence of Nd³⁺. Halides, such as MgGdLuF₄ (M=K,Na), were doped with NIR active rare earth ions, Nd³⁺, where synthesis conditions have been optimized to obtain the brightest phosphor with a size of < 50 nm. Characterization of the NCs were performed to explore the excitation and emission properties, crystal structure, morphology, magnetization properties, and X-ray fluorescence properties. The potential use of these NCs can be utilized as contrast agents for medical imaging application such as optical imaging, magnetic resonance (MRI) and X-ray imaging.

037.220 H Variable analysis of photovoltaic cell exposure efficiency, *Christopher Arguello, University of the Incarnate Word; Erik Coronado, University of the Incarnate Word; Daniel Potter, Administration; Sree Nair, University of the Incarnate Word*

Solar energy is a free and clean source of energy which is currently the focus of many emerging fields of research in science and technology. We present the fundamental theory and various applications of photovoltaic cells. We will discuss the differences between various types such as monocrystalline, polycrystalline, and thin-film doped polycrystalline solar cells. The details of sample solar panels built in the lab, the analysis of its primary circuit components, and the input and output characteristics will be emphasized. This study also examines the various factors affecting the output power and the conversion efficiency including location, panel tilt, atmospheric temperature, humidity, etc. of the solar panels. We will present the experimental results on the open circuit voltage exposure efficiency of the solar panel under various optimum conditions. Our results show that optimizing the tilt and orientation for specific geographic locations and climate conditions will maximize the panel output voltage.

037.221 U White Dwarf G29-38, *Woody Woodall, Temple College Physics Club*
A White Dwarf (WD) is defined as the stellar remains of a collapsed star. (WD) is thought to be the final stage in the "life cycle" of a star that does not contain enough mass to become a neutron star. Once collapsed G29-38 will retain a volume similar to the size of the earth, and still containing a mass similar to our sun. This type of (WD) is classified as a degenerate dwarf composed primarily of electron-degenerate matter.[1] The first WD star was discovered by William Herschel on 31 January 1783. The nearest (WD), Sirius B, was first observed in 1862 by Clark at a distance of 8.6 light years from earth.[2]The first reports of G29-38 variations was from Shulov and Kopatskaya in 1974.[3] G29-38 being classified as a DAV has luminosity variations with amplitudes

up to 30%.[4] Using the variances in luminosity emitted from the (WD) it is possible to determining the composition and spread of elements across the surface of the (WD). [5]We used Period 04, a software designed by astronomers for the purpose of processing astronomical data that has time gaps in observations.[6] The data we used was provided to us from the network of telescopes and observers know as Whole Earth Telescope (WET)and Central Texas Astronomical Society. The data was reduced prior to our analysis by the Delaware Ateroseismic Center [7], the administrator's for (WET). The results of our teams will be used by University researchers to assist determining the distribution of calcium in G2938.

Science Education

Science Education Poster Session

Participants:

037.222 N Building a Community of Microbiology and Developmental Entomology Undergraduate Researchers to Increase Scientific Expertise and Confidence,

Lisa M Goering, St. Edward's University; Patricia J Baynham, St. Edward's University

This United States Department of Agriculture (USDA) funded project enhanced student experiential learning by engaging 23 St. Edward's University (SEU) undergraduates in research projects over the course of four years. Through collaborative research projects and exposure to career opportunities, this project offered students an optimized learning experience that enhanced the likelihood that they would pursue careers in agricultural science. Each cohort began the program with a research skills course that enhanced their scientific skills with an average increase in assessment scores of 20%.

Participants were also mentored by a government scientist for one week at the USDA Agricultural Research Service (ARS) in New Orleans, LA; this gave students a very positive view of agricultural research and made them more likely to pursue this field. Students undertook individually mentored research projects during two consecutive summers, at both SEU and the University of Texas at Austin. Participants made 71 research presentations winning 16 awards for their work. Fifty percent of the students indicated that the program made them more likely to include research in their future career plans. This project has raised the profile of research conducted at SEU and facilitated interactions with research scientists at UT-Austin and the USDA-ARS. Finally, this project has had major impacts on the student participants as they developed interest, skill and confidence in scientific research, making them more motivated and

competitive for employment and graduate/post-baccalaureate programs.

037.223 G Environmental Monitoring of Soils along Houston Highways, *Matthew John Fiala, Texas Southern University; Hyun-Min Hwang, Texas Southern University*

Automobiles are a major source of environmental contamination as they release heavy metals such as copper, lead, zinc, vanadium, and iron into the environment. As these heavy metals deposit on soils, they can infiltrate down the soil column or wash off into nearby streams causing toxic effects to the ecosystem. Houston traffic congestion may be a major source of contamination immediately along roadsides. Field portable X-ray fluorescence (FPXRF) spectrometry is a useful analytical technique for onsite real-time screening due to its fast analysis of undisturbed soils without laboratory acid digestion steps. The X-rays penetrates approximately 2 mm in soil matrix and quantify concentrations of various elements with low detection limits of 10 ppm. The FPXRF can be taken to sample locations and placed directly on the soil surface to measure heavy metal contamination. This in-situ analysis allows rapid analysis of a large number of samples, providing cost- and time-effective delineation of contaminant distributions, that that can be used to make decisions in the field in a timely manner for more efficient environmental quality management. FPXRF (Niton XL3t) analyzer allows precise and accurate measurements of heavy metals deposited on the soil surfaces along the highways in the Houston Metropolitan area. Monitoring data can be used to determine contamination hotspots that require future investigation and/or remediation. This study will also measure heavy metals in surface soils before and after rain events to investigate wash-off of trace metals by rains in January 2015.

Systematics & Evolutionary Biology

Systematics and Evolutionary Biology Poster Session

Participants:

037.224 U Do cannibalistic mothers discriminate against their own young?, *Amanda Reed Broca, St. Edward's University*

Kin selection is a form of intraspecific discrimination that usually depends on genetic relatedness. Preferential treatment of kin can result in cannibalism of genetically different individuals that are not involved in a parent-offspring relationship. Although seemingly counter-intuitive, cannibalism is an adaptive trait that has evolved independently in many organisms throughout the animal kingdom. According to kinship theory, individuals should exhibit harmful behavior to non-relatives more often than to relatives. However, in some instances, inclusive fitness is increased when the benefits to direct

fitness exceed the costs to indirect fitness. Fish species have been shown to exhibit cannibalistic behavior in both natural and laboratory settings. *Gambusia affinis* is a species notorious for cannibalizing neonates, and an experiment performed by Hamontree et al. (under review) tested whether post-parturition or gravid females of *G. affinis* cannibalized at higher rates and if they could discriminate against kin. The results showed that post-parturition females cannibalized at greater rates in order to re-sequester nutrients lost during parturition, and that they consumed their offspring (kin) at the same rate as non-kin. Therefore, females could not discriminate kin based on visual cues alone. This experiment will build off of the previous study and determine if females can discriminate between kin and non-kin with the addition of olfactory cues. I hypothesize that females will not discriminate against kin with the addition of olfactory cues because they do not possess the cognitive ability, nor will decreased indirect fitness (loss of kin and genes) outweigh increased direct fitness (nutritional gain). It may be more important for females to re-sequester nutrients lost during parturition in order to persist and reproduce in the future.

037.225 U Do coercive males trade-off mating for competition when faced with multiple competitors?, *Hufsa Ali, St. Edward's University*
The livebearing western mosquitofish (*Gambusia affinis*) serves as a model organism for studying male-male competition because of high aggression levels in relation to coercive mating. This study seeks to better understand male competition as a mechanism of sexual selection in this coercive system. Previous work by Deaton (2008) and Cureton et al. (2011) showed that male body size, density and sex ratio affect male behavior and suggested that at a certain density, males likely trade-off mating for competition. However, these studies did not exclusively test male competition under incremental competitor densities to assess the potential trade-off. Thus, we attempt to identify a possible density “threshold” at which males trade-off mating with competition. If both exist, we expect a negative relationship between mating and competition at some density. To date, we have observed mating and aggression behaviors of individuals in a repeated-measures design under incremental competitor densities (ranging from 1 to 4). We scored both frequency of male mating behaviors towards the female and aggressive behaviors towards the competitors. Behaviors include chasing, biting, and gonopodial displays or thrusts. As predicted, mating behaviors increase with increasing male densities; however, aggressive behaviors towards other males did not. Mating behaviors continued to increase with

competitor densities, indicating no trade-off between mating and competitive behaviors at the densities tested. Rather, there is strong correlation between mating and competitive behavior frequencies with increasing density. Future work will test higher densities and vary male body-size, which is known to influence mating success and competition.

037.226 N Evolution of shell shape in the land snail family Polygyridae, *Kathryn E Perez, University of Texas Pan American; Russell Minton, University of Houston Clear Lake*
Polygyridae is a large, morphologically diverse family of land snails composed of widespread species, well traveled invasives and narrow range endemics, some of which are of conservation concern. Polygyridae presents several examples of sympatric convergences of shell morphology, where there are multiple examples of members of different genera having completely indistinguishable shell shapes. The extent of this convergence across the family is unknown, as are the evolutionary processes behind it. We directly assessed the phylogenetic signal in shell shape by mapping geometric morphometric shape variables onto a phylogeny of the family. There was significant phylogenetic signal in the shell shape data (tree length=0.142, $p < 0.001$). Convergences in shell shape were common, e.g. highly globose shells in *Stenotrema* and *Mesodon normalis*.

037.227 U Impact of prey availability on behavior in *Elaphe guttata*, *Aubery Norman, UT Tyler*
There exists an evolutionary trade off between foraging for food and remaining safe from predatory attack. While safety is achieved in the comfort of a secure hiding place, it is necessary for foraging to take place in order to sustain life. The study objective was to note what differences in this trade off would be exploited due to prey availability. Of the two groups of Corn snakes that were observed, one was fed a weekly diet of 60% its body weight while the other was fed 20% of its body weight. After 8 months, foraging statistics were taken represented by time spent inside its domed enclosure versus time spent outside of enclosure where food could be found. Each snake was then subjected to a predatory attack using a hawk model. Post attack statistics were then collected for comparison. For those snakes undergoing a restricted diet, changes in antipredator behavior including increased foraging as well as increased aggressiveness were expected when compared to the high diet group. Snakes on restricted diets were also expected to engage their prey faster than their counterparts on the high diet. With the presence of potential predators, in this case the hawk model, a strain is put on the trade off between hunger and safety. There was no

difference in mean time spent foraging. Both groups experienced a decrease in foraging times post attack. The restricted diet delivered more strikes to the hawk model than did the high diet group.

037.228 U Invertebrate diversity in the seagrass meadows of Texas, *Ashleigh Brown, St. Edward's University; Roberta Engel, St. Edward's University*

Seagrass meadows with a primary composition of turtle grass (*Thalassia testudinum*) harbor a rich and diverse biota. This unique habitat is threatened by dredging and has been impacted by oil spills. In addition, climate change (e.g., changes in sea level and water temperature) could potentially affect the meadows as they are found in relatively shallow waters. It is important to assess the biodiversity before there is further habitat destruction and permanent loss. The aim of this project is to assess macroinvertebrate diversity, with a focus on arthropods, found in seagrass meadows along the western coastline of the Gulf of Mexico. Preliminary fieldwork, conducted in the fall of 2014, has provided us with a baseline dataset. Specimens were collected using a seine net from two sites in Redfish Bay. The macroinvertebrates were collected into formalin or 70% ethanol in the field; upon return to the laboratory, specimens were transferred into fresh 70% ethanol. Specimens were sorted, identified, and vouchers were placed into 2.5 mL tubes. A rapid bioassessment marine macroinvertebrate survey similar to that used for macroinvertebrate stream surveys will be developed for the seagrass meadows. The next phase of the study is to measure species diversity, both species richness and species abundance, in Redfish Bay and other localities along the Texas coastline.

037.229 U Methodology for sperm extraction and a preliminary assessment of predicting reproductive allocation based on mating system in sex role reversed fishes, *Sana Rashid, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

Theory predicts that reproductive investment should vary according to mating system. Syngnathid fishes provide an important model system for such studies as closely related fishes exhibit differing mating strategies (from monogamous seahorses to polyandrous pipefishes). In systems where males and females mate monogamously, reproductive investment should be lower overall, since sperm competition also is lower. For polygynous and polyandrous species, on the other hand, reproductive investment should be higher as sperm competition is also stronger. To our knowledge no studies have investigated this theoretical predication in a

sex role reversed organism. The Gulf Coast of Texas supports several species of syngnathid fishes, including seahorses and pipefishes. Three species of pipefishes will be used to test predictions related to sperm allocation by males and reproductive investment by females. Additionally, little is known about sperm production in male pipefish, and only few studies have reported success in extracting sperm from males. Herein, we describe our methods for successfully extracting sperm from male pipefishes and provide preliminary data on reproductive investment by both males and females in the most common of the three species, the polyandrous Gulf pipefish, *Syngnathus scovelli*.

037.230 N Prevalence of parasitism in a newly described cave-adapted fish, *David E Starkey, University of the Incarnate Word; Julie L. Day, U.S. Fish and Wildlife Service*

Grotto Sculpin, *Cottus specus*, are found exclusively in Perry County, Missouri, a region well known for its extensive karst topography. There are a number of complex cave systems underlying much of the County, comprised of several hundred miles of mapped passageways and conduits. Grotto Sculpin were recently differentiated as a cryptic lineage of the Banded Sculpin complex, *Cottus carolinae*, and were found to be endemic only to the Bois Brule drainage of Perry County. This drainage system is fairly extensive and includes numerous caves, recharge areas and resurgences, as well as surface streams that may be intermittently connected to cave streams. In many recent studies, cryptic diversity has been recovered from well-defined cave systems, but novel lineages are restricted to cave habitats. *Cottus specus* is unique in that the observed diversity of its populations extends beyond the cave environment into surface habitats, which is exceptionally rare for species that have previously been classified as obligate stygobites. In an attempt to determine whether populations of *C. specus* represent unique divergences in ecological as well as evolutionary trajectories, we compared the extent of parasitism in cave vs. surface populations. Comparative studies of host-parasite dynamics and occurrence have shown strong utility in beginning to address whether or not populations might be under selective pressures. Our preliminary findings indicate that *C. specus* found in cave streams are more highly parasitized than those found in surface streams, suggesting that they are subject to unique selective pressures which could serve to further differentiate cave populations from those on the surface.

037.231 U The evolution and selection pressures of facial stripes in birds, *Stephen Eric Scribner, Stephen F Austin State University*

Various selection pressures have been proposed for the evolution of facial stripes in birds. Facial stripes may function in glare reduction in open habitats, as targets of sexual selection, or promote individual recognition in social species. In this study, phylogenetic comparative methods were used to test these three alternative hypotheses for the adaptive evolution of facial stripes in four avian families: Falconidae, Paridae, Tyrannidae, and Parulidae. Using published phylogenies of each group, potential patterns of correlated evolution between facial stripes and each proposed selective agent were tested using the pairwise comparison test in the Mesquite data analysis software. Evolution of a stripe through the eye in open habitat, aerial predators, such as the Falconidae and Tyrannidae supports the ant glare hypothesis. Facial stripes evolve in concert with sexual dimorphism in the Parulidae, supporting the sexual selection hypothesis. The individual recognition hypothesis is supported in the Paridae, as facial stripes evolve primarily in highly social species.

Terrestrial Ecology and Management

Terrestrial Ecology and Management Poster Session
Participants:

037.232 U A Test of the Relative Abundance, Diversity and Distribution of Ants at the Vireo Preserve in Relation to Habitat Manipulation for the Black-capped Vireo (*Vireo atricapilla*), James Thomas LaManna, St. Edward's University
Anthropogenic disturbances, and land management, can disrupt species richness and evenness in a system. In this study, we sought to examine how land management strategies for the endangered Black-capped Vireo, *Vireo atricapilla* (BCV), affect arthropod biodiversity at the Vireo Preserve in Austin, Texas. The Vireo Preserve serves as a critical habitat for BCV population recovery. By studying how land management activities affects arthropod communities, which serve as a food source for the BCV, we can evaluate those management strategies. To analyze arthropod diversity, ants were used as a bioindicator due their diversity, abundance, and role as a keystone taxon in terrestrial ecosystems. Using pitfall sampling, ants species compositions in managed and unmanaged sites of an Oak/Juniper forest were compared using a Simpson biodiversity index. While arthropod diversity at the unmanaged site was greater than that of the managed site, studies indicate that there has not been sufficient time for species populations to stabilize.

037.233 U Analysis of a plant community after 10 years of not mowing, Brittney Garner, East Texas Baptist University; Troy A Ladine, East Texas Baptist University

An assessment of the plant community on a 6 ha

grassy area of the Environmental Studies Area of East Texas Baptist University was conducted May - June 2014. This area has not been mowed for 10 years. Twenty-four species were collected in 15 1-m diameter circles randomly placed within the area. All sites were a minimum of 50 m from other sites. Dominant species at the site were *Solidago rugosa*, *Paspalum notatum*, *Campanula rotundifolia*, *Arrhenatherum elatius*, and *Rubus fruticosus*. Simpsons' diversity measure was 0.941 and evenness = 0.547. Richness of the site was 37.1 + 4.52 estimated species (95% C.I. =27.5-46.9). The south portion of the field used was predominantly *Ligustrum*. If the grassy area remains unmowed, I expect that the *Ligustrum* will overtake the field. There are conifers to the northern end of the field that I expect will eventually begin to populate the grassy area as well.

037.234 U Analysis of predator-prey interactions in resource stressed environments with extreme changes in drought conditions, Emily Herzog, Midwestern State University; Eric Savage, Midwestern State University; Joseph Falade, Midwestern State University; Dale McDonald, Midwestern State University; Michael M. Shipley, Midwestern State University

As urban environments populated by humans expand, it forces more animal populations into these "concrete jungles". We are investigating how this changes the behavior of wolf spiders (family Lycosidae) and field crickets in a resource-stressed urban environment. Wolf spiders were captured around grassy and wooded locations in North Texas, and the crickets were procured from a local pet store. This experiment is the second of two phases and was conducted under "Level 5" drought conditions. The results are compared with spiders obtained from the same locations a year before under drought conditions of "Level 3". The spiders were placed within terraria with the crickets, simulating an urban environment, and predation events were personally observed. Crickets were supplied with food, while the spiders had no special food apart from their prey. We found that unlike the "Level 3" spiders, the "Level 5" spiders immediately preyed upon both crickets and other spiders. The "Level 3" spiders seemingly prioritized the crickets for their predation events, with the majority of the cannibalistic events occurring after the cricket population had been significantly reduced. Even though crickets were commercially raised, their behavior was affected as they were observed consuming other dead crickets and dead spiders, sometimes preferring them over their supplied food, unlike the previous year. We conclude that the more severe drought conditions affect the spiders' behavior and may influence the crickets

as well.

037.235 G Characteristics and prevalence of intradermal chigger mites *Hannemania* sp. among a population of *Gastrophryne olivacea* (Amphibia: Microhylidae) in South Texas, *Mayra Oyervides, University of Texas-Pan American; Andrea Lozano, University of Texas-Pan American; Adriana Huerta, University of Texas-Pan American; Maximiliano Barbosa, University of Texas-Pan American; Ramiro Patino, The University of Texas- Pan American; Teresa P. Feria, The University of Texas- Pan American; Frederic Zaidan, University of Texas-Pan American*

Larval *Hannemania* sp. mites, commonly known as chiggers are known to parasitize several different amphibian species. *Hannemania* sp. larvae infect their hosts by burrowing intradermally in the stratum spongiosum, where they are manifested as orange to red pustules beneath the skin of the host. The host's response to chigger infections includes acanthosis, inflammation, and necrosis. Herein we describe a case study of the high prevalence of chigger mite infection among a population of *Gastrophryne olivacea* in the Lower Rio Grande Valley (LRGV). Thirty-three *G. olivacea* were examined for the presence and abundance of chigger mites using a catch-release method on site. Results indicate the prevalence of infection was 97% (32/33 individuals). The mean abundance was 13.8 mites per individual. A Kruskal-Wallis test was applied to analyze the data, after a normality and homogeneity test. Our results showed a significantly higher number of chiggers attach to the pelvic patch and hind limbs compared to other body locations ($F=14.94$; $df=8, 288$; $P<0.0001$), in addition to the high prevalence of parasitism. This is particularly important as the pelvic patch serves an important role in water uptake among anurans. Future studies should examine the seasonality of such high prevalence of infection among the population and the potential effects on the species survival, reproduction, and overall health.

037.236 N Do cavity nesting birds recognize predator odors?, *Diane Neudorf, Sam Houston State Univ.; Nicole Vaughn, Sam Houston State Univ.; Elisabeth Horstman, Sam Houston State Univ.*

Extensive research has revealed the importance of chemical detection in various contexts of an organism's life. Although olfaction has been extensively studied among fish, amphibians, reptiles and mammals the information regarding avian olfaction remains inconclusive. Some birds are known to use olfaction to navigate, forage and distinguish among individuals. Another important role of olfaction is the detection of

predator scents. The ability to detect predators is especially important among cavity nesting species because snakes and small mammals will use cavities as refuges and when foraging. We observed responses of the Carolina chickadee, *Poecile carolinensis*, a resident cavity nester, to the odor of a potential predator (mink). We predicted that if Carolina chickadees use olfaction to detect predators, they would avoid the nest and exhibit an antipredatory response more so to the predator odor than control odors (water or garlic). We exposed 31 pairs of chickadees to predator or control odors by placing scented filter papers in their nest boxes during the nestling stage. There were no significant differences among treatments in the amount of time the parent birds spent inside the nest box, the amount of time away from the box or the amount of hesitation prior to entering the box on either nestling day 8 or nestling day 12. We conclude that Carolina chickadees either cannot detect the mink's odor or do not recognize it as a predator's scent.

037.237 U Egg-laying habits of Slosser's buckmoth (Lepidoptera: Saturniidae) from Andrews County in northwest Texas, *Trilby Olivia King, Angelo State University; Nicholas Negovetich, Angelo State University; Lendon Partain, Angelo State University; Ned Strenth, Angelo State University*

Slosser's buckmoth *Hemileuca slosseri* inhabits the rolling sand plains of southeastern New Mexico, northwest Texas, and southwestern Oklahoma, where the larval stages of this species feed exclusively on the leaves of *Quercus harvardii*. Adults emerge in November and immediately complete their egg laying activities. Observations in the field during the fall of 2013 revealed that many of the newly deposited egg rings were positioned in close proximity to existing hatched egg rings left over from the previous year. This study was undertaken to observe the egg laying habits of *H. slosseri* in Andrews County and determine if there is any correlation between the presence of existing hatched egg rings and the deposition of new eggs. Following all seasonal reproductive and egg laying activities in January of 2014, a 12 by 40 meter study area was established adjacent to Hwy 115 approximately 13 km SW of Andrews, Texas. All egg rings were mapped as to location, and height above ground as well as the stem diameter of each egg ring was recorded. A total of 134 egg rings were observed on the study plot (91 hatched and 43 un-hatched). Height above ground did not vary between new and old egg cases (Unhatched: 22.8 ± 0.79 cm; Hatched: 20.7 ± 0.66 cm; $P<0.065$), but new eggs were found on smaller stems compared to old eggs (Unhatched: 1.69 ± 0.089 mm; Hatched: 2.17 ± 0.072 mm; $P<0.0002$). All

egg cases exhibited an aggregated dispersion that appeared to follow the dispersion of the *Q. havardii*. Nearest neighbor analysis supports this claim, but it does not suggest an association between new and old egg rings. Therefore, stem diameter and not presence of hatched egg cases appears to be the determining factor in the positioning of the new egg rings. Additional field studies are currently underway and should provide a more complete resolution of the factors affecting oviposition in female moths.

037.238 U Forest Floor Characteristics in Areas Disturbed by Oak Regeneration

Silvicultural Treatments, Meagan Bell, University of Texas at San Antonio; Chad Sundol, The University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio; Fernando A. Martinez, UTSA; Cathryn Greenberg, USDA Forest Service

Forest management strategies aimed at promoting advanced oak regeneration have been shown to change forest floor features. Recent silvicultural practices conducted in the Southern Appalachians to promote oak regeneration may have had an impact on forest floor cover type within the study area. This study took place congruently with a study conducted to determine possible effects of silvicultural treatments (midstory herbicide application, repeated prescribed burn, and shelterwood burn, all implemented in 2009-10) on forest floor herpetofauna. Sixteen 5 ha units (four replicates per treatment; including controls), contained eight drift fences with two pitfall traps at each end. In July 2013 and 2014 forest floor percent cover of leaf litter, bare-ground, humic mat; coarse woody debris (> 12.5 cm diameter), and shrub cover (< 0.9 m) were recorded using the start-stop method. Four 15 m transects were placed at a random azimuth from the uphill bucket of random fences in each treatment unit. Changes in percent ground cover were analyzed using one-way ANOVA. Leaf litter decreased in the prescribed burn treatment (by $26\% \pm 5$), this was significantly different from the control ($< 1\% \pm 15$, $P = 0.0305$). Two of the prescribed burn replicates received the repeated burn in April 2014 so this difference was expected. Forest floor composition changes following a prescribed burn typically recover within a few years post-burn. As the forest floor is crucial habitat for numerous taxa of ground-dwelling vertebrates, continued monitoring to insure informed land management decisions should be a priority.

037.239 U Germination rates of Cajander larch (*Larix cajanderi*) seeds from northeastern Siberia under different environmental

conditions, Ivonne Lidia Trujillo, University of Texas at Brownsville; Aaron P. White, University of Texas at Brownsville; Dr. Heather Alexander,

University of Texas Brownsville

Boreal forest ability to regrow following wildfires and to migrate north in response to climate warming depends on seed viability and appropriate environmental conditions for seed germination. In this study, we evaluated germination rates of Cajander larch (*Larix cajanderi*) seeds from far northeastern Siberia under different environmental conditions, including air temperature (20 and 30 °C), 14-day pre-treatment (moist paper towel, submerged in water, and non-treated control), and substrate (sterilized potting soil or moist paper towel). Light was present 24 hours for all treatments. Each treatment was replicated nine times and contained 15 seeds (1620 larch seeds total). Seed germination was observed daily for 30 days. We hypothesized that seed germination would be fastest when pre-treated by submerging in water and when grown on sterilized potting soil at 30 °C. We expected this response because larch seeds naturally occur in environments characterized by seasonal melt of the permafrost active layer and high soil moisture, and new seedlings are typically observed during the growing season when air temperature is warm and ambient light high. We found that larch seeds germinated quickest (7 days) when pre-treated in moist paper towels at 30 °C in sterilized soil, but the highest germination rates (21%) were found for those pre-treated by submerging in water rather than being placed on a moist paper towel at 20 °C. Results of this study will help establish the role of environmental conditions in determining larch seed germination rates, and ultimately, larch forest ability to regrow after wildfire and respond to warming climate.

037.240 U Reproductive Condition of Aestivating *Siren intermedia* in Deep South

Texas, Randy L Powell, Texas A&M, Kingsville; Ayssa E. Trevino, Texas A&M, Kingsville; M. Andres Soto, Texas A&M, Kingsville; Ashton V. Crocker, Texas A&M, Kingsville; Shawnda L. Kumro, Texas A&M, Kingsville

The Lesser Siren, *Siren intermedia*, is found in permanent and ephemeral habitats in South Texas. During drought conditions, sirens aestivate in the drying soil. A large aggregation of seventy-three sirens was recovered from an excavation near a road, adjacent to a culvert in Kleberg County, TX (27.541669°N, 97.880272°W; WGS 84) on 18 November 2011. The size ranges, sex ratio, and reproductive condition of these sirens are reported. The total lengths of complete individuals ranged from 31.8 to 59.0 cm. Twelve were males ranging in total length from 40.0 to 59.0 cm. Seven were females ranging in total length from 40.0 to 47.5 cm. Primary sex organs were recovered from deceased specimens. The number of eggs in females ranged from 2,200 to 7,200. The number

of eggs reported is much higher than any previous report.

037.241 U Species Diversity of Herpetofauna in Response to Silvicultural Treatments in the Southern Appalachians, *Melissa Todd, UTSA; Chad Sundol, The University of Texas at San Antonio; Janis Kathleen Bush, UT San Antonio; Fernando A. Martinez, UTSA; Cathryn Greenberg, USDA Forest Service*

In the southern Appalachian Mountains of western North Carolina, reptiles and amphibians were trapped in an experimental study of different oak regeneration treatments. The study compares three different treatments (four replicates) which were initiated 2009-2010: midstory removal by herbicide, shelterwood-burn, prescribed burn; as well as a control. In each replicate were eight 7.6 m long drift fences with a 20 L bucket buried flush with the ground at both ends and a funnel trap on both sides of each fence. Traps were checked daily except Sunday from late-May to mid-August 2013 and 2014. Simpson (D) and Shannon-Wiener (H) diversity indices were calculated and compared by two-way ANOVA. Neither the treatment, year, nor their interaction had a significant effect on the Shannon index ($P > 0.05$). There was a significant treatment and treatment-year interaction for the Simpson index ($P < 0.05$). In general, the Simpson index was significantly higher in the shelterwood-burn treatment ($D = 0.82$) than the prescribed burn treatment ($D = 0.63$); however the magnitude of the difference was dependent on year. Simpson decreased from 2013 to 2014 for the midstory herbicide treatment ($D = 0.76$ versus 0.64) and the control ($D = 0.79$ versus 0.59); while the shelterwood-burn ($D = 0.79$ versus 0.85) and prescribed burn ($D = 0.56$ versus 0.70) increased from 2013 to 2014. The difference between the two indices may be a result of the importance of dominance in the Simpson Index, while evenness plays a more important role in determining the Shannon-Weiner index.

037.242 G Tracking the elusive Maritime Pocket Gopher (*Geomys personatus maritimus*), *Tara Hansler, Texas A&M, Kingsville; Scott Henke, Texas A&M, Kingsville; Jon Baskin, Dept. of Biology and Health Sciences*

The Maritime Pocket Gopher (*Geomys personatus maritimus*) is a fossorial rodent endemic to the upper South Texas coastal mainland in Nueces and Kleberg counties. The study site is located on Flour Bluff in Corpus Christi, Texas. We trapped four control gophers from the study site and 10 relocation gophers from nearby properties. Radio transmitters were implanted subcutaneously between the scapulae. Control gophers were released into their home burrows and relocation gophers were released

either on the surface or in premade burrows. All gophers were tracked regularly over the course of 4 months at varying times to determine home range and activity. Five of the 10 relocation gophers shirked their transmitters between one and two weeks after relocation. One relocation gopher that shirked was recaptured and appeared healthy and active with only a scar to indicate where the transmitter had been implanted and subsequently removed. Of the five remaining relocation gophers, two of the gopher signals were lost within two weeks of release. The remaining three transmitters have not moved and we have been unable to recover them. Of the four control gophers one shirked its transmitter, and one control is still actively moving. The remaining two transmitters have not moved and have not been recovered. Preliminary field trials revealed that the transmitters give reliable data on location fixes up to one foot radius for depths down to three feet. These field trials also revealed that tunnels do not seem to convolute the signal but underground obstructions such as roots and rocks may seriously dampen the signal strength.

Sunday, March 8

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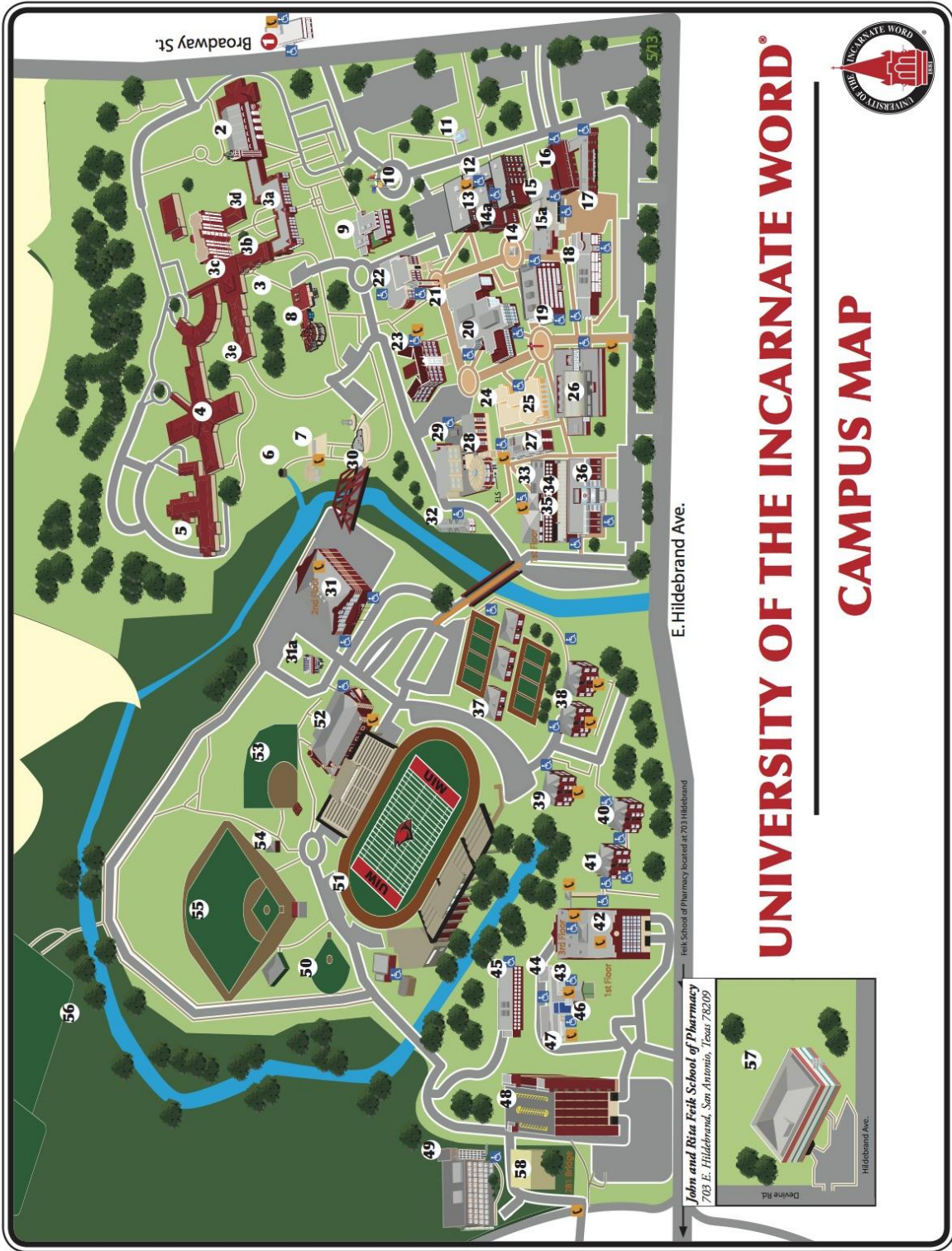
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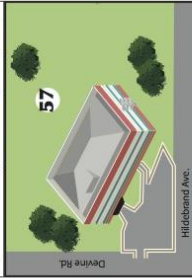


UNIVERSITY OF THE INCARNATE WORD®

CAMPUS MAP



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 703 E. Hildebrand, San Antonio, Texas 78209



E. Hildebrand Ave.

Broadway St.

UNIVERSITY OF THE INCARNATE WORD® CAMPUS MAP



1. Kathleen Martin Watson Enrollment Center:
Admissions
2. Chapel of the Incarnate Word
3. Village at Incarnate Word
- 3a. Pierre House
- 3b. Madeline House
- 3c. Dubuis House
- 3d. CHRISTUS Heritage Room
- 3e. Alphonse House
4. DeMatel House
5. Angelique House
6. Blue Hole
7. Picnic Area/Sand Volleyball Court
8. George Washington Brackenridge Villa
9. Incarnate Word Generalate
10. Mission Plaza
11. Bernard O'Halloran Fountain
12. Administration Building: Registrar, Business Office, Post Office, Campus Ministry,
Sr. Columkille Colbert Residence Hall, Paul R. Duber Academic Computer Center,
Asher-Bowie-White Teleconferencing Center (AD)
13. Sr. Antoninus Buckley Courtyard
14. Our Lady's Chapel (CHAPEL)
- 14a. Financial Aid (1st floor) (CHAPEL)
15. Maureen Halligan-Ronald Ibbes Theatre and Dance Center (HIT)
- 15a. Elizabeth Huib Coates Theatre (EHMT)
16. University Auditorium
17. Genevieve Tarlton Dougherty Fine Arts Center (FA)
Douglas and Donna Semmes Gallery (1st floor)
Palestrina Recital Hall (2nd floor)
18. Bonilla Science Hall (BSH)
19. AT&T Science Center (AT&T)
20. J. E. and L. E. Mabey Library, McCreless Art Gallery, Computer Labs,
Counseling (LIBR)
21. The Marjorie Jordan Carillon Plaza
22. Sr. Mary Elizabeth Joyce Applied Arts & Sciences Building (JB)
23. Bishop Claude Dubuis Residence Hall
24. Sr. Margaret Patricia Slattery Incarnate Word House
25. Gorman Business and Education Center (GB)
26. Richard and Janet Cervera Wellness Center (WC)
27. Sr. Clement Eagan Residence Hall, Campus Police
28. Marian Hall: Student Center, Dining Hall, ELS (MA)
29. Marian Residence Hall
30. Lourdes Grotto and Angel of Hope Statue
31. Ann Barsbop Natatorium (NATA)
31a. Solar House
32. Buckley-Mitchell Advancement Center (BUCCMIT)
33. Agnese/Sosa Living/Learning Center
34. Center for Well-Being
35. Student Health Center
36. Sr. Charles Marie Frank Nursing Building (NB)
37. Clarence Mabry Tennis Center
38. Village of Avoca Apartments (A&B)
39. Avoca C
40. Avoca D
41. Avoca E
42. McCombs Center: Housing/Bookstore (4th floor)/Rosenberg Sky Room,
Java on the Hill
43. Henriette Leonard Auditorium
44. St. Joseph's Hall
45. Hillside I Dormitory
46. AT&T Conference Room
47. Dr. Burton E. Grossman International Conference Center (ICC)
48. Alonso Ancira Tower
49. Hillside II Dormitory
50. Practice Infield
51. Gayle & Tom Benson Stadium
52. Alice P. McDermott Convocation Center
Gorman-Mitchell Room (2nd floor) (CONV)
53. Softball Field
54. Concession Building
55. Daniel J. Sullivan IV Baseball Field
56. Practice Soccer Fields
57. Feik School of Pharmacy (FSOP)
58. Hillside III Dormitory



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