119th Annual Meeting of the Texas Academy of Science

March 4-6, 2016
Llano River Field Station
Texas Tech University
Junction, Texas

TEXAS ACADEMY OF SCIENCE
119TH ANNUAL MEETING
LLANO RIVER FIELD STATION
TEXAS TECH UNIVERSITY

SCHEDULE OF EVENTS

Friday, March 4

8:00 AM – 12:00 PM	TAS Board of Directors Meeting	Packard Hall North
10:00 AM – 6:00 PM	Conference Registration	Academic Building
10:00 AM – 1:00 PM	Poster Set Up	Dining Hall and Academic Building
12:00 – 12:45 PM	Section Chairs Pre-Session Lunch Meeting	Packard Hall North
1:00 – 2:30 PM	Paper Sessions	
2:30 – 3:00 PM	Coffee Breaks	
3:00 – 4:30 PM	Paper Sessions	
4:30 – 6:00 PM	Poster Session I	Dining Hall and Academic Building
4:30 – 9:00 PM	Social	Llano Hall Pavilion
7:00 PM	Star Gazing Party	Llano Hall Pavilion
7:00 – 8:45 PM	Workshops	Packard Hall

Saturday, March 5

7:00 – 8:00 AM	Past Presidents' Breakfast	Packard Hall North
7:00 AM – 12:00 PM	Conference Registration	Academic Building
8:00 – 9:30 AM	Poster Session II	Dining Hall and Academic Building
9:30 – 10:00 AM	Coffee Breaks	
10:00 – 11:30 AM	Paper Sessions	
10:00 – 11: 30 AM	Graduate Student Competition I	Packard Hall East
11:30 AM – 1:00 PM	Lunch	Llano Hall Pavilion
1:00 – 2:30 PM	Paper Sessions	
1:00 – 2:30 PM	Graduate Student Competition II	Packard Hall East
2:45 – 3:15 PM	Section Chairs Post-Session Meeting	Packard Hall North
4:00 – 4:30 PM	Business Meeting	Coker Stevenson Center
4:45 – 5:30 PM	Outstanding Texas Educator Lecture	Coker Stevenson Center
5:30 – 6:15 PM	Texas Distinguished Scientist Lecture	Coker Stevenson Center
6:15 – 7:15 PM	Reception	Coker Stevenson Center
7:15 PM	Awards Banquet	Coker Stevenson Center

Sunday, March 6

7:00 AM	Field Trips	Dining Hall

Future Meetings
2017 University of Mary-Hardin Baylor, Belton

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ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIR

Welcome to Junction 2016! It was an honor and privilege to serve as program chair this year. First, many thanks to our local host, Dr. Tom Arsuffi, Director of the Llano River Field Station and TAS past-president, and the staff at LRFS for making this meeting and program a success. The Academy held its 112th annual meeting here in Junction in 2009, and we're delighted to be back. Section Chairs and Vice-Chairs always play an important role in the production of a strong program and I'd like to thank all 32 of them for their hard work and dedication to the Academy. They are the true pillars of the Academy. I am also indebted to the TAS Coordinator of Information & Technology, Dr. Chris Vitek, for his insight and assistance with the online abstract submission and scheduling system.

This year's program consists of four paper sessions, two poster sessions, Friday evening professional development workshops, and four field trip opportunities on Sunday. I hope you enjoy your stay in Junction, take advantage of the workshops and field trips, and have a productive meeting experience!

Jason L. Locklin, Ph.D.
2016 Program Chair

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. Danette Rene' Vines

Welcome to the Llano River Field Station at Texas Tech University and the 119th Annual Meeting of the Texas Academy of Science! I am pleased to announce that we have 262 scientific presentations which include 124 papers and 138 posters. This represents a significant increase from last year. The Texas Academy of Science is proud to continue its commitment to the advancement of science by awarding over $13,500 in undergraduate and graduate student research awards to scientists throughout the great state of Texas.

I wish to thank you all for contributing to the success of this conference. The TAS annual meeting continues to thrive due to the commitment and dedication of its members, associates, sponsors, and friends. The success of this year's program is a testament to the hard work and dedication of many wonderful and talented students throughout the state of Texas as well as to the support and encouragement of their advisors, mentors, families and friends. This year's annual meeting is in a large part due to the dedication and commitment of our Program Chair and President Elect, Dr. Jason Locklin, and our most gracious host and dear friend, Dr. Tom Arsuffi, Professor and Director of the Llano River Field Station at Texas Tech.

I want to especially thank some folks who have been actively working behind the scenes. I wish to thank the head of technology, Dr. Chris Vitek, Vice President, Dr. Neil Gray, who is in charge of this year's Awards Committee, and Dr. Chris Ritzi, our immediate past president for his support and experience and for overseeing the elections process for this year's new TAS officers. I would also like to thank Dr. Cathy Early, Don Harper, and Dr. Kathleen Wood for their continuous work and dedication in so many areas: awards, finances, trouble-shooting and the occasional extending of a needed hand. I would especially like to thank the section chairs for their commitment, dedication, and expertise including their ability to so adeptly and patiently handle the abstract reviewing process, judging, and many other activities. Finally, there are no words to express my gratitude and admiration for the TAS Board of Executives. They have volunteered their services and time unselfishly and provided invaluable mentorship to me all while continuing to support and uphold the mission of TAS. I will never get tired of listening to their interesting stories about mollusks and aquifers, and I quite honestly know of no better company I would rather be in.

Lastly, I would like to thank Schreiner University, my home institution. I want to especially thank my dear colleagues: Diana, Fred, Kiley, Lesa and Bob, for introducing me to TAS at my first meeting many years ago which was held serendipitously right here in Junction, Texas. I would like to also thank the administration, especially Dr. Charlie McCormick, VPAA, and President Tim Summerlin who have always supported and shared our deep commitment to undergraduate research. And finally, I would like to thank my students past and present because at the end of the day they are what makes it all worthwhile.

In closing I hope you all enjoy the enlightening scientific events we have planned during the next two days in Junction along the beautiful Llano River. Symposia and professional development sessions, scientific talks and poster sessions, as well as wonderful field trips are just part of the fun in store over the next two days. On the final night, we will culminate with our Texas Distinguished Scientist and Outstanding Texas Educator presentations, followed by the awards banquet. My deepest wish is for you all to enjoy the great science showcased here at the 119th Annual TAS Meeting in the heart of the beautiful Texas Hill Country, and that you all walk away inspired to take science to new heights wherever you go!

Danette Rene Vines, Ph.D.

President, 2015- 2016

Texas Academy of Science

Dear Friends & Colleagues of the Texas Academy of Science:

The past few years, we've been getting all kinds of inquiries about where they are, are they lost, will they come visit Junction again. Our response has been, it takes time, they have other commitments, and requests..... Be patient. We are now happy to say:" THEY'RE BA-ACK!" (famous line in Poltergeist: The Other Side). And we're glad the Texas Academy of Science (TAS) is back to Junction and the Texas Tech University Llano River Field Station. It seems a short 7 years ago.

So, Welcome!!! - To the 119th meeting of the Texas Academy of Science at the picturesque and scenic Llano River Field Station (LRFS) at Texas Tech University at Junction. Junction is referred in its billing as "Front Porch of the West" and gets its name, not from the intersecting highways, but from the merging of the North and South Llano Rivers. The LRFS is one of the largest (> 400 acres) inland field stations in Texas and located in the biologically diverse Texas Hill Country and bisected by the headwaters of the South Llano River. Our goal is to facilitate, support, and attract excellent basic and applied science associated with water and watersheds, natural resources, k-12 environmental education and public engagement. What we aspire to, is what TAS has been doing for over a 100 years. Having TAS here again will provide more examples for how LRFS can improve – we'll be taking notes.

As you know, it takes a lot of people to put on a meeting of this size and scope. I'll take this opportunity to acknowledge all the good work provided by the following folks at TTU LRFS – they made this meeting possible: Mike Bailey, Derrick Ard, Susan Hawkins, Kelly Scioneaux, Yaso Anguiano, Carla Massie, Maria Dempsey, Inocencia Gutierrez, Julia Martinez, Salvador Martinez, Clay Armes, Esmeralda Valenzuela, Linda & Donn Edwards, and Tyson Broad. *If you see them, say hi and thanks.*

The City of Junction has also been a tremendous supporter of the 119th Texas Academy of Science annual meeting and I hope you especially acknowledge the Junction businesses that kindly sponsored many aspects of the meeting. You'll find them listed at the back of the Program. In particular, Connie Booth of the Chamber of Commerce was instrumental in organizing solicitations and sponsors. The Chamber has arranged for 5 door prizes to be awarded at the banquet.

As always, our gratitude to Texas Parks & Wildlife Department for continued support.

Lastly, we hope you find the meeting enjoyable, successful and rewarding.
Sincerely and best regards,

Tom Arsuffi, Robert Stubblefield, Karen Lopez

Tom, Robert, Karen

CITY OF JUNCTION

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Main: 325 446 2622 Fax: 325 446 3003

February 15, 2016

Dr. Thomas L. Arsuffi
Board of Directors Texas Academy of Science
Director, Llano River Field Station
Texas Tech University Center at Junction

To the membership of the Texas Academy of Science:

On behalf of the City of Junction, I am writing to extend a warm and enthusiastic welcome to each member of the Texas Academy of Science attending the annual meeting here at the Texas Tech Field Station in Junction. We feel even more honored to have been chosen now for a second time to be the host city for your annual meeting.

We recognize and congratulate your organization's long term commitment to science and education in the great state of Texas. In Junction, we feel that educating our young people is the most important responsibility we have. Thank you for your commitment to science and education.

While you are in Junction, don't forget to take time to view the night sky. With a Bortle rating of 3, South Llano River State Park, right next door, has one of the darkest "night sky" ratings in the state. The South Llano river is one of the last places in Texas that the Guadalupe bass is not hybridized. Finally, the many species of deer that call Junction home is quite impressive, from India, Africa, Asia and Europe come species of deer that thrive here on the edge of the hill country.

May your meeting be a great success and your time here in our part of paradise as enjoyable as it has been for us to have you here, and we hope you will come back soon.

Sincerely yours;

Russell Hammonds, Mayor
City of Junction Texas

TEXAS TECH UNIVERSITY
Office *of the* Provost

LETTER OF WELCOME FROM THE PROVOST, TEXAS TECH UNIVERSITY

12 February 2016

On behalf of our faculty, staff and students I welcome you to our campus at the Llano River Field Station @ Junction to hold the 119th annual meeting of the Texas Academy of Science. As one of the oldest scientific organizations in Texas you have a rich and storied history with some of Texas' greatest scholars and educators as your Presidents and in membership. Of note for the 119th Junction meeting is over 250 research presentations, 500+ participants, Outstanding Texas Educator and Distinguished Scientist awardees and many awards for student research/presentations – a testament to the health, quality and sustainability of the organization and membership. Texas Tech University is honored you chose the Llano River Field Station again to host your 119th meeting.

A new era of excellence is dawning at Texas Tech University as it stands on the cusp of being one of the nation's premier research institutions. Our Llano River Field Station is an important part of that growth in terms of water and watershed research, k-12 award winning Outdoor School, Discovery Point Trail, renewable energy solar and wind demonstration projects, Rattlesnake Canyon pictographs, our South Llano River that runs through our campus and abundance of natural resources.

Organizations like yours are the fabric of multidisciplinary academic interaction, promotion of student research and professional development and service to Texas. You honor us by your presence.

Again, I welcome you to our Junction campus and wish you a rewarding, productive and successful meeting.

Sincerely,

Lawrence Schovanec

Lawrence Schovanec, Provost
Texas Tech University

TEXAS TECH UNIVERSITY SYSTEM

Robert Duncan, *Chancellor*

March 4, 2016

On behalf of the Texas Tech University System, it is my distinct pleasure to welcome you to the 2016 Annual Meeting of the Texas Academy of Science on the campus of Texas Tech University at Junction.

This is the 119th annual meeting, and we expect more than 300 presentations to take place and more than 500 students, professionals, teachers and scientists to attend. This is an important gathering of those who love science and the pursuit of new knowledge. It also represents a wonderful opportunity to showcase our unique Junction campus.

We are honored to serve as host for this distinguished and tradition-rich organization, which has roots dating to 1880. I hope you will enjoy your time in Junction, one of the many jewels of the Texas Hill Country.

Yours truly,

Robert Duncan,
Chancellor

/dh

Posters Assignments

Set up: Friday, March 4 10:00-1:00

Poster Numbers and Building Assignments:

Numbers	Building
025.073 – 025.102	Academic Building
026.103 – 026.143	Dining Hall
035.144 – 035.153	Academic Building
036.154 – 036-207	Dining Hall

Academic Building

Presents Fri 4:30 to 6:00 pm

Anthropology
Biomedical
Botany
Computer Science
Mathematics
Neuroscience

Presents Sat 8:00 to 9:30 am

Geosciences
Physics

Dining Hall

Presents Fri 4:30 to 6:00 pm

Cell & Molecular Biology
Conservation Ecology
Environmental Science
Freshwater Science

Presents Sat 8:00 to 9:30 am

Chemistry & Biochemistry
Marine Science
Science Education
Systematics & Evolutionary Biology
Terrestrial Ecology & Management

Authors may present during both sessions (Friday and Saturday), but are expected to be present at their poster during the designated times above.

Presenter Key for Poster and Paper Abstracts

N	Non-student
H	High School student
U	Undergraduate student
G	Graduate student

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Thanks to our 2016 Sponsors!

Susan Bratton Cathy Early Jason Locklin

Danette Vines Andrew Woodward

Venders

(visit our venders in the Academic Building)

2016 Texas Distinguished Scientist

Dr. Gary Garrett

Dr. Gary Garrett is a research biologist in the Department of Integrative Biology at the University of Texas at Austin. From 2009 – 2013, he was the Director of the Watershed Conservation Program at the Texas Parks and Wildlife Department. From 1982 - 2008, he worked as a Conservation Biologist in the Research Division of TPWD at the Heart of the Hills Fisheries Science Center. His interests are centered on the conservation of aquatic natural resources in Texas and he has authored more than 85 scientific publications on the subject. He has a long history of working cooperatively with private landowners, local communities, NGOs, and other state and federal agencies to protect, restore and enhance critical habitats. He has served as the Chairman of the Desert Fishes Council, President of the Texas Organization for Endangered Species, President of the Texas Chapter of the American Fisheries Society, Editor of the Proceedings of the Desert Fishes Council, Editor of the Proceedings of the Texas Chapter of the American Fisheries Society and Associate Editor for the Southwestern Association of Naturalists.

Dr. Garrett is a member of the USFWS Rio Grande Silvery Minnow Recovery Team, the Southern Edwards Aquifer Species Recovery Team, and is Team Leader of the Rio Grande Fishes Recovery Team. He is also a Fellow of the Texas Academy of Science, a Research Fellow at The University of Texas, Visiting Professor at Texas A&M University, Adjunct Professor at Texas State University and is on the Board of Scientists of the Chihuahuan Desert Research Institute.

2016 Outstanding Texas Educator

Carol Brown

Carol Brown teaches Honors Chemistry, and AP Chemistry, at Saint Mary's Hall in San Antonio, Texas, where she has taught for 27 years. After teaching for a total of 41 years, she has taught all levels of science from 4th grade through graduate school. She earned a B.A. from Trinity University and an M.S. in chemistry from The University of Texas at San Antonio. She has been a faculty consultant (AP reader) for ETS for Thirteen years. She served as a member of the AP Chemistry Test Development Committee for 9 years and was a member of the Curriculum Design and Assessment Committee for two years. That committee was responsible for the chemistry redesign. In 1993 Ms. Brown was named a Tandy Technology Scholar. In 1994 Ms. Brown was awarded the Outstanding Chemistry Teacher in Texas by the Associated Chemistry Teachers of Texas and received the College Board Special Recognition Award for Outstanding Teaching and Participation in the Advanced Placement program in 1987 and 1997. She is a 1999 recipient of the Siemens Award for Advanced Placement and a 2005 Educator of Distinction from the Coca-Cola Co. She is a contributing author of the Laying the Foundations Resource and Strategies Guides that are currently being used as curriculum for the National Math and Science Initiative.

2016 Fellow of the Academy

Dr. George Perry

Dr. George Perry received a B.A. in zoology with high honors from the University of California Santa Barbara, and a Ph.D. in marine biology at Scripps Institution of Oceanography. He then received a postdoctoral fellowship in the Department of Cell Biology at Baylor College of Medicine. He is Dean of the College of Sciences, Professor of Biology, and holds the Semmes Foundation Distinguished Chair in Neurobiology at The University of Texas at San Antonio. Perry is distinguished as one of the top Alzheimer's disease researchers with over 1,000 publications, one of the top 100 most-cited scientists in neuroscience and behavior, and one of the top 25 scientists in free radical research. He has been cited over 62,000 times (H=125) and is recognized as a Thompson-Reuters highly cited researcher. Perry's research is primarily focused on how Alzheimer's disease develops and the physiological consequences of the disease at a cellular level.

2016 Fellow of the Academy

Dr. Susan Klinedinst

Dr. Susan Klinedinst received a B.S. in Botany from North Carolina State University, a M.S. in Plant Biology from the University of Maryland at College Park, and a Ph.D. in Molecular, Cellular and Developmental Biology from the University of Michigan. She is currently an assistant professor at Schreiner University. Using *Drosophila*, her research focuses on the molecular mechanisms involved in axonal transport. Susan has been an active member in TAS for the past several years.

2016 New Officers

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Field Trips

Field Trip 1: 700 Springs and South Llano River Kayak Trip. ($50 with breakfast, lunch, kayaks and transport)

Email questions to karen.lopez@ttu.edu

Lee Pfluger has kindly granted permission for the Texas Academy of Science to visit his ranch to view 700 Springs and the rare opportunity to start a kayak trip down to the South Llano River from his ranch. The South Llano River is considered by many to be one of the few remaining pristine rivers in Texas. Participants will get to see spectacular limestone bluffs, waterfalls and beautiful scenery not normally afforded canoers and kayakers of the South Llano River. The 700 Springs Ranch is located south of Telegraph and has five miles of river frontage. In addition to wildlife viewing, the ranch offers fishing and kayaking opportunities. The springs really are impressive and gush from a number of points on the side of a bluff and from beneath a small lake.The South Llano River is considered by many to be one of the few remaining pristine rivers in Texas. Participants will get to see spectacular limestone bluffs, waterfalls and beautiful scenery not normally afforded canoers and kayakers of the South Llano River. Plans are for the trip to be guided by Tyson Broad, Llano River Field Station's Expert on watershed and a brief history of 700 Springs will be provided. The trip and kayaking are suitable for the family.

Field Trip 2. Enchanted Rock and Bamberger-Selah Ranch ($70 with breakfast and lunch, entrance fees and transport)

Email questions to karen.lopez@ttu.edu

Enchanted Rock State Natural Area consists of 1643.5 acres on Big Sandy Creek, north of Fredericksburg, on the border between Gillespie and Llano Counties. It was acquired by warranty deed in 1978 by the Nature Conservancy of Texas, Inc., from the Moss family. The state acquired it in 1984, added facilities, and reopened the park in March 1984, but humans have visited here for over 11,000 years. Enchanted Rock was designated a National Natural Landmark in 1970 and was placed on the National Register of Historic Places in 1984. The Rock is a huge, pink granite exfoliation dome that rises 425 feet above ground, 1825 feet above sea level, and covers 640 acres. It is one of the largest batholiths (underground rock formation uncovered by erosion) in the United States.

Selah, Bamberger Ranch Preserve is a 5,500-acre ranch that has been described as the largest habitat restoration project on private land in Texas. The ranch is a working example of grass-based agriculture the practices of good conservation and their value to the entire ecosystem. To educate visitors by providing facilities and programs which enhance the visitors' experience and encourage appreciation and awareness of Selah's and their own natural and cultural heritage. To provide a place where visitors of all ages can

experience the beauty of nature, learn the importance of good conservation and land stewardship, and leave with a sense of power that the individual can positively impact his or her environment. This will be a guided excursion combining some hiking, scenic, educational, bird watching, and land management/stewardship and conservation components. It is a whole day trip returning to Junction at 5 PM and suitable for the whole family.

Field Trip 3. Fort McKavett State Historical Site and Caverns of Sonora. ($75, with breakfast and lunch, entrance fees and transport).

Email questions to karen.lopez@ttu.edu

Fort McKavett: Atop a remote hill, the remains of a 150-year-old fort beckon visitors to one of the best preserved examples of a Texas Indian Wars (1850–1875) military post. At Fort McKavett State Historic Site, take in the spectacular Hill Country vistas and experience early West Texas life through the real stories of the infantrymen, Buffalo Soldiers, women, and children who lived at what Gen. William T. Sherman once described as "the prettiest post in Texas."

Caverns: The Caverns of Sonora is internationally recognized as one of the most beautiful show caves on the planet. This will be a guided excursion combining some hiking, scenic, educational, bird watching, historical and cave and components. It is a whole day trip returning to Junction at 5 PM and suitable for the whole family.

Field Trip 4. Geological Survey of Northern Llano Uplift.

Email questions to cbarker@sfasu.edu

The Geoscience Section of the Texas Academy of Science will run a geologic field trip to the Northern Llano Uplift lead by LaRell Nielson and Chris Barker from Stephen F. Austin State University. The field trip will start in Junction, Texas by examining the Cretaceous, Edwards Group in the local area. It will then visit the algal bioherms in the San Saba River north of Mason, Texas. The Hickory Sandstone northwest of Llano, Texas, that contains beautiful crossbedding and Cambrian brachiopods, will be the next stop. A trip to this area would not be complete without going to the famous Llanite Dike and collecting blue quartz. The final stop on the trip will be at the Llano River Bridge to look at the Pack Saddle Schist with its unique structural features. The trip will end at the world famous Coopers BBQ for lunch. Individuals attending the trip will provide their own transportation and pay for their own meals. The guidebook will be online and should be downloaded and printed by those are going on the trip.

Program Schedule

Friday, March 4

TAS Board Meeting
8:00 am to 12:00 pm
Packard Hall, North Room

Poster Set Up - Academic Building and Dining Hall
10:00 am to 1:00 pm
Academic Building and Dining Hall

Registration
10:00 am to 6:00 pm
Academic Building, Atrium

Section Chairs Pre-Session Lunch Meeting
12:00 to 12:45 pm
Packard Hall, North Room

006. Biomedical Oral Session and Business Meeting
1:00 to 1:45 pm
Academic Building, 113

Chair: **Andrew Warren Woodward**, *The University of Mary Hardin-Baylor*
Participants:

1:00 006.001 U **Elucidating the mechanism of cadaverine in the nitrosative stress response of uropathogenic** *Escherichia coli* , *Kristen N Clemons, Abilene Christian University; Brittany Fleming, University of Utah; Matthew Mulvey, University of Utah*

1:15 Biomedical Section Meeting

007. Botany Oral Session I
1:00 to 2:00 pm
Academic Building, 111

Chair: **Michael A. Grusak**, *USDA*
Participants:

1:00 007.002 U **Analysis of Fungal and Bacterial Root Microbiomes of** *Muhlenbergia reverchonii* **at Wild Basin**, *Margaret Ann Walsh, Undergraduate Research*

1:15 007.003 U **Analysis of fungal and bacterial root microbiomes of** *Juniperus ashei* **(Cupressaceae)**, *Katrina Chuah, St. Edward's University; Charles Hauser, St Edwards University*

1:30 007.004 U **Network and community analyses of fungal microbiomes**, *Jacquelyn Ileana Turcinovic, St. Edward's University; Charles Hauser, St Edwards University*

1:45 007.005 N **Recent collections and observations of the rare milkweed vine,** *Matelea atrostellata* **(Apocynaceae)**, *David E Lemke, Texas State University*

008. Chemistry & Biochemistry Oral Session I
1:00 to 2:15 pm
Bluebonnet House, 01

Chair: **Mary A. Kopecki-Fjetland**, *St. Edward's University*
Participants:

1:00 008.006 U **Analysis of vapors released by the heating of e-liquids**, *Timothy Turner, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*

1:15 008.007 U **Anion analysis of the mineral springs of Lampasas Texas**, *David Hauer, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*

1:30 008.008 U **Does transformation of** *PhMe2SiH* **to** *[η6-Cr(CO)3Ph]Me2SiH* **activate or deactivate Si-H bond?**, *Alexander Bradford, University of Texas at El Paso; Keith Pannell, University of Texas at El Paso; Hermant K. Sharma, University of Texas at El Paso; Paulina Gonzalez, University of Texas at El Paso*

1:45 008.009 U **Molecular dynamics simulations of ion transport through bent carbon nanotubes**, *Christopher Jackson, Saint Edward's University*

2:00 008.010 U **Progress towards new actinide and lanthanide ligand systems**, *Sarah Jane Bibby, University of Texas at El Paso; Raul Cuevas, University of Texas at El Paso; Laura Saucedo, University of Texas at El Paso; Keith Pannell, University of Texas at El Paso*

009. Environmental Science Oral Session I
1:00 to 2:15 pm
Tech House, 01

Chair: **Mary Poteet**, *The University of Texas at austin*
Participants:

1:00 009.011 U **Arsenic exposure and mortality in** *Aedes aegypti* **and** *Aedes albopictus*, *Brenda Hernandez-Barron, University of Texas Rio Grande Valley; Christopher Vitek, University of Texas Rio Grande Valley*

1:15 009.012 G **Characterization of water quality and associated factors in natural and created wetlands of the Texas coast**, *Natasha Zarnstorff, University of Houston-Clear Lake; George J Guillen, University of Houston Clear Lake*

1:30 009.013 U **Insect diversity in areas impacted by the biological control of saltcedar (***Tamarix* **spp.) in west texas**, *Jaimie Michelle Lawhorn, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

1:45 009.014 G **Small-scale distribution of mercury contamination in Zimbabwean streams: A comparison of three introductory pathways**, *Corey Scott Green, Sam Houston State University*

2:00 009.015 G **The value of Beach Quality Using Hedonic Pricing Models in Galveston, Texas**, *Ashton Danielle Burgin, Texas A&M Galveston Campus*

010. Freshwater Science Oral Session I
1:00 to 2:15 pm
Mockingbird House, 01

Chair: **George J Guillen**, *University of Houston Clear Lake*
Participants:

1:00 010.016 U **Habitat Selection for type and complexity in a freshwater amphipod, San Marcos River, Texas**, *Ashley Cao, student; Raelynn Deaton Haynes, St. Edward's University*

1:15 010.017 G **Hybridization between the invasive** *Cyprinodon variegatus* **and endemic** *C. rubrofluviatilis*, *Kristina Ayers, Stephen F. Austin State University; Jennifer M. Gumm, Stephen F. Austin University*

1:30 010.018 U **Species and sex differences in foraging competition between two between Gambusia congeners**, *Valencia Mobley, St. Edward's University*

1:45 010.019 U **The Habitat Selection of San Marcos River** *Hyalella* **under Different Competition Densities**, *Victoria Alford, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

2:00 010.020 G **The genetics of the visual system of two species of pupfish (Genus** *Cyprinodon* **)**, *Chelsey Price, Stephen F. Austin State University*

Friday, March 4

011. Science Education Oral Session I
1:00 to 2:30 pm
Lantana, 01

Chair: **Mamta Singh**, *Lamar University*
Participants:

1:00 011.021 U **Stimulating the Natural Curiosity of K-5 Children in the Sciences Through University Sponsored Community Outreach Programs**, *Tamika M. Stith, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*

1:15 011.022 U **Build-A-Creature: A constructivist approach to teaching genetics in elementary schools**, *Kevin M. Chappell, Univ. of Mary Hardin Baylor; Kaleb K Heinrich, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*

1:30 011.023 U **One Fish, This Fish, Which Fish, That Fish!**, *Kimberly Hawkins, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*

1:45 011.024 U **A Brief Introduction to LabVIEW**, *Richard Kuchenbecker, University of Houston*

2:00 011.025 U **Assessing the Importance of Green Energy Awareness in K-6 Education**, *Maria K Cardenas, Lamar University; Mamta Singh, Lamar University*

2:15 011.026 G **Understanding Density**, *Michele Johnson Mann, University of Texas at Austin; Anthony Petrosino, University of Texas at Austin*

012. Systematics & Evolutionary Biology Oral Session I
1:00 to 2:30 pm
Juniper House, 01

Chair: **Russell Minton**, *University of Houston Clear Lake*
Participants:

1:00 012.027 U **Are freshwater crustaceans ideal free or ideal despotic?**, *Jennifer Beal, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

1:15 012.028 U **Behavioral correlates of male dominance in a coercive livebearing fish**, *Elizabeth B Conklin, St Edward's University; Raelynn Deaton Haynes, St. Edward's University*

1:30 012.029 U **Differentiating Bell County snail species by identifying species-specific or genus-specific genomic differences**, *Sarah Elizabeth Velo, University of Mary-Hardin Baylor; Kathleen Wood, University of Mary Hardin-Baylor*

1:45 012.030 U **Do all coercive livebearing male mosquitofish establish dominance hierarchies?**, *Rochelle Hajikhani, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

2:00 012.031 U **Do freshwater crustaceans make rational decisions in habitat selection?**, *Catherine Ann Maloney, St. Edward's University; Jennifer Beal, St. Edward's University; Haley Christians, St. Edward's University; Sana Rashid, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

2:15 012.032 U **Effects of mate choice and competition on habitat selection in a freshwater amphipod**, *Sana Rashid, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

013. Terrestrial Ecology & Management Oral Session I
1:00 to 2:30 pm
Hummingbird House, 01

Chair: **Travis LaDuc**, *University of Texas at Austin*
Participants:

1:00 013.033 G **A Comparative Study of Diversity and Abundance of Mosquitoes at Two Sites in Lower Rio Grande Valley of Texas**, *Lopamudra Chakraborty, UTRGV; Christopher Vitek, University of Texas Rio Grande Valley*

1:15 013.034 N **Biotic controls on carbon exchange processes in an encroaching savanna in central Texas**, *Ann Thijs, St. Edwards University; Marcy Litvak, The University of New Mexico*

1:30 013.035 N **Community Ecology of Flower Visitors of Tecoma stans in the Coastal Bend**, *Richard Patrock, TAMUK; John Reilley, E. "Kika" de la Garza PMC, USDA Kingsville*

1:45 013.036 G **Influence of Daily Temperature Range of Soil on Microbial Dynamics in Dryland Agriculture**, *Diana Vargas-Gutierrez, Texas Te4ch University; John Zak, Texas Tech University*

2:00 013.037 N **Unraveling the natural history of the enigmatic Spot-tailed Earless Lizard (*Holbrookia lacerata*) through research and cooperation**, *Travis J LaDuc, University of Texas at Austin; Brad Wolaver, The University of Texas at Austin; Ben Labay, The University of Texas at Austin; Jon Paul Pierre, The University of Texas at Austin; Mike Duran, The Nature Conservancy; Toby Hibbitts, Texas A&M University; Wade Ryberg, Texas A&M University*

2:15 013.038 U **Winter habitat use of Longspurs (*Calcarius* spp.) in Hale and Floyd County, Texas**, *Lauryn Bruggink, Wayland Baptist University; Andrew C. Kasner, Wayland Baptist University*

014. Neuroscience Oral Session and Business Meeting
1:45 to 2:30 pm
Academic Building, 112

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

1:45 014.039 U **Evaluating the Quality of Life and Functional Outcomes of Patients with Diffuse Axonal Injury Post TBI**, *Jonathan Siktberg, Baylor University*

2:00 014.040 U **Salt addiction is mediated by encephalic vasopressin**, *Jake Augustus Brozek, Wayland Baptist University; Mayra Herrera-Gonzales, Wayland Baptist University; Janlyn Jerome, Wayland Baptist University; Chanda J. Smith, Wayland Baptist University; Phillips Whitney, Wayland Baptist University; Sharon Robinson, Wayland Baptist University; Daniela Pereira-Derderian, Wayland Baptist University*

2:15 Neuroscience Section Meeting

015. Cell & Molecular Biology Oral Session I
3:00 to 4:00 pm
Academic Building, 112

Chair: **Susan Klinedinst**, *Schreiner University*
Participants:

3:00 015.041 U **Characterization of the roles of PP2A regulatory subunits B56α and B56δ/γ in the non-canonical Wnt/PCP pathway in *Xenopus laevis*.**, *Cody Austin Brannan, Sam Houston State University; Joni Seeling, Sam Houston State University*

3:15 015.042 U **RNA-seq analysis of phosphate-stressed *C. reinhardtii* cells**, *Isavannah Reyes, St Edwards University; Charles Hauser, St Edwards University*

3:30 015.043 U **The effects of social interaction and salt addiction on renal gene expression in rats.**, *Catherine Elizabeth Wiechmann, Wayland Baptist University; Mayra Herrera-Gonzales, Wayland Baptist University; Jake Augustus Brozek, Wayland Baptist University; Ashley DTB Rivera, Wayland Baptist University; Trevor Burrow, Texas Tech Health Sciences Center; Katie Bennett, Texas Tech Health Sciences Center; Ericka Hendrix, Texas Tech Health Sciences Center; Daniela Pereira-Derderian, Wayland Baptist University*

3:45 015.044 U **Transcriptional Regulation of the ICE R391 RumA'$_2$/B DNA Polymerase V by SetR^{R391}**, *Kylie Borden, Southwestern University; Audrey Garcia, Southwestern University; Roger Woodgate, National Institute of Child Health and Human Development, NIH; Martin Gonzalez, Southwestern University*

016. Chemistry & Biochemistry Oral Session II
3:00 to 4:00 pm
Bluebonnet House, 01

Chair: **Mary A. Kopecki-Fjetland**, *St. Edward's University*
Participants:

3:00 016.045 U **Metal analysis of the mineral springs of Lampasas Texas**, *Megan E. Jenkins, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*

3:15 016.046 U **Synthesis of Small Molecules for Exploitation of Collateral Sensitivity in Multidrug Resistant Cancer**, *luke kotin, Texas Lutheran University; Amairanys Rodriguez-Delgado, Texas Lutheran University*

3:30 016.047 U **Synthesis of isatin-β-thiosemicarbazones for Exploitation of Collateral Sensitivity in Multidrug Resistant Cancer**, *luke kotin, Texas Lutheran University*

3:45 016.048 U **The Synthesis of Fatty Acid Furfuryl Ester Mixtures**, *Amanda L. Raley, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University*

017. Computer Science Oral Session and Business Meeting
3:00 to 3:30 pm
Academic Building, 113
Chair: **Vacant**

Moderator **John McClain**, *Temple College*
Participants:

3:00 017.049 U **Experimental Framework for a Campus Security Purposed Unmanned Aerial Vehicle**, *Callen Ann McCauley, Schreiner University; Brian P. Bernard, Schreiner University*

3:15 Computer Science Section Meeting

018. Conservation Ecology Oral Session I
3:00 to 4:00 pm
Academic Building, 111

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

3:00 018.050 U **A comparison of the impact of biometeorology on the scent-marking behavior of Red wolves (***Canis rufus*) and Grey wolves (Canis lupus), *Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

3:15 018.051 G **Foraging Patterns and Population Density of the Buff-Bellied Hummingbird (***Amazilia yucatanensis*), *Megan Izabella Villarreal, University of Texas Rio Grande Valley; Timothy Brush, University of Texas Rio Grande Valley*

3:30 018.052 U **Reproduction of the Georgetown Salamander (***Eurycea naufragia*), *Samuel T. Guess, Southwestern University; Benjamin A. Pierce, Southwestern University*

3:45 018.053 U **Seagrass-associated fish biodiversity in a hypersaline bay: Laguna Madre, Texas**, *Somerley J Swarm, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

019. Marine Science Oral Session I
3:00 to 4:30 pm
Mockingbird House, 01

Chair: **Thomas Linton**, *Texas A&M University at Galveston*
Participants:

3:00 019.054 G **EVALUATION OF** *PRYMNESIUM PARVUM* **FATTY ACID AMIDE ACCUMULATION AND THEIR CONTRIBUTION TO FISH MORTALIITY EVENTS**, *Sean O'Mara, Texas A&M University - Corpus Christi; I-Shuo Huang, Texas A&M University-Corpus Christi; Danielle Gutierrez, Vanderbilt University; Greg Southard, TPWD Inland Fisheries – Analytical Services; Paul Zimba, Texas A&M University - Corpus Christi*

3:15 019.055 U **Effect of oviposition site on habitat selection in two species of gobies in the Texas Gulf Coast**, *Clint Morris, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

3:30 019.056 G **Factors of the Sargassum Migratory Loop System; Determining the Influential Dynamics Primarily Responsible for the Anomalous 2014, 2015 Sargassum Seasons**, *Brandon Nicholas Hill, Texas A&M University at Galveston; Thomas Linton, Texas A&M University at Galveston*

3:45 019.057 U **Fish Bite Prevalence of Yellow-band Disease on** *Montastraea and Orbicella* **complexes in Roatan, Honduras**, *Kara L Schmidt, McLennan Community College*

4:00 019.058 U **Fish bite prevalence on three coral species with dark spot syndrome in Roatan, Honduras**, *Mariana Juarez, McLennan Community College; Erin Castillo, McLennan Community College*

4:15 019.059 G **Taxonomic identification and toxin isolation of a new-to-science cyanobacterium** *Pseudoleptolyngbya mysidocida* **gen. nov. & sp. nov.**, *I-Shuo Huang, Texas A&M University-Corpus Christi; Paul Zimba, Texas A&M University - Corpus Christi; Tom Linton, Texas A&M University Galveston*

020. Science Education Oral Session II
3:00 to 4:15 pm
Lantana, 01

Chair: **Mamta Singh**, *Lamar University*
Participants:

3:00 020.060 G **Inquiring Minds Want To Know**, *Jennifer Dee Hooper, University of Texas at San Antonio*

3:15 020.061 N **Profile of an Effective STEM Principal**, *Denise Kern, Texas State University*

3:30 020.062 N **Reflections on Transforming a Verification Based General Chemistry Laboratory to an Inquiry Based Curriculum**, *Mary A. Kopecki-Fjetland, St. Edward's University*

3:45 020.063 G **The One-Room Schoolhouse approach: Creating and leveraging a learning environment of commingled introductory and advanced GIS students**, *Moulay Anwar Sounny-Slitine, Southwestern University; Caitlin Schneider, Southwestern University; Dakota McDurham, Southwestern University; Jen O'Neal, Southwestern University; Brandee Knight, Southwestern University*

4:00 020.064 G **Using Effective Project Based Learning in a Third Grade Science Classroom**, *Michele Johnson Mann, University of Texas at Austin; D'Anna Pynes, University of Texas at Austin*

021. Systematics & Evolutionary Biology Oral Session II
3:00 to 4:00 pm
Juniper House, 01

Chair: **Russell Minton**, *University of Houston Clear Lake*
Participants:

3:00 021.065 U **Fighting with swords: is genital combat an alternative explanation for same-sex mating in a coercive livebearer (***Gambusia affinis***)?**, *Julian Alejandro Rios, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

3:15 021.066 U **How long does it take for coercive males to replenish sperm reserves?**, *Skylor Ryan Matchett, St. Edwards university; Raelynn Deaton Haynes, St. Edward's University*

3:30 021.067 U **Sperm expenditure as a potential predictor of male genital combat**, *Anthony Sanchez, St. Edward's University; Julian Alejandro Rios, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

3:45 021.068 U **The effects of alternative mating strategies on sperm competition in a coercive livebearing fish**, *Alenka Cardenas, student; Raelynn Deaton Haynes, St. Edward's University*

022. Terrestrial Ecology & Management Oral Session II and Business Meeting
3:00 to 3:45 pm
Hummingbird House, 01

Chair: **Richard Patrock**, *TAMUK*
Participants:

3:00 022.069 G **Insect Pollinator Diversity and Other Associates of Salt Cedar (***Tamarisk* **sp.) at Alamito Marsh, Presidio County, Texas**, *Alexandria M. Hassenflu, Dept of BGPS, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University; Anne Marie Hilscher, Dept of BGPS, Sul Ross State University*

3:15 022.070 N **Long-term monitoring of the subtropical tamarisk beetle (***Diorhabda sublineata***) on saltcedar (***Tamarix***) and athel (***Tamarix aphylla***) along the Río Grande**, *Christopher M. Ritzi, Sul Ross State University; Anne Marie Hilscher, Dept of BGPS, Sul Ross State University; Alexandria M. Hassenflu, Dept of BGPS, Sul Ross State University*

3:30 Terrestrial Ecology and Management Section Meeting

023. Physics Oral Session and Business Meeting
3:30 to 4:15 pm
Academic Building, 113
Physics
Physics Oral Session and Business Meeting

Chair: **Kim Arvidsson**, *Schreiner University*
Participants:

3:30 023.071 U **Small Bubble Star Formation**, *Heather McCain, Schreiner University*

3:45 023.072 U **Small Bubbles Research**, *Robert Guy Vastano, Schreiner University*

4:00 Physics Section Meeting

024. Mathematics Section Business Meeting
4:15 to 4:30 pm
Academic Building, 113
Chair: **Angela Brown**, *Sul Ross State University*
4:15 Mathematics Section Business Meeting

025. Poster Session I - Academic Bldg
4:30 to 6:00 pm
Academic Building, Academic Building Posters
Anthropology
Anthropology Poster Session

Chair: **Robert Z. Selden Jr.**, *Center for Regional Heritage Research, Stephen F. Austin State University*
Participants:

025.073 N **Addressing Missing Data in 3D Scans of Caddo Ceramics**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University*

025.074 G **An Economical and Viable Method for Recording Cemetery Data**, *Rebecca Lynn Schultz, Texas Tech University*

025.075 N **Dart Point Morphology: Preliminary Thoughts from the USFS Collections in East Texas**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University*

025.076 G **Digital Documentation, Analysis, and Preservation of Grave Stones from the Historic Pagel Settlement Cemetery, Lavaca County, Texas**, *Alyssa Brooke Bonorden, Texas Tech University*

025.077 G **Eating oneself? Stable isotopic enrichment during weight loss and tissue turnover in humans**, *J Alex Canterbury, Texas A&M University; Chase W Beck, Texas A&M University; Crystal A Dozier, Texas A&M University; Megan L Greenfelder, Texas A&M University; Kristin Hoffmeister, Texas A&M University; Jude Magaro, Hunter College, CUNY; Ali Mendha, Texas*

A&M University; Angie Perrotti, Hunter College, CUNY; Casey Wayne Riggs, Texas A&M University; Anthony Taylor, Texas A&M University; Lori E. Wright, Texas A&M University

025.078 N **Exploratory Network Analysis: Attribute Suites and Caddo Ceramics**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University; Timothy K. Perttula, Center for Regional Heritage Research, Stephen F. Austin State University*

025.079 G **Incorporating Indigenous perspectives on resource management: The Alibates Flint Quarries National Monument traditional use study**, *Emma Frances Richburg, Anthropology*

025.080 N **Preliminary Analysis of Asymmetry in Caddo Ceramics: A Case Study from the Washington Square Mound Site**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University*

Biomedical

Biomedical Poster Session

Chair: **Andrew Warren Woodward**, *The University of Mary Hardin-Baylor*
Participants:

025.081 U **Components of** *Equisetum arvense* **Cytotoxic to Cultured 4T1 Murine Breast Cancer Cells**, *Jake Augustus Brozek, Wayland Baptist University; Sarah Kelly, Wayland Baptist University; Adam Reinhart, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University*

025.082 U **Geographic distribution of** *Ixodes scapularis* **in the Lower Rio Grande Valley**, *Flor Martinez, University of Texas Rio Grande Valley; Maximiliano Barbosa, University of Texas Rio Grande Valley; Ramiro Patino, University of Texas Rio Grande Valley; Maria Esteve-Gassent, Texas A&M University; Teresa P. Feria, University of Texas Rio Grande Valley*

025.083 H **Invasive Pressure Measurements at Rest and During Supine Exercise in Young Adults**, *Kelsey N. Brown, Brooke Army Medical Center; Christina A. Koscielski, Brooke Army Medical Center; Bernard J. Rubal, Brooke Army Medical Center*

025.084 U **The effect of pH on the growth of probiotic bacteria: A simulation of the human gastrointestinal tract**, *Kizil Ather Yusoof, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*

Botany

Botany Poster Session

Chair: **Michael A. Grusak**, *USDA*
Participants:

025.085 U **Adventitious Root Formation in Response to Flooding Stress in Andean Common Beans (***Phaseolus vulgaris* **L.; Fabaceae)**, *Nicole Londero Monteiro, St. Edward's University; William J. Quinn, St. Edward's University; Michael A. Grusak, USDA*

025.086 U **Analysis of Fungal and Bacterial Root Microbiomes of** *Carex planostachys* **(Cyperaceae)**, *Louise Gaunt, St. Edwards; Charles Hauser, St Edwards University*

025.087 U **DNA Barcoding of Guadalupe County Plant Specimens**, *Becky Lynn Woodward, Texas Lutheran University; Jacob Lara, Texas Lutheran University; Broderick Sargent, Texas Lutheran University; Stephanie Perez, Texas Lutheran University; Mark Gustafson, Texas Lutheran University; Alan Lievens, Texas Lutheran University*

025.088 G **Growth of** *Tamarix* **species (Tamaricaceae),** *Tamarix chinensis/ramosissima* **(salt cedar) and** *Tamarix aphylla* **(athel): A comparison of hormonal application and hydroponic growth**, *Crystal Skolnick, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

025.089 U **Identification of anthocyanins in wild-type and natural yellow-flowered mutants of** *Ipomopsis rubra* **(Polemoniaceae)**, *Jose Eustolio Cantu, Biology Major; Amanda Kenney, St. Edward's University*

025.090 N **Investigation of morphological differences leading to rust resistance in indiangrass (***Sorghastrum nutans***; Poaceae).**, *Paul Gray, Dept. of Biology, Stephen F. Austin State Univ.;*

Josephine Taylor, Dept. of Biology, Stephen F. Austin State Univ.; Alan Shadow, East Texas Plant Materials Center

025.091 U **Mapping mineral content in developing** *Phaseolus vulgaris***, L. (Fabaceae) plants through ArcGIS.**, *Devin John Herd, St. Edwards University; Michael A. Grusak, USDA; William J. Quinn, St. Edward's University*

025.092 U **Phylogenetic relationships and patterns of homoplasy in** *Mentzelia* **section** *Bicuspidaria* **(Loasaceae)**, *Christian H Hofsommer, Abilene Christian University; Denise Naude, Abilene Christian University; Stephanie Sariles, Abilene Christian University; Gabriela Simonsen, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

025.093 U **Using the Internal Transcribed Spacer as a Comparative Guide to Distinguish** *Physalis heterophylla* **from** *Physalis hederifolia* **(Solanaceae)**, *Kindry Cruz Kirbo, Howard Payne University*

Computer Science

Computer Science Poster Session

Participants:

025.094 U **Spatial data management of species interactions in the Gulf of Mexico**, *Juan Martinez, Texas A&M Corpus Christi; James Simons, Texas A&M Corpus Christi*

Mathematics

Mathematics Poster Session

Chair: **Angela Michelle Brown**, *Sul Ross State University*

Participants:

025.095 G **Modeling through model-eliciting activities: a comparison among different achievement level.**, *Jair Aguilar, The University of Texas at Austin*

Neuroscience

Neuroscience Poster Session

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

Participants:

025.096 N **An Investigation into Aβ/Metal Binding via MALDI MS**, *George Perry, The University of Texas at San Antonio; Andrea Kelley, The University of Texas at San Antonio; Stephan B.H. Bach, The University of Texas at San Antonio*

025.097 U **Effects of lithium chloride on nicotinic acetylcholine receptor expression in the regenerating model system,** *Lumbriculus variegatus***.**, *Gabriela Andrea Hernandez Gonzalez, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*

025.098 G **Effects of transcranial infrared laser stimulation in category learning**, *Celeste Saucedo, University of Texas at Austin; Nathaniel J. Blanco, University of Texas at Austin; F. Gonzalez-Lima, University of Texas at Austin; W. Todd Maddox, University of Texas at Austin*

025.099 G **GABA receptor isoforms, a signature for neuronal activity?**, *Amrithesh Kumar Arun, Neurogenetics Lab, Texas A&M University - Kingsville; Rudolf Bohm, Texas A&M University-Kingsville*

025.100 U **Positron Emission Tomography (PET) Imaging of Pathological Markers in Alzheimer's Disease**, *Katherine Lynn Gillis, Washington University School of Medicine; Tammie Benzinger, Washington University School of Medicine; Karl Friedrichsen, Washington University School of Medicine; Christopher Owen, Washington University School of Medicine; Brian Gordon, Washington University School of Medicine*

025.101 N **Purification and Advanced Imaging of Amyloid Plaque Cores from Alzheimer Disease**, *GERMAN PLASCENCIA VILLA, UTSA; Arturo Ponce, UTSA; Joanna F. Collingwood, University of Warwick; Miguel Jose-Yacaman, UTSA; George Perry, UTSA*

025.102 G **The impact of ozone air pollution on vision processing**, *Carlos A. Garcia, University of the Incarnate Word; Jordan M. Wetz, University of the Incarnate Word; Philip Aitsebaomo, University of the Incarnate Word*

026. Poster Session I - Dining Hall
4:30 to 6:00 pm
Dining Hall, 02
Texas Academy of Science Annual Meeting
Poster Session I - Dining Hall
Cell and Molecular Biology
Cell & Molecular Biology Poster Session

Chair: **Susan Klinedinst**, *Schreiner University*
Participants:

026.103 U **Analysis of Β-catenin gene expression and identification of Β-catenin full coding sequence in the regenerating annelid *Lumbriculus variegatus***, *Fernando Hernandez, University of the Incarnate Word; Robert Alan Miranda, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*

026.104 G **Behavioral study of underlying neuronal defects in pomace flies**, *Erick Palacios, Texas A&M University-Kingsville; James Coy Bolton, Texas A&M University-Kingsville; Rudolf Bohm, Texas A&M University-Kingsville; Enrique Massa, Texas A&M University-Kingsville*

026.105 U **Differential effects by Butyrate and TSA on MEFs demonstrate features of Butyrate beyond HDAC inhibition**, *Rose Massey, Austin College; Astrid Grouls, Austin College; Vidur S Marwaha, Austin College; Lance F. Barton, Austin College*

026.106 U **Effect of Nutritional Stress Maternal Provisioning of Oocytes in** *Drosophila melanogaster*, *Vivian Le, St. Edward's University; Kamryn N. Gerner-Mauro, St. Edward's University; Lisa M. Goering, St. Edward's University*

026.107 G **Effects of Environmental Pollutants on Dermal Fibroblasts**, *Samantha Alper, Sam Houston State University; James M Harper, Sam Houston State University*

026.108 U **Elucidating the role of PA28γ on Akt and ERK signaling pathways following staurosporine treatment**, *Dilan S Shah, Austin College; Karisma Y. Sheth, Austin College; Victoria J. Campbell, Austin College; Lance F. Barton, Austin College*

026.109 U **Examining Genetic and Phenotypic Variation of Cis Regulatory Elements in** *Drosophila simulans* **and** *Drosophila melanogaster*, *Amber Randolph, St. Edward's University; Lisa M. Goering, St. Edward's University; Stephanie Pace, St. Edward's University*

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

026.111 G **Lyophilized Bone Marrow-Based Substrate Supports In Vitro Cultivation of Mouse Mesenchymal Stem Cells.**, *Laura M. Mueller, University of Houston - Clear Lake; Natasha Nielsen, University of Houston - Clear Lake; Rayan Eter, University of Houston - Clear Lake; Leonard J. Giblin, III, University of Houston - Clear Lake; Larry Rohde, University of Houston - Clear Lake; Richard Puzdrowski, University of Houston - Clear Lake*

026.112 G **Manipulation of the** *fruitless* **Gene in** *Drosophila melanogaster* **to Form a Mutant for Circuit Mapping**, *Elyse Dyan Grilli, Texas A & M University-Kingsville*

026.113 U **Purification of components from** *Inula hilinium* **(elecampane) which are cytotoxic to the 4T1 murine breast cancer cell line.**, *Sarah Kelly, Wayland Baptist University; Jake Augustus Brozek, Wayland Baptist University; Thomas McElwain, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam Reinhart, Wayland Baptist University*

026.114 N **Quantification by ELISA of the Levels of DNA Topoisomerases in the Nuclei of HuT 78 Cells Treated with Interleukin-2**, *Paul David Fogloesong, University of the Incarnate Word; R. Sajana Nair, University of the Incarnate Word; Nikita K. Gupta, University of the Incarnate Word*

026.115 U **Quantifying** *Wolbachia* **and** *Spiroplasma* **Infection Rates in Monarch and Queen Butterflies**, *Kristen Brehm, Abilene Christian University; Isabel Laiseca-Ruiz, Abilene Christian University; Jamie E Thompson, Abilene Christian University; Rebecca Hunter, Abilene Christian University*

026.116 U **Relationship Analysis of Oligochaetes and related invertebrates using cDNA sequences of the alpha subunit of the Na+-K+ ATPase**, *Travis Odom, Collin College; Chris Doumen, Collin College*

026.117 U **Utilization of the qPCR assay to analyze Β-catenin mRNA abundance during regeneration in** *Lumbriculus variegatus*, *Timothy Dean, University of the Incarnate Word; Robert Alan Miranda, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*

Conservation Ecology

Conservation Ecology Poster Session

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

Participants:

026.118 G **Behavioral variation as a potential mechanism of invasion and competition in three livebearing fishes (Genus** *Gambusia***)**, *Claire Hemingway, Student*

026.119 N **Bioblitzing as a tool for monitoring native fishes of greatest conservation need**, *Melissa Casarez, University of Texas at Austin; Sarah Robertson, Texas Parks and Wildlife; Ben Labay, University of Texas at Austin; Dean A. Hendrickson, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Gary P. Garrett, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin; Cullen Hanks, Texas Parks and Wildlife*

026.120 U **Biodiversity survey of mammals on a ranch in Runnels County**, *Anthony Weldon Kocher, Hardin Simmons University; Darby Ross Thornton, Hardin-Simmons University; Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

026.121 U **Carpal glands in raccoons (***Procyon lotor***)**, *Cullen Wilder, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*

026.122 U **Dragonfly behavior and hyrdrofracking**, *Caitlin Magargee, Schreiner University; Brooke Ohlman, Schreiner University; Chris Distel, Schreiner University*

026.123 U **Food habits of raccoons (***Procyon lotor***) in an urban system**, *Benjamin Rhodes, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*

026.124 G **Foraging Ecology of Common Bottlenose Dolphins (***Tursiops truncatus***) in Galveston Bay**, *Sherah Loe, University of Houston- Clear Lake; Kristi Fazioli, University of Houston - Clear Lake; George J Guillen, University of Houston Clear Lake*

026.125 U **Seasonal variation in activity of raccoons (***Procyon lotor***) in an urban ecosystem**, *Sydney Keane, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*

026.126 U **Sediment burial decreases weight loss and increases survival following simulated drawdown conditions in the aquatic invasive plant** *Hydrilla verticillata*, *Bridgett Nicole Pickman, Texas Tech University; Matthew Alexander Barnes, Texas Tech University*

026.127 N **Stakeholder Opinions on Invasive Species and their Management in the San Marcos River**, *Florence Marie Oxley, Austin Community College; Tina Marie Waliczek, Texas State University-San Marcos; Paula S. Williamson, Texas State University-San Marcos*

Environmental Science

Environmental Science Poster Session

Chair: **Mary Poteet**, *The University of Texas at austin*

Participants:

026.128 U *Sand Dune Restoration and Vegetation Changes from 2005 to 2015 Using Applied Geographic Information Systems*, *Lucas Ben Gomez, UTRGV; Andre Munoz, UTRGV; Brenda Bazan, UTRGV; Gladis Hinojosa, UTRGV; Francisco Arredondo, UTRGV; Luis Garza, UTRGV*

026.129 U **A Decade of Dunes**, *Andrew Atkinson, University of Texas Rio Grande Valley; Mariel Gonzalez, University of Texas Rio Grande Valley; Samantha B Moore, University of Texas Rio Grande Valley; Vincent Ochoa, UTRGV; Romeo Rubiano, University of Texas Rio Grande Valley; Stefany Salinas, University of Texas Rio Grande Valley; Jovahn Quiroz, University of Texas Rio Grande Valley*

026.130 G **Effects of dust exposure on the opportunistic bacterial co-cultures**, *Mariam Konate, Texas Southern University*

026.131 U **Examining uptake of arsenic by rice plants: results from small scale bench studies**, *Sioned Kay Kirkpatrick, Texas Lutheran University; Alison Bray, Texas Lutheran University; Derrick Quarles, Applied Spectra*

026.132 U **Including Geospatial Information into Habitat Maps for Gulf of Mexico Species Interaction Data**, *Kalen Rice, Texas A&M University - Corpus Christi; May Yuan, University of Texas-Dallas; James David Simons, Texas A&M University-Corpus Christi*

026.133 U **Land use effects on biological activity in the San Antonio River**, *Gabriela Andrea Hernandez Gonzalez, University of the Incarnate Word; Gerald Mulvey, University of the Incarnate Word*

026.134 G **Particulate matter contribution from metal recycling center**, *Allen Ladd White, Texas Southern University*

026.135 U **South Padre Island Beach Nourishment**, *Myrna Leal, University of Texas Rio Grand Valley; James Martinez, University of Texas Rio Grande Valley; Leslie Soto, University of Texas Rio Grande Valley; Sarah Nash, University of Texas Rio Grande Valley; Mariela Zavala, University of Texas Rio Grande Valley; Shelby Bessette, University of Texas Rio Grand Valley*

Freshwater Science

Freshwater Science Poster Session

Chair: **George J Guillen**, *University of Houston Clear Lake*

Participants:

026.136 U **Bacterial Heavy Metal Resistance in Town Lake, Austin, TX**, *Teresa Marie Bilinski, St. Edward's University; Andrea Canales, St. Edward's University*

026.137 U **Can you see it now? Molecular screen for** *Angiostrongylus cantonensis* **in Uruguayan apple snails**, *Carissa Bishop, Southwestern University; Romi L. Burks, Southwestern University*

026.138 G **Desiccation tolerance of introduced** *Pomacea maculata* **populations in Texas.**, *Adrian Medellin, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake; Paul Glasheen, Southwestern University; Romi L. Burks, Southwestern University*

026.139 U **New Record of Mystery Snails in Harris County Texas**, *Bianca J. Perez, Southwestern University; Averi Harp Segrest, Southwestern University; Sofia Campos, Southwestern University; Romi L. Burks, Southwestern University; Russell Minton, University of Houston Clear Lake*

026.140 G **Reach level habitat association and life history of two crayfishes in Smith County, Texas**, *Andrew Glen, University of Texas at Tyler; Jared Dickson, UT Tyler; Neil Ford, University of Texas at Tyler*

026.141 U **Seeking refuge in a warm subtropical reservoir: how are zebra mussels surviving these waters?**, *Devin Garcia, Temple College; Jason L Locklin, Temple College*

026.142 U **Using Indicator Microorganisms to Determine the Effects of Urbanization on Ecosystem Services**, *Maria Rodriguez, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*

026.143 U **Individual-level foraging competition between Gambusia congeners under varying flow regimes**, *Ralph Khayat, St. Edward's University; Haley Christians, St. Edward's University; Valencia Mobley, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

Friday, March 4

Social
4:30 to 9:00 pm
Llano Hall Pavilion

Star Gazing Party
7:00 to 9:00 pm
Llano Hall Pavilion

Workshop: Dream Science Jobs
by **Joe Beach**, *Texas Parks & Wildlife*
7:00 to 7:45 pm
Packard Hall, South Room

Workshop: Work-Life Balance
by **Erika Lima**, *University of Texas at Austin*
7:00 to 7:45 pm
Packard Hall, North Room

Workshop: Professional Science Resume
by **Frank Dirrigl**, *University of Texas – Rio Grande Valley*
8:00 to 8:45 pm
Packard Hall, South Room

Workshop: The Guidelines for the Preparation and Professional Development of Environmental Educators
by **Christine Moseley**, *University of Texas at San Antonio*, and **Lisa Brown**, *Sam Houston State University*
8:00 to 8:45 pm
Packard Hall, North Room

Saturday, March 5

Past Presidents' Breakfast
7:00 to 8:00 am
Packard Hall, North Room

Registration
7:00 am to 12:00 pm
Academic Building, Atrium

035. Poster Session II - Academic Bldg
8:00 to 9:30 am
Academic Building
Geosciences
Geosciences Poster Session

Chair: **Russell LaRell Nielson**, *Stephen F. Austin State Univ*
Participants:

035.144 G **An ecological functional assessment of extant African rodents using postcrania**, *Timothy L. Campbell, Department of Anthropology, Texas A&M University; Kersten Bergstrom, Department of Anthropology, Texas A&M University*

035.145 U **Late holocene stable carbon and nitrogen isotopic variation of bulk organic matter deposited in blackwood sinkhole, abaco, the bahamas**, *Kristin Nicole West, TAMUG*

035.146 G **Origin of folding at Ernst Tinaja, Big Bend National Park, TX**, *Ryan Robert Silberstorf, Stephen F. Austin State University; Chris A. Barker, Stephen F. Austin State University*

035.147 G **Possible Cool Water Origins of an Unnamed Permian Unit in the Alexander Terrane of Southeast Alaska**, *Mitchell Alexander May, Sul Ross State University*

035.148 U **To What Extent Do Early Paleogene Sandstones in Big Bend National Park Document a Change in Volcanic Provenance?**, *Ryan Kubena, Sul Ross State University; Jesse Kelsch, MS, Sul Ross State University*

Physics
Physics Poster Session

Chair: **Kim Arvidsson**, *Schreiner University*
Participants:

035.149 N **Calculating Resonance States for the Helium Atom**, *Steve Alexander, Southwestern University*

035.150 U **Constructing an Outdoor Robot Using Wheelchair Motors**, *Yash Ghandi, Southwestern University; Eric Rodriguez, Southwestern University; Isabella Ferranti, Southwestern University*

035.151 U **The link between Fourier waves and emotional responses to music.**, *Lydia Grace Ryan, Temple College*

035.152 U **Towards Understanding Variability in Be Stars**, *Archit Vasan, Austin College; Amy Glazier, Austin College; Brian Schrandt, Austin College; David Whelan, Austin College*

035.153 U **Using a GPS Chip to Control the Path of a Robot**, *Isabella Ferranti, Southwestern University; Yash Ghandi, Southwestern University; Eric Rodriguez, Southwestern University*

036. Poster Session II - Dining Hall
8:00 to 9:30 am
Dining Hall

Chemistry and Biochemistry
Chemistry & Biochemistry Poster Session

Chair: **Mary A. Kopecki-Fjetland**, *St. Edward's University*
Participants:

036.154 U *In vivo* **investigations (efficacy and pharmacokinetics) of a new cyanide antidote**,

Valerie Luz Coronado, Sam Houston State University; Lorand Kiss, Sam Houston State University; James Ross, Sam Houston State University; Janna Lowry, Sam Houston State University; Taylor Petrash, Sam Houston State University; Ching-En Chou, Sam Houston State University; Secondra Holmes, Sam Houston State University; Deeptika De Silva, Sam Houston State University; Ilona Petrikovics, Professor, Sam Houston State University

036.155 U **An investigation into air sample testing using a miniature atmospheric chamber and gas chromatography-mass spectrometry**, *Joseph Harrison Meadows, East Texas Baptist University; Kristin Butterworth, East Texas Baptist University*

036.156 U **DNP conjugation of receptor targets for diseased cell receptors**, *Darean Bague, Schreiner University*

036.157 U **Detection of heavy metals in commercial teas**, *Tamara D Kotin, Texas Lutheran University; Amber Duelm, Student*

036.158 U **Determination of element concentrations (and risk assessment) in fish purchased from stores in Nacogdoches, East Texas, USA**, *Kefa Karimu Onchoke, Stephen F. Austin State University; Christopher Franclemont, Stephen F. Austin State University*

036.159 U **Discovering a novel inhibitor for inosine 5 monophosphate dehydrogenase in** *B. anthracis* , *Lisa Strong, The University of Texas at Austin; Ashley Ciosek, The Freshman Research Initiative at the University of Texas at Austin; Josh Beckham, The Freshman Research Initiative at the University of Texas at Austin*

036.160 U **Discovery of novel inhibitors for verona-integron encoded metallo-beta-lactamase in** *Pseudomonas aeruginosa*, *Steven Duc Tran, University of Texas at Austin; Josh Beckham, The Freshman Research Initiative at the University of Texas at Austin*

036.161 U **Fluorescence Assay of Wild-Type, W60Y, and W96F β-2-Microglobulin Aggregation**, *Christopher Alcorta, Austin College*

036.162 G **Investigating the membrane penetration of a novel cyanide antidote in a blood-brain barrier model (BBB-Parallel Artificial Membrane Permeability Assay)**, *Chathuranga Chinthana Hewa Rahinduwage, Sam Houston State University; Brooke Mendenhall, Sam Houston State University; Magen Ross, Sam Houston State University; Waleska Baca, Sam Houston State University; Ilona Petrikovics, Professor, Sam Houston State University; Lorand Kiss, Post Doctorate Researcher*

036.163 U **Investigating the solubility of a novel cyanide antidote and its binding potency to the walls of containers**, *Sarah R. Crews, Sam Houston State University; Tze K. Mak, Sam Houston State University; Melissa Sutrisno, Sam Houston State University; Lorand Kiss, Post Doctorate Researcher; Ilona Petrikovics, Professor, Sam Houston State University; David E. Thompson, Professor, Sam Houston State University*

036.164 U **Lithiation of triacetic acid lactone methyl ether**, *Tristan Thomas Adamson, Schreiner University*

036.165 U **Novel spectroscopic and electrochemical determination for water bound environmental contaminants**, *Nguyen Luu, University of Houston-Downtown; Mian Jiang, University of Houston-Downtown*

036.166 U **Phenolic content, anthocyanin levels and antioxidant properties of acai berry (***Euterpe oleracea***) supplements and products**, *Mei M. Earling, Southwestern University; Emily D. Niemeyer, Southwestern University*

036.167 U **Purification of beta-2-microglobulin W60A mutant**, *Alison Chao, Austin College*

036.168 U **RecA sequence specificity among selected drug-resistant mutation-prone sites in Mycobacterium tuberculosis**, *Mason Ryan Taylor, Wayland Baptist University*

036.169 U **Reconstitution and characterization of occludin-incorporated nanodiscs**, *Jay S Jeon, Austin College; Maria S Bewley, Pennsylvania State University; Xingxheng Wang, Pennsylvania State University; John M. Flanagan, Pennsylvania State University*

036.170 U **Structural insights into the regulation of JAK3 activity: Evidence from molecular modeling of full human JAK3 protein**, *Jaimie Albach, Texas A&M University at Galveston; Abigail Grant, Texas A&M University at Galveston; Jhenny Galan, Assistant Professor*

036.171 U **Synthesis of Metal-Impregnated Xero- and Aero-gel Catalysts for Carbon Dioxide Reduction**, *Christopher Jackson, Saint Edward's University*

036.172 U **Synthesis of a Novel Solid-State Regenerating Chlorinating Agent**, *Brittany Pollok, Texas Lutheran University; Megan Sweeney, Texas Lutheran University*

036.173 U **The influence of structure on combustion of organoclays**, *Celeste Keith, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*

036.174 U **Variations in phenolic composition and antioxidant properties among lemon balm (*Melissa officinalis*) cultivars**, *Maxime Boneza, Southwestern University; Emily D. Niemeyer, Southwestern University*

036.175 U **Spectroscopic determination of heavy metals in spinach and kale**, *Eddie Scott, Texas Lutheran University; Patricia Snow, Texas Lutheran University*

Marine Science

Marine Science Poster Session

Chair: **Thomas Linton**, *Texas A&M University at Galveston*
Participants:

036.176 U **Behavior of the Cleaner Fish *Elacatinus spp.* and their Clients in Roatan, Honduras**, *Kennedy L Chudej, McLennan Community College*

036.177 U **Frequencies for Dark Spot Syndrome on three coral species in Roatan, Honduras**, *Gabriela Garcia, McLennan Community College*

036.178 H **Laboratory based primary productivity and respiration in the seagrass, *Halodule wrightii* Aschers. (shoal grass) under low salinity**, *Gisselt Gomez, The University of Texas-Pan American; Oscar Trujillo, The University of Texas-Pan American; Kirk Cammarata, Texas A&M University Corpus Christi; Hudson DeYoe, The University of Texas Rio Grande Valley; Jason Parsons, The University of Texas Rio Grande Valley; Joseph Kowalski, The University of Texas Rio Grande Valley*

036.179 U **Microplastic and anthropogenic fiber ingestion by marine pinfish (*Lagodon rhomboides*) collected from inshore marine sites adjoining Freeport and Galveston, Texas**, *Kaitlyn Rieper, Baylor University; Peyton Thomas, Baylor University; Susan Power Bratton, Baylor University*

036.180 G **Ownership of Submerged Lands in Coastal Waters: A Case Study of Texas**, *Anna Wood, Texas A&M Galveston; Ashton Danielle Burgin, Texas A&M Galveston Campus*

036.181 U **The affects of climate patterns on *Sargassum* landings in the Gulf of Mexico**, *Victoria Bartlett, Texas A&M University at Galveston; Brandon Nicholas Hill, Texas A&M University at Galveston; Thomas Linton, Texas A&M University at Galveston*

036.182 U **The effects of oxygen levels on hemoglobin expression in Ophiactid brittle stars**, *Julia Grace McElwee, Lamar University; Ana Beardsley Christensen, Lamar University*

036.183 U **Water Quality and Health of Coral Reefs**, *Laura Mae Hinson, Texas A&M*

Science Education

Science Education Poster Session

Chair: **Mamta Singh**, *Lamar University*
Participants:

036.184 G **Biology faculty attitudes regarding online education**, *Beverly Kopachena, Texas A&M University-Commerce; Charlotte Larkin, Texas A&M University-Commerce*

036.185 U **Educating Young Children about Green Energy Education and Awareness**, *Hudspeth A Elizabeth, Lamar University; Mamta Singh, Lamar University*

036.186 N **Examining Secondary Students' Mental Models of a Local Environment after an Experiential Learning Field Trip**, *Sara Elizabeth Jose, Oso Bay Wetlands Preserve & Learning Center*

Systematics & Evolutionary Biology

Systematics & Evolutionary Biology Poster Session

Chair: **Russell Minton**, *University of Houston Clear Lake*

Participants:

036.187 N **A re-analysis of Cryptodiran relationships: What insights can be gained by utilizing genealogical concordance?**, *David E. Starkey, The University of the Incarnate Word*

036.188 U **Circumscription of a Potentially New Species of land snail from South Padre Island, Cameron County, Texas**, *Eli Ruiz, University of Texas Rio Grande Valley; Marco Arturo Martinez Cruz, The University of Texas Rio Grande Valley; Russell Minton, University of Houston Clear Lake; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley*

036.189 U **Development of nuclear markers for phylogeny reconstruction in the rodent genus** *Thomasomys*, *Maya J Feller, Abilene Christian University; Amberly N Grothe, Abilene Christian University; Paulina Sanchez, Abilene Christian University; Jessica A James, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

036.190 N **Distribution and systematics of Vietnamese** *Pollicaria* **(Gastropoda: Pupinidae)**, *Russell Minton, University of Houston Clear Lake; Phillip Harris, University of Alabama; Ernest North, University of Houston Clear Lake; Do Van Tu, IEBR, Vietnam Academy of Science and Technology*

036.191 U **Effects of male body size and competitor size on male fitness in** *Gambusia affinis***, a livebearing fish**, *Kayla Simone Richard, St. Edward's University; Hilary Evans, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

036.192 U **Friend, foe, or frenemy: Testing the dear enemy hypothesis in a sex role reversed pipefish,** *Syngnathus scovelli*, *Nancy Pamela Cisneros, St. Edward's University*

036.193 U **Mitochondrial genome heterogeneity in Stylommatophora and new insights into the discovery of a new species of Polygyridae land snail.**, *Marco Arturo Martinez Cruz, The University of Texas Rio Grande Valley; Russell Minton, University of Houston Clear Lake; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley*

036.194 U **Phylogeny of the rodent genus** *Thomasomys* **based on mitochondrial markers**, *John Iragena, Abilene Christian University; Jeremy M Aymard, Abilene Christian University; Samantha N Studvick, Abilene Christian University; Kathryn D Mitchell, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

036.195 U **The first record of Wormian bones in lizards**, *Lauren Rudie, shsu; Sarai Nicole Mesa, Sam Houston State University; Juan Daza, shsu; Patrick Lewis, Sam Houston State University*

036.196 G **Use of computed tomography survey to reveal hidden structures and a survey of supernumerary molars within** *Pongo pygmaeus*, *Kelsey Jenkins, Sam Houston State University; Justin Levy, Sam Houston State University; Kersten Bergstrom, Department of Anthropology, Texas A&M University; Ruby Jean Velasquez, Texas A&M University; Patrick Lewis, Sam Houston State University; Timothy L. Campbell, Department of Anthropology, Texas A&M University*

036.197 U **Variation in the jaw joint of** *Zygaspis* **based on x-ray computed tomography**, *Sarai Nicole Mesa, Sam Houston State University; Lauren Rudie, shsu; Sarah Bivens, Sam Houston State University; Juan D Daza, Sam Houston State University; Patrick Lewis, Sam Houston State University*

036.198 U **Identification of a Newly Discovered Population of** *apple snails* **(***Pomacea* **spp., Family Ampullariidae) in the Rio Grande Valley**, *Victoria Garcia Gamboa, University of Texas Rio Grande Valley; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley; Romi L. Burks, Southwestern University*

Terrestrial Ecology and Management
Terrestrial Ecology & Management Poster Session

Chair: **Richard Patrock**, *TAMUK*
Participants:

036.199 U **An analysis of the impact of biometeorology on the activity levels of small mammals**, *Sarah Elizabeth Bowen, Hardin-Simmons University; Elizabeth Lopez, Hardin-Simmons University; Nathalie De la Torre, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

036.200 U **Baseline survey of small mammals and bacterial pathogens in the southeastern Rolling Plains**, *Hannah Seah, Abilene Christian University; Gomez Daisy, Abilene Christian University; Nathan R Neill, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

036.201 G **Biometeorology survey of large mammals on a ranch in Runnels County**, *Lauren Spindler, Hardin-Simmons University; Hannah Stouffer, Hardin-Simmons University; Cody Berryman, Hardin-Simmons University; Charelle Marshall, Hardin-Simmons University; Alyssa Stegner, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

036.202 G **Blood Hormone and Lipid Level Influences on Ectoparasite Abundance in the Southern Plains Woodrat (***Neotoma micropus***)**, *Missy B Schenkman, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University; Joseph B. Schenkman, Midland College*

036.203 U **Concentration Effects of Plant Growth Promoting Rhizobacteria on** *Nolina lindheimeriana* **in Differing Organic Matter**, *Jessica Williamson, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*

036.204 U **Differentiating Bell County Snail Species by Identifying Species-Specific or Genus-Specific Genomic Differences in** *Rumina decollata*, *Sarah Elizabeth Velo, University of Mary-Hardin Baylor; Kathleen Wood, University of Mary Hardin-Baylor*

036.205 U **Habitat Use by Ladder-backed Woodpecker (***Picoides scalaris***) in the Caprock Canyonlands in Floyd County, Texas.**, *Victoria Kristine Solis, Wayland Baptist University; Andrew C. Kasner, Wayland Baptist University*

036.206 G **Managing Daily Temperature Range of Soil to Increase Microbial Processes**, *Kholoud Ghanem, Texas Tech University; John Zak, Texas Tech University*

036.207 U **Relationships between small mammal assemblages and land management in the southeastern Rolling Plains**, *Catherine C Longest, Abilene Christian University; Nathan R Neill, Abilene Christian University; Gomez Daisy, Abilene Christian University; Jamie E Thompson, Abilene Christian University; S James Nix, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

037. Botany Oral Session II and Business Meeting
10:00 to 11:15 am
Academic Building, 111

Chair: **Michael A. Grusak**, *USDA*
Participants:

10:00 037.208 G *Euphorbia cryptorubra* **(Euphorbiaceae), a new species in** *Euphorbia* **section** *Anisophyllum* **from Texas, U.S.A and Chihuahua, Mexico**, *Nathan Taylor, Sul Ross State University; Martin Terry, Department of Biological, Geological and Physical Sciences, Sul Ross State University*

10:15 037.209 G **A Preliminary Report of 3, 4, 5-Trimethoxyphenethylamine Concentrations in Over-The-Counter Topical Products Purported to Contain** *Lophophora williamsii* **(Cactaceae).**, *Robert Joseph LeBlanc, Department of Biology, Geology, and Physical Sciences; Martin Terry, Department of Biological, Geological and Physical Sciences, Sul Ross State University*

10:30 037.210 N **Habitat preference for Comanche Peak Prairie Clover (***Dalea reverchonnii***; Fabaceae), a rare North-Central Texas endemic.**, *Allan D. Nelson, Tarleton State University; Sam Kieschnick, City of Mansfield, Texas*

10:45 037.211 N **Identification of bacteria colonizing the roots of** *Acacia smallii* **(Fabaceae).**, *Kathleen Wood, University of Mary Hardin-Baylor*
11:00 Botany Section Meeting

038. Cell & Molecular Biology Oral Session II and Business Meeting
10:00 to 11:15 am
Academic Building, 112

Chair: **Susan Klinedinst**, *Schreiner University*
Participants:

10:00 038.212 U **Comparative Genomic Analysis of Two** *Paragonimus* **Species**, *Joe Dylan Sosa, St. Edward's University; Samantha N McNulty, McDonnell Genome Institute at Washington University; Bruce Rosa, McDonnell Genome Institute at Washington University; Takeshi Agatsuma, Department of Environmental Health Sciences, Kochi Medical Schoo; Hiromu Sugiyama, Laboratory of Helminthology, Department of Parasitology, National Institute of Infectious Diseases; Peter Fischer, Department of Internal Medicine, Washington University School of Medicine; Makedonka Mitreva, The McDonnell Genome Institute , Department of Internal Medicine Washington University, School of Medicine,*

10:15 038.213 U **Effect of nutritional stress on fecundity in** *Drosophila melanogaster*, *Kamryn N. Gerner-Mauro, St. Edward's University; Vivian Le, St. Edward's University; Lisa M. Goering, St. Edward's University*

10:30 038.214 U **The Role of Eip63E in** *Drosophila* **Axonal Transport**, *Pearl Anne Henry, Schreiner university; Susan Klinedinst, Schreiner University*

10:45 038.215 G **The effect of cancer-associated PP2A A subunit mutations on the wnt signaling pathway**, *Lauren Sommer, Sam Houston State University; Joni Seeling, Sam Houston State University*
11:00 Cellular & Molecular Biology Section Meeting

039. Chemistry & Biochemistry Oral Session III and Business Meeting
10:00 to 11:15 am
Bluebonnet House, 01

Chair: **Mary A. Kopecki-Fjetland**, *St. Edward's University*
Participants:

10:00 039.216 G **Application of biochar for removing heavy metals from aqueous solution**, *Sergio Ivan Mireles, Graduate Student; Marissa Davila, The University of Texas Rio Grande Valley*

10:15 039.217 N **Physical compatibility of co-solubilized vancomycin, piperacillin, and tazobactam in aqueous solution**, *Sean C Butler, The University of Texas at Tyler; Neil Gray, UT Tyler; Rachel Mason, The University of Texas at Tyler*

10:30 039.218 G **Removal of zinc from aqueous solution using charcoal-based adsorbents**, *Sergio Ivan Mireles, Graduate Student*

10:45 039.219 N **Smart coatings for the surface decontamination of chemical warfare agents**, *Neil Gray, UT Tyler*
11:00 Chemistry & Biochemistry Section Meeting

040. Environmental Science Oral Session II and Business Meeting
10:00 to 11:15 am
Tech House, 01

Chair: **Mary Poteet**, *The University of Texas at austin*
Participants:

10:00 040.220 N **Congener Specific Determination of Polychlorinated Biphenyls (PCBs) in Human Milk**, *Prof. Mohamed Hamza EL-Seaid, Professor, Chromatographic Analysis Unit Director, College of Food and Agricultural Sciences, King Saud University, Riyadh, Saudi Arabia*

10:15 040.221 N **Lowered soil respiration and lowered climatic sensitivities under two different savanna encroachers**, *Ann Thijs, St. Edwards University; Marcy Litvak, The University of New Mexico; Christine Hawkes, The University of Texas at Austin*

10:30 040.222 N **Shoreline Diptera as Potential Bioindicators of Metals in Freshwater and Marine Habitats**, *Frank Joseph Dirrigl, Jr, University of Texas Rio Grande Valley; Thomas Eubanks, University of Texas Rio Grande Valley*

10:45 040.223 N **Turbidity reduction of construction site runoff using synthetic and biopolymers**, *Jihoon Kang, University of Texas Rio Grande Valley*

11:00 Environmental Science Section Meeting

041. Freshwater Science Oral Session II and Business Meeting
10:00 to 11:15 am
Mockingbird House, 01

Chair: **George J Guillen**, *University of Houston Clear Lake*
Participants:

10:00 041.224 N **American Eel in Texas – what we do, don't, and need to, know**, *Dean A. Hendrickson, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Ben Labay, University of Texas at Austin; Gary P. Garrett, University of Texas at Austin; Melissa Casarez, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin*

10:15 041.225 N **Collaborations for the Future of Texas Water, Watersheds and Environmental Literacy: Community Partnerships with Texas Tech University's Llano River Field Station**, *Tom Arsuffi, Texas Tech University Llano River Field Station; Tyson Broad, TTU Llano River Field Station; Robert Stubblefield, TTU Llano River Field Station; Karen Lopez, TTU Llano River Field Station*

10:30 041.226 N **Healthy watershed approach to protecting streams : Role of science, stakeholders, education, and partnerships**, *Tyson Broad, TTU Llano River Field Station; Tom Arsuffi, Texas Tech University Llano River Field Station; Kevin Wagner, Texas Water Resources Institute*

10:45 041.227 N **Review of the Texas fish list of Species of Greatest Conservation Need**, *Gary P. Garrett, University of Texas at Austin; Dean A. Hendrickson, University of Texas at Austin; Ben Labay, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Melissa Casarez, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin*

11:00 Freshwater Science Section Meeting

042. Graduate Student Competition I
10:00 to 11:15 am
Packard Hall, East Room

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

10:00 042.228 G **A Missing Link: The Reproductive Biology of** *Winslowia tuscumbiana*, *Kathryn Parsley, Texas State University; Michael Dunn, Cameron University*

10:15 042.229 G **Cloning and Expression of** *Pseudomonas aeruginosa* **Elastase with plasmid recombinant vector**, *Derek Thomas Draper, University of Texas at Tyler*

10:30 042.230 G **Comparative helminth community structure in two species of arctic-nesting waterfowl: black brant (***Branta bernicla nigricans***) and greater white-fronted geese (***Anser albifrons***)**, *Nicole Traub, Sam Houston State University*

10:45 042.231 G **Developing a Lung Tissue Bacterial Co-culture Model Evaluating the Impact of Dust Exposure**, *Shari Galvin, Texas Southern University*

11:00 042.232 G **Digitization to Realization: The utilization of Structure from Motion and ArcScene to Identify Taphonomic Processes and Digitally Preserve Burial CC-B14.**, *Samantha Mitchell, Texas Tech University; Ashley Booher, Texas Tech University; Brett A Houk, Texas Tech University*

Saturday, March 5

043. Science Education Oral Session III and Business Meeting
10:00 to 11:15 am
Lantana, 01

Chair: **Mamta Singh**, *Lamar University*
Participants:

10:00 043.233 N **Denialism and the Disciplines: How improving interdisciplinary discourse on climate change can counter denialism**, *Patrick Lewis, Sam Houston State University; Ken Hendrickson, Sam Houston State University*

10:15 043.234 N **Effective STEM Principal Profile**, *Denise Kern, Texas State University; Sandra West Moody, Texas State University*

10:30 043.235 N **Incorporating Educational Research Articles in Science Teaching Methods Course: Assessing Pre-Service Teachers' Perception in Elementary Science Teaching**, *Mamta Singh, Lamar University*

10:45 043.236 N **Modifying Physical Layout of Materials to Reduce Student Frustration and Encourage Student-centered Learning in Biology Labs**, *Cathleen N. Early, Univ. of Mary Hardin-Baylor*

11:00 Science Education Section Meeting

Lunch
11:30 am to 1:00 pm
Llano Hall Pavilion, 01

045. Anthropology Oral Session and Business Meeting
1:00 to 1:45 pm
Bluebonnet House, 01

Chair: **Robert Z. Selden Jr.**, *Center for Regional Heritage Research, Stephen F. Austin State University*
Participants:

1:00 045.237 N **Excavation results from the Black Vulture Rock Shelter (41BN207), a Late Toyah occupation on the Edwards Plateau.**, *Raymond Paul Mauldin, UT San Antonio; Leonard Kemp, Center for Archaeological Research-University of Texas at San Antonio; Cynthia Munoz, Center for Archaeological Research, UT San Antonio; Sarah Wigley, Center for Archaeological Research at UT San Antonio; Jason Perez, Center for Archaeological Research at UT San Antonio*

1:15 045.238 N **Stepping Beyond the Wow Factor: A 3D Archaeological Investigation of the Black Vulture Site, Bandera County, Texas.**, *Leonard Kemp, Center for Archaeological Research-University of Texas at San Antonio; Cynthia Munoz, Center for Archaeological Research, UT San Antonio; Katherine Smyth, Center for Archaeological Research-University of Texas at San Antonio*

1:30 Anthropology Section Meeting

046. Conservation Ecology Oral Session II and Business Meeting
1:00 to 2:15 pm
Academic Building, 111

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

1:00 046.239 N **Gulf of Mexico Species Interactions (GoMexSI) database: Beyond the fishes!**, *Theresa C Mitchell, Center for Coastal Studies at Texas A&M University; James David Simons, Texas A&M University-Corpus Christi; Jorrit Poelen, Data Analysis and Visualization Consultant*

1:15 046.240 N **Identifying Nesting Habitat for Texas diamondback terrapin in the Nueces Estuary, TX**, *Aaron Scott Baxter, Center for Coastal Studies @ TAMUCC*

1:30 046.241 N **Unionid mussel survey and the presence of golden orb, Quadrula aurea, in the Lower Cibolo Creek, Texas**, *Shaun Michael Donovan, San Antonio River*

1:45 046.242 N **Carpal located scent-marking in raccoons** *Procyon lotor*, *Troy A Ladine, East Texas Baptist University*

2:00 Conservation Ecology Section Meeting

047. Graduate Student Competition II
1:00 to 2:15 pm
Packard Hall, East Room

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

1:00 047.243 G **DisintegratoR: a new R package for evaluating phylogenetic trees while accounting for correlations between character states**, *William Bernard Gelnaw, University of Texas at Austin*

1:15 047.244 G **Elevated humidity and bunching decrease desiccation rate and increase survival of air-exposed fragments of the aquatic invasive plant** *Hydrilla verticillata*, *Sasha Danielle Soto, Texas Tech University; Matthew Alexander Barnes, Texas Tech University*

1:30 047.245 G **Examining Ancient Maya Warfare: Diet and Mobility in the Colha Skull Pit, Belize**, *Kristin Hoffmeister, Texas A&M University; Lori E. Wright, Texas A&M University*

1:45 047.246 G **Habitat, Diet, and Life History Characteristics of the Saltmarsh Topminnow (***Fundulus jenkinsi***)**, *Josi Robertson, University of Houston-Clear Lake*

2:00 047.247 G **The stratigraphic position of fossil vertebrates from the Pojoaque Member of the Tesuque Formation (middle Miocene) near Española, New Mexico**, *Garrett Ross Williamson, Stephen F. Austin State University*

048. Marine Science Oral Session II and Business Meeting
1:00 to 2:15 pm
Mockingbird House, 01

Chair: **Thomas Linton**, *Texas A&M University at Galveston*
Participants:

1:00 048.248 N **Effects of rapid salinity decrease on photosynthetic performance in the seagrasses,** *Thalassia testudinum***,** *Syringodium filiforme***, and** *Halodule wrightii* **using PAM fluorescence**, *Joseph Kowalski, The University of Texas Rio Grande Valley; Kirk Cammarata, Texas A&M University Corpus Christi; Hudson DeYoe, The University of Texas Rio Grande Valley*

1:15 048.249 N **Gulf of Mexico species interactions (GoMexSI) database: Big data, big ecology, big deal??**, *James David Simons, Texas A&M University-Corpus Christi; May Yuan, University of Texas-Dallas; Maru Vega-Cendejas, CINVESTAV; Jorrit Poelen, Freelance Software Engineer*

1:30 048.250 N **Influence of Freshwater Inflow on Aquatic Biota of the Lower Brazos River, Texas**, *George J Guillen, University of Houston Clear Lake; Jenny Oakley, University of Houston Clear Lake - EIH; Stephen Curtis, University of Houston Clear Lake - EIH*

1:45 048.251 N **Lessons learned from three years of seagrass monitoring in San Antonio Bay**, *Cynthia Hobson, Texas Parks and Wildlife Department*

2:00 048.252 N **New trophic data for the Gulf of Mexico large marine ecosystem to support ecosystem assessment, fisheries modeling, and management**, *Tracy Fisher Weatherall, Texas A&M Corpus Christi; James David Simons, Texas A&M University-Corpus Christi*

2:15 Marine Science Section Meeting

049. Systematics & Evolutionary Biology Oral Session III and Business Meeting
1:00 to 2:00 pm
Juniper House, 01

Chair: **Russell Minton**, *University of Houston Clear Lake*
Participants:

1:00 049.253 G **A new mosasaur from the Cretaceous Taylor Group of Texas: implications for the genus** *Clidastes* **and the evolution of Mosasaurinae**, *Joshua Ryan Lively, The University of Texas at Austin; Michael Polcyn, Southern Methodist University; Gorden Bell, Great Basin National Park*

1:15 049.254 G **Genetic analysis of potential hybridization between the endangered** *Gambusia nobilis* **and invasive** *Gambusia geiseri* **in Texas**, *Victoria Rodriguez, shsu*

Saturday, March 5

1:30 049.255 G **Patterns of genetic diversification in a widely distributed species of bat, *Molossus molossus*, based on nuclear markers**, *Laramie Louise Lindsey, Texas Tech University; Robert D Bradley, Texas Tech University; Loren K Ammerman, Angelo State University*

1:45 Systematics & Evolutionary Biology Section Meeting

050. Geosciences Oral Session and Business Meeting
2:00 to 2:30 pm
Bluebonnet House, 01

Chair: **Russell LaRell Nielson**, *Stephen F. Austin State University*
Participants:

2:00 050.256 N **Boudins and other ductile structures in Packsaddle Schist at the Llano River bridge in Llano, TX**, *Chris A. Barker, Stephen F. Austin State University; Russell LaRell Nielson, Stephen F. Austin State University*

2:15 050.257 N **Stromatolitic bioherms in the Upper Cambrian, Point Peak Member of the Wilberns Formation near Camp San Saba, Texas**, *Russell LaRell Nielson, Stephen F. Austin State University; Chris A. Barker, Stephen F. Austin State University*

2:30 Geosciences Section Meeting

Section Chairs Post-Session Meeting
3:00 to 3:30 pm
Lantana, 01

Business Meeting
4:00 to 4:30 pm
Coke Stevenson Center, 01

Distinguished Texas Scientist & Outstanding Texas Educator Lectures
4:45 to 6:15 pm
Coke Stevenson Center, 01

Reception
6:15 to 7:15 pm
Coke Stevenson Center, 01

Awards Banquet
7:15 to 10:00 pm
Coke Stevenson Center, 01

Sunday, March 6

Field Trip: 700 Springs and South Llano River Kayak Trip
7:00 am to 5:00 pm
Dining Hall

Field Trip: Enchanted Rock and Bamberger-Selah Ranch
7:00 am to 5:00 pm
Dining Hall

Field Trip: Fort McKavett State Historical Site and Caverns of Sonora
7:00 am to 5:00 pm
Dining Hall

Field Trip: Geology of the Northern Llano Uplift
7:00 am to 5:00 pm
Dining Hall

Program Abstracts

Friday, March 4

006. Biomedical Oral Session and Business Meeting
1:00 to 1:45 pm
Academic Building, 113
Biomedical
Biomedical Oral Session and Business Meeting
Participants:

1:00 006.001 U **Elucidating the mechanism of cadaverine in the nitrosative stress response of uropathogenic** *Escherichia coli* , *Kristen N Clemons, Abilene Christian University; Brittany Fleming, University of Utah; Matthew Mulvey, University of Utah*
During a urinary tract infection, the infectious agent uropathogenic *Escherichia coli* (UPEC) elicits a number of host inflammatory response pathways, including the increased generation of reactive nitrogen species (RNS). Unlike non-pathogenic K-12 strains, UPEC can respond to and resolve this nitrosative stress. Previous research in our lab has indicated that UPEC adaptation to RNS is linked to the polyamine cadaverine. UPEC strains lacking either the cadA or cadC gene are unable to produce cadaverine; consequently, these mutant strains are unable to grow in the presence of 3 mM RNS unless grown in cadaverine supplemented media. Although implicating cadaverine, these data do not elucidate the mechanism by which cadaverine provides resistance to RNS. To determine this mechanism, the ΔcadA and ΔcadC strains were mutagenized and screened for loss of rescue by exogenous cadaverine. In this project, the genes identified by the screen were mapped via arbitrary PCR. Among the genes mapped were menA and yieN. To confirm the involvement of these genes, Splicing Overlap Extension (SOE) PCR was used to construct menA and yieN SOE PCR products containing a tetR cassette. The menA SOE PCR product has been transformed into the *E. coli* K12 strain MG1655 and will be moved by phage transduction into UPEC strain UTI89. Upon construction of the UTI89 ΔmenA and ΔyieN strains, these genes' role in the nitrosative stress response of UPEC will be tested by analyzing the mutant strain growth in the presence of RNS. Furthermore, other genes identified through the arbitrary PCR process will be investigated.

007. Botany Oral Session I
1:00 to 2:00 pm
Academic Building, 111
Botany
Botany Oral Session I
Participants:

1:00 007.002 U **Analysis of Fungal and Bacterial Root Microbiomes of** *Muhlenbergia reverchonii* **at Wild Basin**, *Margaret Ann Walsh, Undergraduate Research*
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 a set site of the Wild Basin Creative Research Center in Austin, Texas. The soil was then fractionated into bulk soil (soil outside the rhizosphere not penetrated by plant roots), neighboring soil (soil that surrounds the rhizosphere and is below the O-Horizon), rhizosphere (1 to 2mm of soil touching the root and root hairs), and endosphere (plant tissues). Total genomic DNA was isolated from these fractions and various polymerase chain reactions were run allowing for selective amplification of the V3 and V4 variable regions of the 16s bacterial ribosomal RNA and the analogous 18s fugal rRNA. After sending off the samples for data analysis we will interpret the DNA reeds in QIIME and find statistical meaning within the sites, samples, and fractions (Lee et al., 2012). 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 performing a QIIME analysis pipeline for each plant, interactions between soil-microbe and microbe-plant will

be defined. This research will provide unique tools to examine this vast and mostly undescribed community of organisms.

1:15 007.003 U **Analysis of fungal and bacterial root microbiomes of** *Juniperus ashei* **(Cupressaceae)**, *Katrina Chuah, St. Edward's University; Charles Hauser, St Edwards University*
The microbiome of plant roots include a diverse array of bacterial and fungal species. These microbial populations have been demonstrated to contribute to the overall health of plants, including nutrient acquisition and pathogen resistance. In this study, *Juniperus ashei* (Cupressaceae) was sampled at the Wild Basin Creative Research Center given its prominent role in central Texas ecosystems. Total DNA was isolated from four soil fractions: bulk soil (soil outside the rhizosphere); neighboring soil (soil that surrounds the rhizosphere and is below the O-Horizon); rhizosphere (soil touching the root and root hairs), and endosphere (plant tissues). Bacterial 16S (V4-V5) and fungal 18S (ITS1-ITS2) regions were sequenced from each sample and estimates of microbial diversity were obtained using Quantitative Insights into Microbial Ecology (QIIME). Preliminary analysis of both bacterial and fungal microbiomes supports the hypothesis of plants recruiting specific microbes. Enrichment of particular operational taxonomic units (OTUs) were observed in rhizosphere and endosphere compared to bulk soil. In the future, we will continue to characterize the microbial populations associated with Ashe juniper and seek to determine the signals that establish these communities.

1:30 007.004 U **Network and community analyses of fungal microbiomes**, *Jacquelyn Ileana Turcinovic, St. Edward's University; Charles Hauser, St Edwards University*
Microbial communities in plant roots provide critical links between above and belowground processes in terrestrial ecosystems. Variation in root communities has been attributed to plant host effects and microbial host preferences, as well as to factors pertaining to soil conditions. Beneficial microbiota are known to facilitate plant uptake of critical nutrients such as phosphorus and nitrogen; however, the differences in microbiomes between plant species are not well characterized. To begin to address hypotheses regarding the influence of plant host and soil biogeography on root fungal communities, this study examined the root microbiomes of four plants native to central Texas (*Carex planostachys* [Cyperaceae], *Juniperus ashei* [Cupressaceae], *Muhlenbergia reverchonii* [Poaceae], and *Schizachyrium scoparium* [Poaceae]). DNA was extracted and 18S rDNA (ITS1-ITS2) was sequenced from soil fractions associated with each plant species. Four soil fraction were sampled comprising: soil outside the rhizosphere not penetrated by plant roots (bulk), soil that surrounds the rhizosphere and is below the O-Horizon (neighboring), 1 to 2mm of soil touching the root and root hairs (rhizosphere), and within plant tissues (endosphere). The QIIME analysis pipeline was used in conjunction with ITS extraction (ITSx) to analyze fungal populations based on ITS2 sequences. Characterization of alpha and beta diversity for these plants and a preliminary network analysis of their fungal populations will be presented.

1:45 007.005 N **Recent collections and observations of the rare milkweed vine,** *Matelea atrostellata* **(Apocynaceae)**, *David E Lemke, Texas State University*
The genus *Matelea* (Apocynaceae, Asclepiadoideae) comprises more than 100 species of vines or herbaceous perennials forming decumbent rosettes of short stems from a central rootstock that are native to warm temperate and tropical regions of the western hemisphere. Approximately 20 species, commonly known as milkweed vines, occur in the United States, extending as far north as Tennessee, Missouri, and Oklahoma. Five species of *Matelea* are known to occur in Brewster County, Texas: *M. reticulata, M. producta, M. parvifolia, M. texensis*, and the recently-described *M. atrostellata* which, until recently, was known only from the type collection locality along the Window Trail at Big Bend National Park. Recent collecting activity in the Christmas Mountains has found *M. atrostellata* to be locally common along certain arroyos on the eastern slopes of the mountains, where it exhibits the same color variations as found in the national park. The availability of fresh material of the species has allowed us to investigate the production of scent by the flowers of *M. atrostellata* as well as the production of malodorous leaf aromas that may function as an herbivore deterrent.

008. Chemistry & Biochemistry Oral Session I
1:00 to 2:30 pm
Bluebonnet House, 01
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session I

Participants:

1:00 008.006 U **Analysis of vapors released by the heating of e-liquids**, *Timothy Turner, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*
With the increasing research on the hazards of cigarettes, people are looking for a safer alternative to smoking. Electronic Cigarettes were introduced in the early 2000's to serve this purpose, and they are gaining increasing popularity. The vapors were analyzed using STA-IR and the results indicate that the vapors released after heating are not simply carbon dioxide and water, so the liquids do not undergo combustion and may not be as harmless as claimed by e-cigarette companies. Further investigation using GC-MS is being performed to determine the compounds formed as a result of heating the e-liquids. There are two main concerns that individuals may have concerning e-cigarettes. Most users are concerned about the compounds absorbed by the body, while non users are concerned with the compounds present in the vapors exhaled by users. To address this, IR analysis also has been performed comparing the vapors directly released from the e-cigarette to the vapors released by the user after taking a puff.

1:15 008.007 U **Anion analysis of the mineral springs of Lampasas Texas**, *David Hauer, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*
Over the period of one year, a water analysis was conducted on a series of mineralized springs within the Lampasas Cut Plain in order to distinguish geochemical variability amongst these groundwater discharge sites. The selectivity for the mineral springs was based on the presence of an aroma exhibiting that of "rotten eggs," an indication hydrogen sulfide gas is present. The presence of sulfide in the water is surprising, as most of the waters are found in areas dominated by limestone. A redox reaction in the water converted the sulfide to sulfate and was analyzed by adding barium chloride to see if barium sulfate precipitated. This was done on-site and analyzed with a portable spectrometer and in the laboratory with an Ion Chromatograph (IC). The IC provided more accurate measurement of the sulfate concentration in the waters. The IC also allowed for analysis of other ions that might be present in the waters such as; chloride, nitrate, nitrite, and phosphate.

1:30 008.008 U **Does transformation of *PhMe2SiH* to *[η6-Cr(CO)3Ph]Me2SiH* activate or deactivate Si-H bond?**, *Alexander Bradford, University of Texas at El Paso; Keith Pannell, University of Texas at El Paso; Hermant K. Sharma, University of Texas at El Paso; Paulina Gonzalez, University of Texas at El Paso*
Alex Bradford, Hemant K. Sharma, Keith H. Pannell The University of Texas at El Paso, El Paso, TX.79968-0513 The reaction of PhMe2SiH with Cr(CO)6 under thermal conditions afforded [η6-(CO)3CrPh]Me2SiH, 1.1 There appear to be no studies on the chemistry of this material and our research is focused upon the extent to which the (CO)3Cr substituent activates of deactivates the Si-H bond. To date we have investigated the capacity of 1 to be useful as a hydrosilylation and reductant,2a reagent.2b Thus, we have observed the reaction of 1 with CH2=CHSiMe2 using a platinum catalyst to create [η6-(CO)3Cr]Ph-Me2Si(CH2)2SiMe3. We have also used 1 as a reagent for the reduction of amides to amines, namely DMF to trimethylamine, and the corresponding disiloxane, [(η6-(CO)3CrPh)Me2Si]2O. This reaction proceeds via the intermediacy of [(η6-(CO)3CrPh)Me2Si(CH2)2SiOCH2NMe3] which was observed by 29Si and 13C NMR monitoring. The crystal structures of the various intermediates and products, the kinetic monitoring, full spectroscopic analysis, and comparison of the results with the related chemistry of the unsubstituted PhMe2SiH will be presented. 1. Moran, M. ; Cuadrado I. ; Pascual, M. C. ; Cassado, C. M. Organometallics, 1992, 11, 1210-1220. 2(a). Xu, Z. ; Huang, W. ; Zhang, J. ; Xu, L. Synthesis, 2015, 47, 3645-3668. (b) Arias-Ugarte, R. ; Sharma, H. K. ; Morris, A. L. C. ; Pannell, K. H. J. Amer. Chem. Soc. 2012, 134, 848-851

1:45 008.009 U **Molecular dynamics simulations of ion transport through bent carbon nanotubes**, *Christopher Jackson, Saint Edward's University*
Transport through nanofluidic systems has essential applications in engineering and science. Carbon nanotubes, structures with nanometer length diameters and atomically smooth surfaces, have shown enhanced molecular transport of water and ions at speeds far faster than predicted by continuum hydrodynamic theory. Furthermore, nonstraight carbon nanotubes, a largely understudied system, has shown the ability to increase the rate of transfer of water molecules by up to 3.5 times. The transport of ions through these structures is an area of key interest that has not ben well studied. This work focuses on the design of a nonstraight single-walled carbon nanotube (SWCNT) using coarse-grained techniques. Coarse-grained models allow for the exploration of

larger scale systems (at a lower computational expense) than is possible with traditional full atomic detail. Molecular dynamics (MD) simulations, which follow the motion of individual atoms over time, will be performed using LAAMPS. This research provides fundamental insight into ion and water transport through SWCNTs at this nanometer scale. From this, conditions for maximum ion permeation and high efficiency water flow through carbon nanotubes can be deduced.

2:00 008.010 U **Progress towards new actinide and lanthanide ligand systems**, *Sarah Jane Bibby, University of Texas at El Paso; Raul Cuevas, University of Texas at El Paso; Laura Saucedo, University of Texas at El Paso; Keith Pannell, University of Texas at El Paso*
Department of Chemistry, University of Texas at El Paso, El Paso, TX. 79968-0513
Carbamoylmethylphosphine oxide ligands, R2P(O)CH¬2C(O)NR2, CMPO, are useful lanthanide (Ln)/actinide (Ac) extractants.1 The ultimate goal of our research project is to produce fluorescent CMPO ligands as sensors for low level Ac/Ln salt concentrations. Since BODIPY dyes are well-established fluorophores in our group,2 we have coupled the two distinct areas of interest to produce CMPO-BODIPY materials as outlined in equation 1. CMPO-(CH2)3CH=CH2 + BODIPY-NH(CH2)2SH □ CMPO-(CH2)5S(CH2)2NH-BODIPY (1) To date we have been able to synthesize both the CMPO substituted pentene, 1, and the aminothiol-BODIPY, 2. Extractant 1 itself has been coordinated to uranyl nitrate UO2(NO3)2 and 2 has been shown to interact independently with a variety of metal salts with a change is optical properties. All experimental details, spectroscopic analysis, selected structural data along with the results from the thiol-ene click chemistry between 1 and 2 will be presented. 1. Kapoor, R. N.; Guillory, P.; Schulte, L.; Cervantes-Lee, F.; Haiduc, I.; Parkanyi, L.; Pannell, K. H. J. Appl. Organomet. Chem., 2005, 4, 510-517 2. (a) Banuelos, J.; Martin, V.; Gomez-Duran, C. F.; Cordoba, I. J. Arroyo; Pena-Cabrera, E.; Garcia-Moreno, I.; Costela, A.; Perez-Ojeda, M. E.; Arbeloa, T.; Arbeloa, I. L.. Chemistry - A European Journal, 2011, 17, 7261-7270. (b). Roacho, R. I.; Metta-Magaña, A. J.; Portillo, M. M.; Peña-Cabrera, E.; Pannell, K. H. J. Org. Chem. 2013, 78, 4245-4250.

009. Environmental Science Oral Session I
1:00 to 2:15 pm
Tech House, 01
Environmental Science
Environmental Science Oral Session I
Participants:

1:00 009.011 U **Arsenic exposure and mortality in** *Aedes aegypti* **and** *Aedes albopictus*, *Brenda Hernandez-Barron, University of Texas Rio Grande Valley; Christopher Vitek, University of Texas Rio Grande Valley*
Previous studies have shown that heavy metal accumulations are more prevalent in human-modified soils due to industrialization, unplanned disposal infrastructure and modern agriculture. Contamination levels are expected to increase as industrialized development expands throughout previously rural regions. Our research examines exposure to arsenic in higher-than-normal levels. Very little information is available on the lethal and sub-lethal effects resulting from varying concentrations of arsenic exposure on aquatic insects. Larval development time and mortality may be correlated with levels of pollution in contaminated areas. Two mosquito species were utilized in this study. *Aedes aegypti* and *Aedes albopictus*. We exposed different larval stages to varying concentrations of arsenic solutions (100ppm, 500ppm, and 1000ppm) to determine susceptibility. We hypothesized that older larvae would show greater tolerance to arsenic exposure. Furthermore, we hypothesized that exposure to arsenic would increase development time due to larvae being reared in a stressful environment. Arsenic pollution resulted in 100% mortality in all but the lowest concentrations (100ppm), and showed significant lethal effect at the lowest concentration. Our data suggests a decreased susceptibility to the lowest arsenic concentrations in *Aedes aegypti* 4th instar larvae. Surprisingly, those larvae that were exposed to arsenic and survived also showed a faster development rate. While the arsenic levels tested were low, it appears that mosquito larvae may be extremely sensitive to this heavy metal pollutant, and may be utilized as an indicator species.

1:15 009.012 G **Characterization of water quality and associated factors in natural and created wetlands of the Texas coast**, *Natasha Zarnstorff, University of Houston-Clear Lake; George J Guillen, University of Houston Clear Lake*
Environmental scientists have long recognized the fundamental difference in ambient water quality between open water systems and wetlands. Due to the differences of each system, federal and state

agencies are attempting to develop new specific water quality standards for wetlands. Saltwater wetlands provide a variety of ecosystem services, but little research has been published on water quality of these marshes. In addition to the lack of information that exists on saltmarsh water quality, there has been no critical studies looking at the differences in water quality between created and natural coastal marshes. This information is needed for developing criteria and evaluating the success of created saltmarsh wetlands. The results of our study document the range of water quality conditions and modifying factors in coastal wetlands in Texas. During our study we measured surface water quality of an open water site, a natural marsh, and a created marsh within three bays of the Galveston Bay system. Surface water quality was measured every other month with a YSI sonde and collection of grab samples. Automated water quality monitoring devices were also used to document dissolved oxygen, temperature, and conductivity for three days prior to water sample collection. Water quality trends and comparisons are presented for natural and created saltmarshes. Other physical and biological marsh characteristics were identified and compared with water quality data to identify potential factors influencing biological and water quality characteristics of these wetlands.

1:30 009.013 U **Insect diversity in areas impacted by the biological control of saltcedar (*Tamarix* spp.) in west texas**, *Jaimie Michelle Lawhorn, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

Saltcedar (*Tamarix* spp.) is an invasive species of tree in North America, native to Asia and the Mediterranean. First introduced in the early 19th century for erosion control, saltcedar has spread to dominate over 2 million acres in the United States and Mexico. Biocontrol began in 2001 with the introduction of the saltcedar leaf beetle in Utah, Colorado, Nevada, and Wyoming; this has led to the control of over 200,000 acres of affected land. Following this success, the saltcedar leaf beetle was released along the Rio Grande in Texas in 2008 where it has been having positive effects. This study served to compare the insect biodiversity of areas with controlled saltcedar populations versus areas still under mitigation for saltcedar. It is hypothesized that the control of saltcedar would increase overall insect biodiversity. From this, it was predicted that areas with controlled saltcedar populations would have an increased biodiversity, while the areas currently under management would still have reduced biodiversity due to the limited plant diversity. It was found that insect diversity was significantly increased in the controlled areas. Areas with controlled saltcedar populations exhibited greater species abundance, diversity, and evenness than those currently under management.

1:45 009.014 G **Small-scale distribution of mercury contamination in Zimbabwean streams: A comparison of three introductory pathways**, *Corey Scott Green, Sam Houston State University*

Artisanal small-scale mining (ASM) operations use mercury liberally in the gold extraction process as compared to industrial mines and accounts for one third of anthropogenic mercury consumption worldwide. These ASM operations are concentrated in many impoverished and poorly regulated countries such as Zimbabwe, resulting in many negative environmental and health impacts. There are three pathways by which mercury can enter the environment from gold mining: 1) private miners, 2) stamp mills (also used by ASM miners), and 3) industrial-scale mining operations. The relative impact from each type of mining operation in a single watershed is unknown. Sediment and tailing samples in a single, heavily mined, watershed in southern Zimbabwe were collected from May – June 2015. Samples were taken from 6 stamp mills in the watershed and a single industrial mine. GPS localities were taken of mining operations and sampling sites to allow for examination of the spatial pattern of mercury concentration relative to each mining operation. Sediment samples were analyzed using thermal decomposition, amalgamation, and atomic absorption spectrophotometry according to EPA method 7473. Initial results suggest a correlation between mining operations and mercury contamination within the associated water shed. Results from this study will elucidate the relationship between mercury production and the spatial scale of mercury concentration in aquatic ecosystems in Africa. A better understanding of the relationship between mercury use and community health can help both the local community and global community by alleviating the suffering and early death of many people in impoverished countries where ASM is commonplace.

2:00 009.015 G **The value of Beach Quality Using Hedonic Pricing Models in Galveston, Texas**, *Ashton Danielle Burgin, Texas A&M Galveston Campus*

The Hedonic pricing method will be employed to estimate the value of quality beaches, including certain factors such as beach width, presence of dunes, dune width, and proximity to a beach access

point. Using the residential housing prices on Galveston Island from 2000-2014, the structural characteristics of houses can be related to include the environmental goods nearby along with the quality of these environmental goods such as good quality beaches. Estimating the benefits associated with quality beaches, as revealed by homeowner's marginal willingness to pay, will be a useful resource for beach management and the development of optimal nourishment policy for Galveston beaches. The process of beach nourishment projects is likely to continue due to frequent storms, projected sea level rise and erosion rates impacting the quality of beaches found in the Galveston area. This thesis aims to fill the research gap concerning benefits of beaches and nourishment projects to the residential real estate market in Galveston. Through this process, the economic value of beaches can be measured as they are captured by the real estate market. The Hedonic pricing model, used in this case as an environmental valuation method, will be applied to experimentally estimate the benefits to homeowners derived from good quality beaches.

010. Freshwater Science Oral Session I
1:00 to 2:15 pm
Mockingbird House, 01
Freshwater Science
Freshwater Science Oral Session I
Participants:

1:00 010.016 U **Habitat Selection for type and complexity in a freshwater amphipod, San Marcos River, Texas**, *Ashley Cao, student; Raelynn Deaton Haynes, St. Edward's University*
Habitat selection directly influences an organism's fitness by providing food resources, mates, and refuge. We investigated habit selection in a freshwater amphipod (*Hyalella azteca*) in the San Marcos River, Texas. In two experiments, we first presented amphipods with differing habitat from the natural environment. Secondly, we varied structural complexity of the preferred habitat (algae) using addition of rocks. We hypothesized that amphipods would show preference for particular habitats and that that structural diversity will influence habitat preference. In the first experiment, we offered one amphipod (either male or female to test for sex differences in habitat choice) the choice between algae, vegetation, or a mix (with a no habitat control) in a small bin with spring water. Habitats were weighted to control for mass, and amphipods were size-matched within sexes to control for body size influences on habitat choice. Amphipod habitat location was recorded at time 0, 15 min, 30 min, 45 min, 1 hour, and 24 hours. We used repeated measures ANOVA with average number of amphipods per habitat across time as our response variable, and sex as our treatment. We also used Chi-square to determine if preferred habitats differ from random. To date, our results support that algae is the preferred habitat by both sexes (no sex difference, or sex by time interaction). Habitat choice, however, does vary by time, indicating that amphipods are exploring the habitats. We currently are in process of analyzing experiment 2 (habitat complexity) and those additional results will be reported here.

1:15 010.017 G **Hybridization between the invasive** *Cyprinodon variegatus* **and endemic** *C. rubrofluviatilis*, *Kristina Ayers, Stephen F. Austin State University; Jennifer M. Gumm, Stephen F. Austin University*
Invasive species threaten biodiversity and native species through hybridization. This is the case with pupfish species throughout Texas and the Southwest. We are investigating the extent of hybridization and genetic introgression between the invasive sheepshead minnow (*Cyprinodon variegatus*) and the Red River Pupfish (*Cyprinodon rubrofluviatilis*). Morphological characters have documented the presence of *C. variegatus* in the Brazos River and to identify possible hybrids. Based on patterns of morphological data collected between 2006 and 2012. the invasion of Sheepshead Minnow is advancing upstream at a rapid rate. This presents a serious threat to the remaining populations of *C. rubrofluviatilis*. We are using genetic analysis of microsatellites to confirm the presence of Sheepshead Minnow in the Brazos and Red Rivers. Preliminary genetic evidence suggests hybridization has occurred between these species. Analysis of samples collected from several locations between 2010 and 2015 allow us to track the progression of *C. variegatus* upstream and to determine the leading edge of the invasion. Resampling of specific locations also allows us to monitor the rate of introgression over the last five years. Understanding the extent to which hybridization and genetic introgression has occurred will help determine if conservation efforts are needed for *C. rubrofluviatilis*. Furthermore, genetic analysis will facilitate prompt conservation measures protecting *C. rubrofluviatilis*.

1:30 010.018 U **Species and sex differences in foraging competition between two between Gambusia congeners**, *Valencia Mobley, St. Edward's University*
A long-term study investigating potential for reproductive isolation, niche partitioning and hybridization between the endangered Gambusia nobilis and the introduced Gambusia geiseri has provided insight to understanding individual-level differences in behavior that can aid in the conservation of G. nobilis. Previous research from our lab suggests that female G. nobilis prefer to shoal with heterospecific groups, rather than with their own species. These preferences may exist as a means of reducing intraspecific competition, while encouraging interspecific foraging competition and niche partitioning. We test this hypothesis using two congeners from central Texas that occur sympatrically in some springs. We are interested in understanding the mechanisms used to reduce competition, and ultimately increasing individual fitness. This may also provide a means by which the endangered G. nobilis may persist, even when the invasive G. geiseri are present. To date, we have collected preliminary data of foraging competition between female G. affinis and G. geiseri in mixed vs. same-species shoals. Females of both species show higher levels of food aggression in intraspecific shoals. Overall, female of G. affinis show higher levels of food aggression than do G. geiseri. Further experiments are underway to increase sample size and implement males to test for a species by sex interaction on foraging competition. We plan to incorporate the endangered G. noblis into experiments, as they have been shown previously to show high levels of food aggression. This data will ultimately be used to better understand individual-level foraging competition as a means of potentially reducing competitive interactions.

1:45 010.019 U **The Habitat Selection of San Marcos River** ***Hyalella*** **under Different Competition Densities**, *Victoria Alford, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Habitat selection is an important factor for the individual survival and fitness, as habitat quality determines nutrient availability, developmental processes, and most importantly fitness. Many factors can influence habitat selection, including predation, resource availability, and competition. This experiment is one piece of a larger research question conducted by a group of Animal Behavior Lab students at St. Edward's University in Austin, Texas. Our overarching question focuses on the habitat preference and dispersal behaviors of amphipods in the San Marcos River, Texas (Genus Hyalella) under different environmental contexts. Preliminary data suggest that an aquatic alga is the preferred habitat choice for the amphiopds, followed by a mix of vegetation and algae. In this experiment, we focused on habitat selection of amphipods when faced with competition from other conspecifics. We sought to determine whether patterns of habitat selection change under different social contexts (competition). We tested 35 replicates with 5 focal individuals of each sex (individuals were size-matched) and allowed them to disperse in one of three habitat types: algae only, vegetation only, and algae and vegetation mixed (plus a no-habitat control) over a period of 24 hours (testing at time 0, 15min, 30min 45 min, 1 hour and 24 hours). We will use a two-way repeated measures ANOVA to determine if sex and/or habitat (or the interaction between the two) dictate distribution of the amphiopds when faced with competition for habitat resources with their conspecifics.

2:00 010.020 G **The genetics of the visual system of two species of pupfish (Genus** ***Cyprinodon*** **)**, *Chelsey Price, 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 behavior 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 were 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.

011. Science Education Oral Session I
1:00 to 2:30 pm
Lantana, 01
Science Education
Science Education Oral Session I
Participants:

1:00 011.021 U **Stimulating the Natural Curiosity of K-5 Children in the Sciences Through University Sponsored Community Outreach Programs**, *Tamika M. Stith, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*
It's important for all citizens to understand the rapidly evolving issues in science, enabling them to become more knowledgeable and make informed decisions with respect to the science in their lives. However, by the time students reach high school they have often developed a negative attitude towards STEM concepts. Fortunately, elementary-aged children are still eager to explore. Many public schools lack the resources to engage this age group in exciting science experiences. Families can overcome this problem through extra-curricular activities, but not all communities have interactive science museums. At UMHB, we convert our science building into a children's science museum once a year for Science Saturday. Hands-on, multi-sensory activities encourage participants to use high order thinking skills as they explore the unknown. The variety of activities offered ensures that almost all elementary-aged children, regardless of cognitive ability or science background, are engaged. Science Saturday is labor intensive, but provides an opportunity for collaboration between faculty and university students to create scientifically-sound stations with broad appeal. Our presentation will cover the logistics, challenges, and rewards of providing this community outreach program and hopefully inspire other universities to develop similar programs.

1:15 011.022 U **Build-A-Creature: A constructivist approach to teaching genetics in elementary schools**, *Kevin M. Chappell, Univ. of Mary Hardin Baylor; Kaleb K Heinrich, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*
Traditionally, biological sciences in elementary school focus on zoology and very basic Darwinian evolution. While this may have been adequate in past years, we are now entering an age where research in molecular biology is growing rapidly and is certain to play a large role in the future of all sciences. Most molecular and genetic ideas are considered too difficult for grades 1-5 to grasp, yet by combining these complicated ideas with fun games and activities, children can begin to understand more complicated biological ideas. We present an activity where various body parts are associated with homozygous alleles in the form of letters, and students are allowed to arrange their own unique creature using the body parts. Students are very receptive of the idea that there are multiple types of body parts that come from the same letter. With feedback and prompting, the activity can be fashioned so that ideas like dominance with heterozygous alleles and, even further, inheritance combined with Punnett squares can be taught in an efficient and simple manner. By exposing elementary students to more complicated molecular concepts earlier, we can actively construct knowledge that will be useful as students continue through high school and college, and most importantly, we hope to inspire and excite students about the ever-changing field of science.

1:30 011.023 U **One Fish, This Fish, Which Fish, That Fish!**, *Kimberly Hawkins, Univ. of Mary Hardin-Baylor; Cathleen N. Early, Univ. of Mary Hardin-Baylor*
Interactive play is an effective way to engage children in learning. The Lake Belton Fishing Hole activity uses this method to teach children about local aquatic species and encourage them to appreciate nature. While similar activities are in use at children's museums and nature centers, ours is unique in focusing on species of Bell County, Texas. Inexpensive, easily obtained items were used to create this activity, which targets elementary through middle school aged children. The fishing hole was stocked with realistic color images of fish and turtles. After each child caught one of the organisms, they were encouraged to compare it to gray-scale images to determine which species they had. Gray-scale images were used so that children would not simply match colors, but would look at shapes and patterns. Life history information was also provided with the gray-scale images so that the children and/or their parents could read more about the organism. This activity has been very popular the past 2 years at our annual Science Saturday event for elementary aged children. Next year we plan to add more species, including the invasive zebra mussel, and provide more fishing poles and a larger pond to reduce wait time in the line.

1:45 011.024 U **A Brief Introduction to LabVIEW**, *Richard Kuchenbecker, University of Houston*
A practical lab exercise was developed to provide undergraduate students in Advanced Physics Laboratory, at the University of Houston, with exposure to the LabVIEW programming environment. The experiment emphasizes programming logic, data acquisition, signal generation and control, and signal processing. The experiment is designed to allow students with little or no programming experience a fast 'crash course' in LabVIEW programming. The experiment is composed of modules which increase in complexity, and each requires a thorough understanding of topics covered in previous modules. The final module requires students to utilize all of the features covered in previous modules to perform a Fourier analysis of the ambient noise in the lab, so that they can develop a program to filter that noise for acoustic experiments.

2:00 011.025 U **Assessing the Importance of Green Energy Awareness in K-6 Education**, *Maria K Cardenas, Lamar University; Mamta Singh, Lamar University*
Very limited studies have been conducted in green energy and EC-6 teacher education area. Teacher education is the most effective way as it provides knowledge and skills to teachers to understand the complicated parameters related to subject area, e.g. renewable energy and to pass on to growing minds. "Only if teachers are knowledgeable and well disposed towards RES, the necessary knowledge and values can be properly incorporated into learning process, providing students with the appropriate capabilities to deal with the relevant issues into their everyday lives," (Liarakou, Gavrilakis, & Flouri, 2009, p. 121). Many students are not aware of what green energy is or how it is used in our planet. Therefore, the purpose of the present study was to educate pre-service teachers on renewable and green energy education and to assess pre-service teachers' knowledge and attitude towards renewable energy education. Green energy lesson plans, WebQuest, peer presentations, content knowledge pre-post tests were used during the study. The results indicated the preservice teachers showed positive attitude toward renewable energy education

2:15 011.026 G **Understanding Density**, *Michele Johnson Mann, University of Texas at Austin; Anthony Petrosino, University of Texas at Austin*
Density appears many times in the science standards. In elementary school, students need to compare relative density of matter and in sixth grade; students need to calculate the density of an unknown substance. To determine the understandings about density of pre-service elementary teachers, we gave five different classes the task of making a density column with unknown liquids. The pre-service teachers had to hypothesize the order of the liquids before they added each liquid to the column. If their hypothesis was incorrect the students would loose points on the lab. The students could use any equipment in the science lab. Several groups tested the liquids' viscosity by measuring how fast a drop would flow down a piece of paper. One group added a drop of each liquid to water and compared the relative density. Only five groups measured the mass and volume of each liquid and solving for density. When students were asked after the lab, "What was the formula for density?" most of the students were able to recite the formula. Some students responded that they did not know when to use the formula or did not think of the formula during the lab. This example shows the need of our future elementary teachers to have more inquiry experiences with the science concepts. It is important that the future teachers not only understand the concepts of the grade they will be teaching but also what their students will be expected to understand in future.

012. Systematics & Evolutionary Biology Oral Session I
1:00 to 2:30 pm
Juniper House, 01
Systematics & Evolutionary Biology
Systematics & Evolutionary Biology Oral Session I
Participants:

1:00 012.027 U **Are freshwater crustaceans ideal free or ideal despotic?**, *Jennifer Beal, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Ideal free distribution theory predicts that individuals target habitat patches with the highest fitness payoff and is a complex phenomenon that requires short and long term memory. Ideal despotic distribution, on the other hand, occurs when organisms are not competitively equal and therefore some individuals may not be free to distribute themselves according to patch quality. These theoretical models have been tested empirically in a variety of species but, to our knowledge, have not yet been explored in freshwater crustaceans. We used a freshwater amphipod (*Hyalella azteca*) from the San Marcos River, TX as our model system to explore whether crustaceans disperse

according to an ideal free or ideal despotic model. We varied patch quality based on the number of available mates (habitat quality otherwise controlled by vegetation type and mass) by tethering one, two or three amphipods of each sex and placing them into vegetation habitats. We then tested 10 focal individuals of the opposite sex, and allowed them 24 hours to settle in a habitat (*N*=16 replicates). After 24 hours, amphipod locations were recorded, and all individuals were preserved for measurements, as body size will be used as a covariate in statistical analyses. We also collected 16 vegetation samples from the San Marcos River and are currently in the process of sorting and counting amphipods and other macroinvertebrates (as potential competitors) to determine if amphipods in nature follow either the "free" or "despotic" models. Data from lab experiment and field samples will be compared and presented.

1:15 012.028 U **Behavioral correlates of male dominance in a coercive livebearing fish**, *Elizabeth B Conklin, St Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Livebearing fishes (family Poeciliidae) offer a unique model system for studies in sexual selection, as they show a wide range of male behaviors (courtship to coercion) that directly influence male reproductive success. More specifically, males of the genus *Gambusia* (mosquitofishes) exhibit coercion (also called sexual harassment) as their primary means of obtaining copulations, regardless of body size. These males often are aggressive when competing for females, and show behaviors and phenotypes that may be indicative of their rank in the group. Previous work in our lab has shown that male *Gambusia affinis* do form dominance hierarchies when placed with other males (in groups of three) and that the hierarchy is established very quickly after first encounters. Herein, we sought to determine whether certain behaviors (e.g. gonopodial lowering, displays, pigmentation) can predict status of males within their hierarchical groups. We are testing groups of 5 males over a period of 10 days. Preliminary data suggest that in groups of 5, males show all aforementioned behaviors after Day 1 that may indicate aggression. On Days 1, 5 and 10 males in groups are tested alone, and then with a female (20 minute trials). Number of aggressive behaviors and mating attempts toward females are quantified. Once all trials are complete, we will test relationships between dominance rank (determined by the number of successful matings toward a female) of each male, and then correlate his rank to aggressive behaviors.

1:30 012.029 U **Differentiating Bell County snail species by identifying species-specific or genus-specific genomic differences**, *Sarah Elizabeth Velo, University of Mary-Hardin Baylor; Kathleen Wood, University of Mary Hardin-Baylor*
In 2013, a survey was conducted on snail populations in 19 different locations of Bell County, Texas. The previous survey reported over 20 species, while the most recent survey identified only 15 different macro-snail species. Of the species found, some are more difficult to distinguish by morphological features and could be more easily identified using DNA sequence information. DNA extraction was done on multiple snail species using both frozen and ethanol-preserved tissue, the latter samples providing significantly poorer quality DNA templates for sequencing. The genes sequenced were fragments of the mitochondrial cytochrome C oxidase subunit I gene (COI) and the 16S mtDNA, as well as the entire 18S rDNA. nBLAST analysis showed sequence similarity with other gastropods, however, results at this time are preliminary as to their usefulness in distinguishing species.

1:45 012.030 U **Do all coercive livebearing male mosquitofish establish dominance hierarchies?**, *Rochelle Hajikhani, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*
Dominance hierarchies typically form in organisms that compete heavily for resources, territories, or mates and less so when social dynamics change rapidly. In livebearing fishes of the genus *Gambusia*, males are coercive and exhibit alternative matings strategies, where smaller males are "sneakier" and larger males are more coercive. Studies have shown dominance hierarchies in the related guppy (where female choice is a strong driver of sexual selection) but no studies to our knowledge have sought to understand whether purely coercive male species establish dominance hierarchies. Because mating interactions are very dynamic in this system, it was unknown if male mosquitofish establish clear dominance hierarchies. However, studies from our lab have shown that male *Gambusia affinis* do, in fact, establish dominance hierarchies and do so quickly after first interaction. However, not all mosquitofish are as aggressive and coercive as *G. affinis*. For example, males of the related large spring *Gambusia*, *G. geiseri*, exhibit fewer mating attempts toward females and fewer aggressive behaviors toward other males when tested in groups. Thus, we wanted to compare our data from *G. affinis* with its congener *G. geiseri* to determine whether the less aggressive male congeners also establish clear hierarchies. To do so, we tested groups of three males

over a period of 5 days, recording aggressive and mating behaviors on day 1 and again on day 5 (males were exposed to females for behavioral trials only). This study is currently in progress and completed results will be presented.

2:00 012.031 U **Do freshwater crustaceans make rational decisions in habitat selection?**, *Catherine Ann Maloney, St. Edward's University; Jennifer Beal, St. Edward's University; Haley Christians, St. Edward's University; Sana Rashid, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

Animal choice models predict individuals assign absolute values to alternative options and make rational decisions to maximize Darwinian fitness. Rational decision-making assumes two properties: (1) transitivity (if A > B, and B > C, then A > C); and (2) regularity (the value of an option does not increase or decrease with the addition of further options). Previous research has displayed the influence of the "decoy effect" in decreasing rationality in humans, túngara frogs, and hummingbirds. The "decoy effect" demonstrates a reversal in choice preference between two options (target, competitor) with the addition of a third, less desirable option (decoy). The target and competitor vary over two dimensions, with each option dominating one dimension. The decoy falls between the target and competitor on one dimension and below them on the other. Although previous studies have verified the capacity of invertebrates to make decisions and form state-dependent memories, rationality has yet to be tested in an invertebrate species. This study examines rational decision-making in an invertebrate amphipod species (genus *Hyalella*). Rational habitat selection is evaluated through the two dimensions of habitat size and habitat attractiveness. In the binary trials, amphipods are initially presented with the target habitat (high attractiveness, low volume) and the competitor habitat (low attractiveness, high volume). In the trinary trials, the decoy habitat is introduced (lowest attractiveness, medium volume). If amphipod preference remains constant throughout the binary and trinary trials, then rationality is maintained.

2:15 012.032 U **Effects of mate choice and competition on habitat selection in a freshwater amphipod**, *Sana Rashid, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

The objective of the study was to observe habitat selection and distribution of an amphipod (freshwater crustacean; *Hyalella*) in relation to both available mates and potential competitors. In amphipods, sexual selection is a strong driving force in terms of both male-male competition and female choice, as seen by sexual dimorphism and pre-copula mate guarding. Here, we were interested in determining whether these mechanisms of sexual selection influence habitat choice and distribution of individuals in patches. In our experiment, we presented one male or female amphipod with either available mates of the opposite sex or competitors of the same sex in controlled vegetation habitats. Mates and competitors were tethered to string and placed into habitats at differing densities (to keep them from moving in and out of habitats). We allowed each focal amphipod to settle and observed position of amphipods at time 0, 15 min, 30 min, 45 min, 1 hour, and again at 24 hours in a 2 x 2 crossed design. We used repeated measures ANOVA (amphipod distribution across time as repeated measure), with focal individual sex and tethered individuals as independent variables (N=9 replicates each for a total of 36 trails). Preliminary data suggests that amphipods do distribute themselves according to both habitat quality and available mates (increased patch quality). Further analyses are underway and will be reported.

013. Terrestrial Ecology & Management Oral Session I

1:00 to 2:30 pm

Hummingbird House, 01

Terrestrial Ecology and Management

Terrestrial Ecology & Management Oral Session I

Participants:

1:00 013.033 G **A Comparative Study of Diversity and Abundance of Mosquitoes at Two Sites in Lower Rio Grande Valley of Texas**, *Lopamudra Chakraborty, UTRGV; Christopher Vitek, University of Texas Rio Grande Valley*

With the increased spread of exotic mosquito-borne diseases worldwide, it is critical to assess the abundance, diversity and distribution of potential vectors. In regions where diseases are likely to be introduced, it is important to have a working knowledge of potential vectors found in the area. The objective was to study the spatial and temporal abundance and species composition of mosquito vectors in two different regions of South Texas - Estero Llano Grande State Park, located in Weslaco, Texas and the United States Department of Agriculture (USDA) Moore Air Base, in South

Texas. Trapping was conducted weekly (June – August of 2015) at each location, using ABC light traps baited with dry ice. Mosquitoes collected were identified to species, and relative differences in species composition and abundance were studied. Using Shannon-Wiener Diversity Index (H) and Shannon Equitability (EH), the species richness and species evenness at the two sites were calculated and compared. Rank abundance curves were also used to compare relative abundances at the two sites. It was found that Estero Llano Grande State Park has more species diversity and evenness. The relationships between species abundances and temperature/relative humidity were examined using correlations. Species abundance was found to be negatively correlated with temperature and positively correlated with relative humidity at both the sites. Knowledge gained from this study will help to investigate mosquito diversity and examine the appropriate ecological factors for successful control of vectors and diseases.

1:15 013.034 N **Biotic controls on carbon exchange processes in an encroaching savanna in central Texas**, *Ann Thijs, St. Edwards University; Marcy Litvak, The University of New Mexico*
Woody plant encroachment in grassland and savanna ecosystems is a global phenomenon. The change in biogeochemical characteristics of the ecosystem accompanying this shift in vegetation structure are manifold, and the net consequences for the carbon balance cannot be generalized over climate, soil or encroaching species. To come to a process-based understanding of the carbon dynamics in a Central Texas encroaching savanna, we analyzed patterns of carbon exchange during three years of contrasting water availability. We hypothesized that the overall imbalance between carbon uptake and release (photosynthesis and respiration) was due primarily to the increased photosynthetic uptake of encroaching woody species. We scaled species-specific models of photosynthesis, to estimate contributions of two encroaching tree species, as well as the dominant C4 grassland species, to ecosystem level gross primary productivity (tower-based GPP). We also scaled cover-specific models of soil respiration to estimate tree/grass contributions of soil respiration to ecosystem respiration (tower-based Reco). We further made direct comparisons of chamber-based soil respiration and grassland NEE to tower-based instantaneous ecosystem respiration (Reco) and net ecosystem exchange (NEE). We found that woody encroachment acts as an important carbon sink primarily by increasing the carbon inputs in the ecosystem. Woody encroachment also reduces the sensitivity of GPP to climatic drivers. These two effects constitute a direct effect, as well as a negative feedback to the coupled carbon-climate system.

1:30 013.035 N **Community Ecology of Flower Visitors of Tecoma stans in the Coastal Bend**, *Richard Patrock, TAMUK; John Reilley, E. "Kika" de la Garza PMC, USDA Kingsville*
Esperanza, or Tecoma stans is a west Texas native plant that is widely planted for its showy flowers around the world. Still, it is only a relatively new ornamental in other ecoregions of Texas such the Gulf Coast and little is known of how local herbivorous fauna respond to this new potential plant resource. We followed the dynamics of flower visitation on Tecoma by insects and other organisms relative to other native and exotic ornamentals at five field sites in Kleberg County from 2013 to the present. Insect visitors were all generalists, as might be expected from the plant's biogeographical history and accounts from other continents where this plant is grown. No efficient pollinator was noted and the prevalence of explicit nectar robbing was identified for most of these generalist visitors. Individual honey bees were classified into two distinct behavioral classes with respect to how they handled the corolla. We discuss our behavioral observations of these classes and the other insect visitors with respect to the plant's beneficial role as plantings relative to other species.

1:45 013.036 G **Influence of Daily Temperature Range of Soil on Microbial Dynamics in Dryland Agriculture**, *Diana Vargas-Gutierrez, Texas Te4ch University; John Zak, Texas Tech University*
What role does soil temperature dynamics play in ecosystem resilience and sustainability under increasing climate variability? What aspects of soil temperature can be modified to maintain soil health and sustainability for agricultural systems? Daily temperature range of soil (DTRsoil) has been shown to influence soil microbial and nutrient dynamics in arid ecosystems at Big Bend National Park. What role does DTRsoil have in controlling agricultural system productivity and response to precipitation? By manipulating DTRsoil in a dry-land cotton production system in west Texas, we have examined soil microbial and nutrient responses along with crop productivity. Over two growing seasons we reduced DTRsoil through use of erosion control blankets and stubble application and monitored responses. During the growing season as DTRsoil increased in the control plots, microbial activity decreased but increased in the reduced DTRsoil plots. A reduction in DTRsoil changed bacterial community composition and increased fungal biomass. Soil nitrogen dynamics were also changed with a reduction in DTRsoil. Finally, yields were increased with a

reduction in DTRsoil without any change in soil moisture.

2:00 013.037 N **Unraveling the natural history of the enigmatic Spot-tailed Earless Lizard (*Holbrookia lacerata*) through research and cooperation**, *Travis J LaDuc, University of Texas at Austin; Brad Wolaver, The University of Texas at Austin; Ben Labay, The University of Texas at Austin; Jon Paul Pierre, The University of Texas at Austin; Mike Duran, The Nature Conservancy; Toby Hibbitts, Texas A&M University; Wade Ryberg, Texas A&M University*
Little natural history data exists for the wary and infrequently seen Spot-tailed Earless Lizard (*Holbrookia lacerata*), listed as a species of greatest conservation need (SCGN) by the state of Texas. In 2011, the US Fish and Wildlife Service (FWS) found substantial information that listing this species may be warranted. In 2013, the Texas Legislature earmarked money for research studies, through a program in the office of the Texas Comptroller of Public Accounts (TCPA), on species awaiting FWS listing determination. A group from UT-Austin and The Nature Conservancy were awarded one of the first grants under this new program to work on *Holbrookia lacerata*. Work initiated in 2014 focused on lizard surveys and creating models of lizard habitat and fragmentation of habitat. Because of the potential impacts of a future FWS listing of the lizard species, a species working group composed of stakeholders was organized by the TCPA to provide a direct line of communication between researchers and stakeholders. Following discussions within this group, additional data gaps were identified and approved for additional research funding. Collaborators from Texas A&M University have joined the group to expand field surveys and initiate genetic work. Additional studies on lizard diet and morphology as well as models projecting future habitat/development have been initiated. An invitation from the FWS to the research group to lead the compilation of the Species Status Assessment for *Holbrookia lacerata* represents a significant step towards transparency and a paradigm shift in the FWS listing process.

2:15 013.038 U **Winter habitat use of Longspurs (*Calcarius* spp.) in Hale and Floyd County, Texas**, *Lauryn Bruggink, Wayland Baptist University; Andrew C. Kasner, Wayland Baptist University*
Longspur species (*Calcarius* spp.) populations are declining from habitat loss, however, there is no current literature on this species wintering habitat. Understanding their wintering habitat use would benefit conservation efforts for this species. Roadside point count surveys were conducted from December 2014-March 2015 and November 2015-February 2016, to sample the presence of longspur species in both Hale and Floyd counties in the Southern High Plains of Texas and identify habitat associations. In the first season a total of 257 Longspurs were counted, including 201 McCown's Longspurs, 38 Chestnut-collared Longspurs and 18 Lapland Longspurs. The Chestnut-collared Longspurs and Lapland Longspurs were present in the beginning of the season while the McCown's Longspurs were present towards the end of the season. This occupancy study so far has shown that sites with at least one non-crop field have higher occupancy of longspurs than sites having only crop fields surrounding them. As well, occupancy of individual longspur species is related to the time of year. Finally, there does not appear to be any correlation between longspur occupancy and presence of other bird species recorded.

014. Neuroscience Oral Session and Business Meeting
1:45 to 2:30 pm
Academic Building, 112
Neuroscience
Neuroscience Oral Session and Business Meeting
Participants:

1:45 014.039 U **Evaluating the Quality of Life and Functional Outcomes of Patients with Diffuse Axonal Injury Post TBI**, *Jonathan Siktberg, Baylor 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 evaluated 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.

2:00 014.040 U **Salt addiction is mediated by encephalic vasopressin**, *Jake Augustus Brozek, Wayland*

Baptist University; Mayra Herrera-Gonzales, Wayland Baptist University; Janlyn Jerome, Wayland Baptist University; Chanda J. Smith, Wayland Baptist University; Phillips Whitney, Wayland Baptist University; Sharon Robinson, Wayland Baptist University; Daniela Pereira-Derderian, Wayland Baptist University

Repeated cycles of water deprivation–partial rehydration (WD-PR) induce body-fluid-associated behavioral changes, like sodium intake enhancement. Salt addiction is a behavioral adaptation to repeated sodium deficiency, unrelated to fluid-electrolyte imbalances, and thus, may be due to neuroplastic actions of the natural salt reward. Enhanced vasopressin (Avp) transcripts were found in the hypothalamus of salt addicted animals. This study investigated the effects of intracerebroventricular injection of Avp receptor type-1a/1b/2 antagonists (AAVPR) on WD-PR-induced salt intake sensitization. Twenty male Sprague-Dawley rats had access to chow, water, and 1.8% NaCl. Daily intake was recorded for three weeks. Guide cannulas were stereotaxically placed into the lateral ventricles and after five postsurgical days, animals underwent two WD-PR cycles at 1-week interval. During the cycles, AAVPR administration was performed after 12h of WD and 1h before sodium appetite test (SAT). β-mercapto- β, β-cyclopentamethyleneproprionyl O-Et-Tyr2, Val4, Arg8-Vassopressin (100 ng/3μl saline) for type-1a/2 and SSR149415 Nelivaptan (100 ng/μl DMSO) for type-1b. Deprived control animals did not receive any drug treatment. AAVPR treatment abolished daily sodium intake enhancement (2.9±0.7, 6.23±1.7, 4.7±1.9+ ml/week, respectively; +p<0.05 vs. control) compared to control (4.1±0.5, 11.0±2.0*, 14.6±3.6* ml, *p<0.05 vs 1st week). AAVPR treatment blunted sodium appetite enhancement (4.1±1.2+; 5.6±0.6+ ml/SAT, respectively) compared to control (7.0±0.8; 10.0±0.1 ml, #p<0.05 vs 1st SAT). AAVPR treatment prevented daily chow intake enhancement (24.3±1.0, 23.3±2.5+, 22.7±0.9+ g/week, respectively) compared to control (22.2±1.1, 26.8±0.8*, 29.5±1.0* g). Our results suggest that encephalic vasopressin may be enrolled in the reward-mediated salt seeking behavior induced by repetitions of the WD-PR cycle.

015. Cell & Molecular Biology Oral Session I

3:00 to 4:00 pm

Academic Building, 112

Cell and Molecular Biology

Cell & Molecular Biology Oral Session I

Participants:

3:00 015.041 U **Characterization of the roles of PP2A regulatory subunits B56α and B56δ/γ in the non-canonical Wnt/PCP pathway in** *Xenopus laevis***.**, *Cody Austin Brannan, Sam Houston State University; Joni Seeling, Sam Houston State University*

The Wnt pathway, a key regulator of cell-cell signaling during development and tumorigenesis, divides into two branches, the canonical (β-catenin) and non-canonical (PCP) pathway. The Wnt/PCP pathway regulates convergent extension movements of tissues during development. Protein phosphatase 2A (PP2A), which consists of regulatory B, scaffolding A, and catalytic C subunits, plays multiple roles in Wnt signaling through its B subunits. The B56 gene family of B subunits consists of five genes in vertebrates. B56α and B56δ/γ negatively regulate the Wnt β-catenin pathway by reducing β-catenin abundance. Whole embryo data suggest that B56α and B56δ/γ also regulate Wnt/PCP signaling, as reducing B56α or B56δ/γ expression results in embryos with short body axes and bent-back phenotypes. Morpholino oligonucleotides will be used to knockdown, while RNA injections will be used to overexpress, B56α and B56δ/γ in animal cap and dorsal marginal zone explants to confirm their exogenous and endogenous role, respectively, in Wnt/PCP signaling. Then, examining when these isoforms play a role in convergent extension movements via epistasis experiments will be done to aid our understanding of their roles in Wnt/PCP signaling. In these epistasis experiments, mutated versions of Wnt signaling proteins will be used to induce defects in convergent extension movements in explants. In this way, the point of action of B56α and B56δ/γ in the Wnt pathway can be identified. Knowledge of the point of action of B56α and B56δ/γ in Wnt/PCP signaling will aid in the future design of potential cancer therapeutics.

3:15 015.042 U **RNA-seq analysis of phosphate-stressed** *C. reinhardtii* **cells**, *Isavannah Reyes, St Edwards University; Charles Hauser, St Edwards University*

In algal cells, phosphorous (P) is an essential element, as well as a major component of nucleic acids and phospholipids. Phosphorous limitation is known to trigger a suite of “starvation responses” in most organisms and understanding how algal cells respond to phosphate stress in terms of gene

expression and pathway responses could provide insight into other nutrient stress responses. In this project, gene expression in both wild type and phosphate starvation response (psr1) mutant cells grown in the presence or absence of phosphate were analyzed to identify the pathways affected by phosphate stress. In particular, this project attempted to determine if there was a connection between phosphate deprivation and up- regulation of genes from sulfur response pathways in both wild type and mutant cells. Mapping of the RNA-Seq reads back to the reference genome (Tophat2) indicated the RNAs were partially degraded, potentially resulting in mis-identification of differentially expressed genes (DE). In this work, DESeq2 was used to estimate DE genes using the original data, and employing 3' tag counting (3TC) methodology, which accounts for degradation by trimming gene models from their 5' end. It is expected that application of these methods will result in a more accurate representation of DEGs, and the number of false positives will decrease. Preliminary results suggest that degradation was visually reduced, but the number of differentially expressed genes (DEGs) did not significantly change with the use of 3TC.

3:30 015.043 U **The effects of social interaction and salt addiction on renal gene expression in rats.**, *Catherine Elizabeth Wiechmann, Wayland Baptist University; Mayra Herrera-Gonzales, Wayland Baptist University; Jake Augustus Brozek, Wayland Baptist University; Ashley DTB Rivera, Wayland Baptist University; Trevor Burrow, Texas Tech Health Sciences Center; Katie Bennett, Texas Tech Health Sciences Center; Ericka Hendrix, Texas Tech Health Sciences Center; Daniela Pereira-Derderian, Wayland Baptist University*

Social interaction between rats positively drives reward behavior. Salt intake enhancement is a behavioral sensitization due to repeated sodium deficiency adaptation, like water deprivation–partial rehydration (WD-PR). Individually-housed (IH) rats develop salt addiction when exposed to repeated WD-PR cycles, whereas group-housed (GH) rats do not develop a dependency on salt. However, a ceiling effect of high salt intake is seen in GH animals. This study investigated if social interaction and WD-PR-induced salt dependency would have an effect on renal transcripts that regulate renal sodium balance. Forty adult male Sprague-Dawley rats had access to chow, water, and 1.8% NaCl solution. The kidneys were harvested from IH (one animal/cage) and GH (five animals/cage) that underwent either zero WD-PR (IH non-dep or GH non-dep) or three (IH dep or GH dep) cycles at 1-week intervals. The kidneys were homogenized, RNA extracted, cDNA synthesized, and quantitative real time-polymerase chain reaction was performed for vasopressin (Avp), non-voltage-gated sodium channel 1-b subunit (Scnn1β), and Avp receptor type-2 (Avpr2). Similar β-actin-relative mRNA expression from IH non-dep, IH dep, GH non-dep, and GH dep for Avp (1.0±0.5, 1.5±0.8, 1.0±0.5, 0.3±0.2, respectively), Scnn1β (1.0±0.5, 1.3±0.7, 1.3±0.8, 0.4±0.2), and Avpr2 (1.0±0.5, 1.0±0.4, 1.4±0.7, 0.5±0.3) was observed. Thus, renal Avp, Avp receptor type-2, and non-voltage-gated sodium channel 1-β subunit were not influenced by reward-seeking salt dependency amongst housing conditions. These results lead us to further investigate other transcripts (Scnn1α, Scnn1g, Avpr1a, Avpr1b, Aqp2, Nedd4l, Drd1, Drd2, and Drd5) that could be affecting sodium regulation in the kidneys.

3:45 015.044 U **Transcriptional Regulation of the ICE R391 RumA'$_2$/B DNA Polymerase V by SetRR391,** *Kylie Borden, Southwestern University; Audrey Garcia, Southwestern University; Roger Woodgate, National Institute of Child Health and Human Development, NIH; Martin Gonzalez, Southwestern University*

The integrating conjugative element (ICE) R391 codes for the error-prone DNA polymerase V homolog, RumA'$_2$B. DNA polV homologs have been shown to factor in cellular levels of spontaneous and DNA damage-induced mutagenesis. Bacteria harboring R391 must be able to regulate mutagenesis in order to avoid needless and lethal mutations. We utilized spontaneous mutagenesis assays and western blot analysis to characterize an R391encoded putative repressor of the *rumAB* operon. This putative repressor, designated SetR^{R391}, is a known homolog of the λcI repressor. *Escherichia coli* expressing SetR^{R391} demonstrated a reduced level of RumA'$_2$B–mediated spontaneous mutagenesis relative to *E. coli* cells lacking SetR^{R391}. In addition, SetR^{R391}-mediated repression was shown to be specific for the *rumAB* operon, while not for the operons of the DNA pol V homologs *mucAB* or *umuDC* . Similar to the λcI repressor, in vitro studies with putative SetR^{R391} show that under alkaline conditions, as well as in the presence of activated RecA, SetR^{R391} will undergo autocleavage. To further validate this finding, we created a non-cleavable mutant version of SetR^{R391}. Mutagenesis assays in an activated RecA strain demonstrated nearly equal levels of RumA'$_2$B-mediated spontaneous mutagenesis in *E. coli* with and without SetR, while cells expressing the non-cleavable version of SetR demonstrated reduced levels of mutagenesis. ICE

R391 carries genes that confer resistance to kanamycin, so understanding the regulation of the RumA'$_2$B-mediated mutagenic activity is essential to minimizing mutation-induced resistance to other antibiotics.

016. Chemistry & Biochemistry Oral Session II
3:00 to 4:00 pm
Bluebonnet House, 01
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session II
Participants:

3:00 016.045 U **Metal analysis of the mineral springs of Lampasas Texas**, *Megan E. Jenkins, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*
In and around Lampasas Texas there are several mineral springs that smell strongly of rotten eggs indicating that sulfur is present. In addition, there is sulfur eating bacteria growing in these springs. There is no obvious reason for the presence of sulfur as the geology of the Lampasas area is a predominantly karst environment. Many water samples from these various springs were taken and analyzed for metal content as it is hypothesized that metal sulfides at the origins of the springs, such as galena and chalcopyrite, are responsible for the presence of sulfur. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) was used to analyze these water samples. While it was hypothesized that high lead levels would be found in the water, none has been found and there are high levels of iron (not surprising) and zinc (very surprising).

3:15 016.046 U **Synthesis of Small Molecules for Exploitation of Collateral Sensitivity in Multidrug Resistant Cancer**, *luke kotin, Texas Lutheran University; Amairanys Rodriguez-Delgado, Texas Lutheran University*
Currently, multi drug resistant cancer is one of the greatest obstacles to improving cancer prognosis. One method for solving this problem involves exploiting vulnerabilities in these cancer cells using small molecules. This allows for the selective targeting of multidrug resistant cancer cells. Among a library of small molecules, isatin-β-thiosemicarbazones have demonstrated to exhibit this sort of selectivity for cells which over express MDR1-selectivty. To this end, synthesis of novel isatin molecules for incorporation into isatin-β-thiosemicarbazones was carried out. Several proposed synthesis ideas failed. However, 4-hydroxyisatin was potentially synthesized by cyclizing 4-hydroxyacetanilide. In addition, isatin derivatives were also synthesized using 3-chloro-phenylisothiocyanates and several commercially available isatins. The compounds were generated and analyzed by IR and NMR.

3:30 016.047 U **Synthesis of isatin-β-thiosemicarbazones for Exploitation of Collateral Sensitivity in Multidrug Resistant Cancer**, *luke kotin, Texas Lutheran University*
Currently, multidrug resistant cancer is one of the greatest obstacles to improving cancer prognosis. Many such cases involve a cellular efflux pump called P Glycoprotein that is associated with MDR1 gene expression. P Glycoprotein acts to remove chemotherapeutic agents from the intracellular environment and prevent their action. One method for solving this problem involves exploiting vulnerabilities in these cancer cells using small molecules. This allows for the selective targeting of multidrug-resistant cancer cells. Among a library of small molecules, isatin-β-thiosemicarbazones have demonstrated to exhibit this sort of selectivity for cells that overexpress MDR1. Continuing work with these molecules endeavors to modify different components to test for increased MDR1-selectivity. To this end, synthesis of novel isatin molecules for incorporation into isatin-β-thiosemicarbazones was carried out. Several proposed synthesis plans were unsuccessful. However, 4-hydroxyisatin was potentially synthesized by cyclizing 4-hydroxyacetanilide. The reaction went quite smoothly. Of the five samples collected, the yields were 0.130 g, 0.161 g, 0.180 g, 0.5 g, and approx. 0.15 g. The melting points were 100-120° C, 80-90° C, >160° C, 165-175° C, and sample 5 was unknown(wet)

3:45 016.048 U **The Synthesis of Fatty Acid Furfuryl Ester Mixtures**, *Amanda L. Raley, Stephen F. Austin State University; Russell J. Franks, Stephen F. Austin State University*
Fatty acid furfuryl ester (FAFurE) mixtures have been synthesized using base-catalyzed transesterification. Furfuryl alcohol is a by-product of sugar refining, however, its use as the alcohol component of biodiesel synthesis remains unexplored. Traditional acid-catalyzed transesterification methodology cannot be used with furfuryl alcohol as it induces rapid polymerization. Furfuryl alcohol is also unstable toward concentrated bases, so a milder base must

be used. Potassium carbonate has been used successfully to effect transesterification of furfuryl alcohol and triglycerides. The reaction has been performed using conventional heating as well as microwave heating. The reaction product mixtures have been characterized using 1H-NMR spectroscopy.

017. Computer Science Oral Session and Business Meeting
3:00 to 3:30 pm
Academic Building, 113
Computer Science
Computer Science Oral Session and Business Meeting
Participants:

3:00 017.049 U **Experimental Framework for a Campus Security Purposed Unmanned Aerial Vehicle**, *Callen Ann McCauley, Schreiner University; Brian P. Bernard, Schreiner University*
Safety callboxes on college campuses often provide poor area visibility to campus security responders due to their fixed orientation or limited range of motion. Some stations do not have cameras at all. We present hardware and software framework for a security purposed unmanned aerial vehicle (UAV) to significantly improve sightlines around callboxes for campus security officers. UAV's have become increasingly common in disaster relief efforts to scout areas that may not be safe for human inspection and in surveillance applications to allow commercial and military users to inexpensively monitor wide areas. Our experimental system uses a single quadcopter stored at a central location, which then acts as an automated quick-response system by flying to the location of any callbox that is activated. It then enters standby mode where it provides a live overhead video feed to allow security personnel a wider view of the surrounding area, which is especially valuable for victims who must leave the callbox to evade a pursuer or when the emergency is otherwise out of the callbox's immediate sightline. During this phase, the security officer on their way to the scene is able to remotely control the drone from a mobile device, in order to maintain constant visual contact with a moving victim (or suspect). This presentation will cover the hardware and software used in this proof of concept demonstration, as well as provide future directions of how the framework could be scaled up for final implementation.

018. Conservation Ecology Oral Session I
3:00 to 4:00 pm
Academic Building, 111
Conservation Ecology
Conservation Ecology Oral Session I
Participants:

3:00 018.050 U **A comparison of the impact of biometeorology on the scent-marking behavior of Red wolves (***Canis rufus*) and Grey wolves (Canis lupus**)**, *Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*
Biometeorology, the study of environments' impact on living organisms, assists field biologists in identifying how abiotic conditions affect animal behavior. Multiple studies focusing on conditions such as activity level during the time of day have been conducted on Grey wolves (*Canis lupus*), and a previous study has been conducted analyzing their impact on the endangered Red wolves (*Canis rufus*). Environmental conditions such as time of day, temperature, lunar phase, and barometric pressure impact both animal behavior and the chemosensory signals used by animals to communicate with one another. These environmental conditions can modify chemical messages left by animals and potentially alter their behavior. Abiotic conditions in both the presence and absence of chemicals previously identified to initiate scent-marking behavior in canids were analyzed to determine the impact on wolf behavior. We used time of day, lunar phase, temperature, and barometric pressure as environmental variables to determine optimal conditions for scent-marking behaviors in Red wolves and Grey wolves individually and comparatively. Results reveal a number of overlaps in preferred scent-marking conditions between the two species to include: times from 10am-3pm, the waxing gibbous and full moon lunar phases, from 70-79°F, and 30.20-30.39Hg barometric pressure range. Understanding biometeorological factors' impact in correlation with scent-marking behavior of Red wolves and Grey wolves can provide key knowledge in identifying their effect on canid behavior.

3:15 018.051 G **Foraging Patterns and Population Density of the Buff-Bellied Hummingbird (***Amazilia yucatanensis***)**, *Megan Izabella Villarreal, University of Texas Rio Grande Valley;*

Timothy Brush, University of Texas Rio Grande Valley
The Buff-Bellied Hummingbird (*Amazilia yucatanensis*) is considered to be one of the least studied species in the United States. The purpose of this investigation is to examine the foraging patterns and population density of the *A. yucatanensis*. The information obtained will be useful in designing or improving existing conservation areas and benefit other migratory hummingbird species. The hypothesis of the study purposes that individuals use flowers displaying traditional bird-pollination characteristics: red coloration, tubular corolla, and extended anthers. The study was conducted at five sites located within Hidalgo County, TX ranging from 2.4 to 20 hectares in size. The general environment consisted of sub-tropical thorn forest and open woodland. Observation sessions noted the type and frequency of the flowering species utilized for nectar, their characteristics, as well as the number of individuals seen in each area. A one-way ANOVA test was conducted with four categories: reddish coloration, tubular corolla shape, extended anthers, and none (not containing the previous characteristics). Significance was found between the variables: f-ratio 5.45 exceeded p-value (0.05) 3.24. The average population density per hectare was measured using an incomplete count formula: P=AZ/XY. Results showed a rise from May-June (0.044) to a peak during the July-September (0.057), then a decrease during October-November (0.042). This supports observations of partial migration during winter. The preliminary information gathered supports the initial hypothesis. However, further study is needed to determine if the observed patterns occur in other possible locations within the Lower Rio Grande Valley and throughout the rest of the year.

3:30 018.052 U **Reproduction of the Georgetown Salamander (***Eurycea naufragia***)**, *Samuel T. Guess, Southwestern University; Benjamin A. Pierce, Southwestern University*
The Georgetown salamander, *Eurycea naufragia*, is a spring and cave dwelling neotenic salamander endemic to the San Gabriel watershed of Williamson County, Texas. Using monthly surveys of salamanders at two sites over five years, we examined the reproductive biology of these animals. We found individuals with eggs (gravid salamanders) from October to April at each of our sites during all five years of the study. The percent of gravid salamanders peaked within the winter period of the reproductive season, from October to December, and peaked again within the spring period, from January to April, in each year of the study. We found no significant difference between size or body condition of salamanders reproducing in the winter period and salamanders reproducing in the spring period. We have evidence that some gravid individuals are producing two egg clutches within a single reproductive season. Information about reproduction provides insight into the life history of the Georgetown salamander and improves conservation planning for this federally protected species.

3:45 018.053 U **Seagrass-associated fish biodiversity in a hypersaline bay: Laguna Madre, Texas**, *Somerley J Swarm, St. Edward's University; Raelynn Deaton Haynes, 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, especially fishes. Thus, assessing biodiversity (species richness and number) in relation to seagrasses is vital to our understanding of the health of these ecosystems, and an important first step in establishing potential critical habitat for some species. Herein, we assessed fish and seagrass biodiversity in a rare hypersaline bay, Laguna Madre, South Padre Island Texas. We delineated 9 subplots within a large seagrass area and used random sampling to quantify fish and seagrass abundance. We collected seagrass abundance using 3'x3' grids and percent coverage (9 random samples within each subplot). We also assess seagrass presence within each seine haul made while collecting fishes. We used three seines of varying length in tandem to exhaustively collect fishes in each subplot, and ID's fishes in the field (keeping one voucher per species for later ID verification) to minimize mortality and negative influences on the seagrass ecosystems. We currently are in the process of analyzing our data set and results will be reported. We will use multiple regression and MANOVA to determine which seagrasses are associated with fish biodiversity.

019. Marine Science Oral Session I
3:00 to 4:30 pm
Mockingbird House, 01
Marine Science
Marine Science Oral Session I
Participants:

3:00 019.054 G **EVALUATION OF *PRYMNESIUM PARVUM* FATTY ACID AMIDE**

ACCUMULATION AND THEIR CONTRIBUTION TO FISH MORTALIITY EVENTS, *Sean O'Mara, Texas A&M University - Corpus Christi; I-Shuo Huang, Texas A&M University-Corpus Christi; Danielle Gutierrez, Vanderbilt University; Greg Southard, TPWD Inland Fisheries – Analytical Services; Paul Zimba, Texas A&M University - Corpus Christi*

Prymnesium parvum is a globally distributed HAB species that has contributed to the loss of over 30 million fish and $10 million USD in Texas since 1985. Previous attempts to determine the factors that influence *P. parvum* growth and toxin production found poor co-relationships, possibly due to the incomplete identification of P. parvum toxic metabolites. Field samples from Texas were used to determine the relationship between *P. parvum* cell density, fatty acid amide (FAA) concentration, and ichthyotoxicity units (ITU). Multiple strains of *P. parvum* were used to assess growth rate, photosynthetic efficiency, chlorophyll a (chl a) concentration, and FAA concentration as a function of nitrogen and phosphorus availability. FAA were present in Texas field samples and cultured isolates, and highly correlated ($R2=0.66$, $p<0.001$) with *P. parvum* cell density. While initially nutrient availability appeared to effect FAA concentrations, further analysis yielded little to no effect on the growth, photosynthetic efficiency, and FAA concentration of P. parvum ($p>0.05$). Chl a content of nutrient limited cultures was significantly higher than control cultures after two weeks of growth. This suggests that after blooms deplete nutrients, *P. parvum* growth and photosynthesis may not significantly decrease. Increased FAA concentration from continued *P. parvum* growth would provide a major advantage over other competitors and grazers. Further analysis of nutrient effects on *P. parvum* toxin concentration is underway using methods to screen for prymnesins, another potential toxin produced by this harmful alga.

3:15 019.055 U **Effect of oviposition site on habitat selection in two species of gobies in the Texas Gulf Coast**, *Clint 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, female 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-cite preference. The naked goby (*Gobiosoma bosci*) 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. Current studies observing the effect of increasing complexity (by adding a landmark) have indicated both males and females of both species prefer the more complex habitat. This study will be the first to document interaction between fertile *G. bosci* and *C. boleosoma* females and varying levels of habitat complexity.

3:30 019.056 G **Factors of the Sargassum Migratory Loop System; Determining the Influential Dynamics Primarily Responsible for the Anomalous 2014, 2015 Sargassum Seasons**, *Brandon Nicholas Hill, Texas A&M University at Galveston; Thomas Linton, Texas A&M University at Galveston*

The research question to be addressed within this paper is which of the variables within the Sargassum Migratory Loop led to the swinging extremes of the 2014 and 2015 Sargassum Seasons. In 2014 the Gulf of Mexico experienced the largest landing of Sargassum in recorded history. In the Caribbean Sea the nations there have become inundated in the largest landing that can be remembered for their area. The hypothesis held by SEAS is that it was a combination of the flooding of the Amazon River Basin, the irregular and erratic fluctuation of the Azores High Pressure System that occurred in these two years resulting in shifting oceanic currents, and the cold fronts that passed over south-western gulf coast.

3:45 019.057 U **Fish Bite Prevalence of Yellow-band Disease on** ***Montastraea and Orbicella*** **complexes in Roatan, Honduras**, *Kara L Schmidt, McLennan Community College*

Yellow-band Disease (YBD), is a widespread coral disease primarily attacking the zooxanthellae of the Montastraea and Orbicella complexes. The causative agent for YBD is still unknown; however,

various bacteria and viruses have been implicated. Increasing water temperatures, tourism, fish predation, variations in coral growth, and opportunistic pathogens are all contributing factors to coral disease and reef decline. Corallivorous fish may transmit the pathogen or increase coral susceptibility to infection due to bite wounds as they represent a biotic stressor. This study has assessed the relationship between fish bite and disease area as well as coral status frequencies affected by YBD. Research was conducted yearly between May 2013 and 2015. Area measurements were taken by using a 0.5x0.5 meter quadrat. Orbicella annularis had greater area of fish bites in relation to other evaluated star coral species. In relation to star corals species, O. annularis and O. faveolata were found to be the most affected by YBD. Recently, 2015 data shows that 70 percent of the Montastraea and Orbicella complexes in Roatán, Honduras are affected by disease. Variability in average fish bite area is high among dive sites and years; however, average YBD area shows low variability among dive sites. These data suggest coral disease area is not directly correlated to fish bite area; however, differences in fish feeding behaviors may still play a role in transmission of YBD. Future research should compare species diversity of reef fishes with diseased coral species at different geographical locations to identify potential vectors of disease.

4:00 019.058 U **Fish bite prevalence on three coral species with dark spot syndrome in Roatan, Honduras**, *Mariana Juarez, McLennan Community College; Erin Castillo, McLennan Community College*

Dark Spot Syndrome (DSS) is prevalent on corals in the Caribbean; however, no studies of DSS have been conducted in Roatan, Honduras. Goreau suggested that fish bites could provide an entryway for pathogens that are carried through water currents or fish fecal matter and may be contributing to transmission of DSS. This study was conducted to determine number of fish bites and total area of coral tissue affected with Dark Spot Syndrome on three coral species: Siderastrea siderea, S. radians, and Stephanocoenia intersepta in Roatan Honduras.Surveys were conducted at five dive sites within the Sandy Bay Marine Park from May 18-22, 2015. Each site was visited twice, on different days, with a bottom time of 45 minutes. The Randell-Robertson Marine Survey Technique was used, starting at the deepest depth of the coral species range (10.5 - 14m) and ended at the shallowest depth (3- 4.5m). For each coral species observed, these data were collected: frequency, volume, and disease status. There was no correlation between fish bites and DSS. A significantly higher percentage of DSS was recorded at Barry's Reef and Bear's Den, both located near the northwestern side of the island. Barry's Reef was nearest to a municipal dump and a golf course. The higher percentage of DSS at the northwestern sites may be associated with pollution pulses or nutrient run off. Future studies should investigate these and other ecological factors that could be instrumental in the cause of DSS.

4:15 019.059 G **Taxonomic identification and toxin isolation of a new-to-science cyanobacterium *Pseudoleptolyngbya mysidocida* gen. nov. & sp. nov.**, *I-Shuo Huang, Texas A&M University-Corpus Christi; Paul Zimba, Texas A&M University - Corpus Christi; Tom Linton, Texas A&M University Galveston*

Cyanobacterial toxins are well studied in freshwater systems. With the lesser knowledge on marine cyanotoxins, it is likely that many other marine cyanobacterial toxins are undescribed, particularly from benthic habitats. An unknown marine cyanobacteria was isolated from an aquatic animal rearing facility having mysid mortality events. The cyanobacteria possibly originated from Chesapeake Bay, MD, or Corpus Christi Bay, TX. Molecular phylogenetic analysis in addition to morphology (TEM and SEM) and chemical composition analyses confirm it as a new genus and species. We have named it *Pseudoleptolyngbya mysidocida*. Unialgal bulk cultures were used to produce sufficient material for toxin isolation. Two variants of anabaenopeptins (a group of potent protease inhibitors) were isolated from this new-to-science cyanobacterium. The molecular mass confirmation was performed using triple-Q-MS and TOF-MS. Anabaenopeptins are the least known class of cyanotoxins. The only current known effect of anabaenopeptins is Carboxypeptidase A inhibition. Toxicity to fish, mysids, and copepods occur after toxin exposure. The LD50 for copepods was 221.6 mg/L. The LD50 values are helpful for understanding the specie's response to the toxin and the relative potency of the toxin compared to other toxins.

020. Science Education Oral Session II
3:00 to 4:30 pm
Lantana, 01
Science Education
Science Education Oral Session II

Participants:

3:00 020.060 G **Inquiring Minds Want To Know**, *Jennifer Dee Hooper, University of Texas at San Antonio*

According to the Next Generation Science Standards it is important to understand that the scientific practices include the critical thinking and communication skills that students need for postsecondary success. These science practices encompass the habits and skills that scientists and engineers use day in and day out. These practices for critical thinking include incorporating science inquiry into the classroom. Kim and Chin (2001) state that inquiry based learning helps students develop scientific knowledge, creativity and makes the student learn about the life that surrounds them. Through a hands-on session we will review ways to incorporate science inquiry, evaluate areas of struggle, and discuss how to through hands on activities, we will discuss these obstacles and how to change a traditional 'cookbook' lab into a science inquiry lesson that your students won't soon forget.

3:15 020.061 N **Profile of an Effective STEM Principal**, *Denise Kern, Texas State University*

While being an effective administrator is difficult, being an administrator who can make decisions that enhance STEM education is rare. This session will discuss characteristics that have been identified by grades 5-8 science and math teachers to impede effective instruction by teachers as well as effective learning for students. Our research identified predictable factors listed by teachers such as providing adequate science materials and equipment. Other factors such as the ability to provide funds for next day instruction might not be predicted as important, but teachers reported that they deemed them valuable to their success. Numerous other factors reported by the teachers included some predictable factors while others factors were not. Principals also identified factors hindering effective STEM instruction and student learning at the classroom level, the campus level and at the district level. Suggestions for solutions to impediments plus additional research possibilities will also be discussed.

3:30 020.062 N **Reflections on Transforming a Verification Based General Chemistry Laboratory to an Inquiry Based Curriculum**, *Mary A. Kopecki-Fjetland, St. Edward's University*

Current research shows that wholesale change in general chemistry lab curricular from traditional, directive student experiments to discovery-based student experiments has a significant, positive impact on student learning. Discovery labs, unlike verification labs, illustrate the scientific method and emphasize the connection between theory and the supporting empirical data. At St. Edward's University, General Chemistry Laboratory is the initial chemistry laboratory experience students encounter. An inquiry lab curriculum was introduced into General Chemistry Laboratory with the goal of improving overall student critical thinking skills, student engagement, student preparation, and cooperation and respect within a team. In each experiment learners were presented with a problem and a set of guiding questions that led them toward the discovery of a specific relationship or concept. Students were assessed using graded assignments which included data analysis and post-lab questions. Student survey results along with in-lab observations of student interactions indicate that these lab experiences enhanced student interest, increased communication between students, and improved their ability to explain and correct their own misconceptions.

3:45 020.063 G **The One-Room Schoolhouse approach: Creating and leveraging a learning environment of commingled introductory and advanced GIS students**, *Moulay Anwar Sounny-Slitine, Southwestern University; Caitlin Schneider, Southwestern University; Dakota McDurham, Southwestern University; Jen O'Neal, Southwestern University; Brandee Knight, Southwestern University*

This paper proposes and evaluates a model for teaching GIS at multiple levels (Introductory, Advanced, Research) in a single classroom setting. We call this model the One-Room Schoolhouse approach as it mimics the learning environment historically common in rural United States before the popularization of busing. The one-room schoolhouse model allows students to transition from consumers of knowledge to creators of it through direct participation in the research process, while simultaneously fostering a collaborative learning community. This model has many advantages for institutions developing a robust GIS program in an environment of limited resources and student demand. This model increases students' interaction with the instructor and provides additional instructional support for introductory students. The model also allows more GIS classes to be offered so as to encompass a full educational curriculum. There are many pedagogical benefits including opportunities for peer-instruction, cooperative, and inquiry-based learning. This paper analyzes the experience of establishing this model over a three year period at Southwestern University, a small liberal arts institution. We argue that its success in a liberal arts settings can be

transferred to more established GIS programs; however, questions remain on the scalability of the model to larger class sizes.

4:00 020.064 G **Using Effective Project Based Learning in a Third Grade Science Classroom**, *Michele Johnson Mann, University of Texas at Austin; D'Anna Pynes, University of Texas at Austin*
Project-based learning (PBL) is when students are given a challenging, authentic problem to solve and subsequently must produce some type of product. The students work in collaborative groups to develop their products using skills and content learned from instructional activities that are embedded within the unit. This has been shown to be a highly effective method of teaching but a method that uses considerable instructional time. Knowing the effectiveness of this way of teaching but also realizing the barriers of using this method, we designed a PBL unit for third grade science that required only five class days and used activities and labs familiar to elementary science teachers yet still including the essential elements. This third grade unit was tested in eight third grade classrooms in an ethnically and economically diverse suburban school. Half of the classes were the control and used the standard district curriculum on organisms and their environment and half used the PBL unit on the same concepts. There was no significant difference between the control and experimental groups on the district mandated benchmark test but there was a difference in the level of work the students completed and the number of students that actively participated in the unit. Furthermore the teachers were motivated to try other PBL units in the future. One of the teachers said after completing the unit that she was no longer overwhelmed by the idea of using PBL in her classroom and knew it could be effective.

021. Systematics & Evolutionary Biology Oral Session II
3:00 to 4:30 pm
Juniper House, 01
Systematics & Evolutionary Biology
Systematics & Evolutionary Biology Oral Session II
Participants:

3:00 021.065 U **Fighting with swords: is genital combat an alternative explanation for same-sex mating in a coercive livebearer (*Gambusia affinis*)?**, *Julian Alejandro Rios, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Sexual selection drives 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. 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 affinis*) 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. Perhaps more plausible in some systems, is that such behaviors may be combative, whereby males use gonopodia (a modified anal fin used to transfer sperm) as weapons during aggressive or competitive encounters. I predict that if males are engaging in genital combat, gonopodial scarring caused by male aggression/fighting (with gonopodia) will be higher in all-male treatments than when females are present or males are alone. Results show support for this hypothesis in that virgin males have nearly no genital scarring, and individuals in all-male treatments have higher levels of scarring. Using SEM and ImageJ, I currently am quantifying the amount of tissue damage to the gonopodia and updated results will be reported.

3:15 021.066 U **How long does it take for coercive males to replenish sperm reserves?**, *Skylor Ryan Matchett, St. Edwards university; Raelynn Deaton Haynes, St. Edward's University*
Spermatogenesis, or the process of making sperm, varies widely by species in regards to how long it takes a male to regenerate sperm reserves. In coercive livebearing fishes, males have alternative mating strategies whereby smaller males use “sneaky” matings more often than large males; however, males of all sizes mate coercively. The time to replenish reserves is unknown, which makes designing appropriate experiments difficult. Since livebearers are an important model system for sexual selection, particularly sperm competition, it is important to further our understanding of spermatogenesis. Here, we tested male mosquitofish under varied rearing conditions (virgins never exposed to female vs. raised in mixed sex groups) at varying times after exposure to a female (or no female for controls). At time zero sperm was collected for baseline measure. We then exposed each

male to a female and collected sperm at times 30 minutes, 1 hour and 2 hours. We sought to determine at what point sperm reserves were replenished (and if there is a threshold at which the reserves are back to baseline), and whether this time varied based on male treatment. Preliminary results show that at 30 min sperm reserves are not yet replenished. We are currently analyzing data and will present results from the full experiment. This study will enable researchers to more carefully design experiments based on one additional and important piece of information regarding spermatogenesis in livebearing fishes.

3:30 021.067 U **Sperm expenditure as a potential predictor of male genital combat**, *Anthony Sanchez, St. Edward's University; Julian Alejandro Rios, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
In many animals across nature, males show aggression by fighting with armaments (body parts that act as weapons). In livebearing fishes (e.g. *Gambusia*) males use a modified anal fin (gonopodium) equipped with hooks and barbs to transfer sperm. Males of this genus also exhibit what appears to be same-sex mating; an alternative explanation is that they may be fighting with their gonopodia. In a series of three experiments, we are testing genital combat as an alternative to same sex mating. In the first experiment, we are investigating genital scarring on the gonopodium that may results from fighting. Here, we are investigating sperm expenditure of males in varying social treatments (1 male alone control; 5 males alone, and 5 males and 5 females). On day 0 we strip all males of sperm, and collect sperm on days 1 and 5. This allows us to quantify sperm expenditure over time in the different treatments. We also measured male body size as a potential covariate. If males are using their gonopodia for fighting (rather than mating), we expect that sperm expenditure will be greater in treatments with females than with males alone. We have completed the experiment with 37 replicates, and are currently processing all sperm samples. Final results will be reported.

3:45 021.068 U **The effects of alternative mating strategies on sperm competition in a coercive livebearing fish**, *Alenka Cardenas, student; Raelynn Deaton Haynes, St. Edward's University*
In coercive mosquitofish, alternative mating results in n increased intraspecific diversification due to competition for mates. This system provides us with a unique opportunity to investigate the evolution of ejaculation as a result of sperm competition. In *Xiphophorus nigrensis*, commonly known as swordtails, it is confirmed that alternative mating tactics result in sperm plasticity. However, it is unknown if alternative reproductive strategies affect sperm plasticity in western mosquitofish, *Gambusia affinis*, that mate coercively regardless of body size. My main objective is to test the hypothesis that varying sex ratios will lead to alternative reproductive strategies associated with sperm plasticity in *Gambusia affinis*. I predict that males in a predominantly female environment will produce more sperm due to the lack of competition from male competitors. Inversely, I predict males that are surrounded by other males will decrease sperm number due to the expected sperm competition. In experimental trials I varied social context of one male (N=30 trials) offering him the following randomized treatments: a larger male competitor and a female, a smaller male competitor and a female, and a female/female control. On day 1 sperm were stripped from males, and on day 7 sperm were collected from each male. I currently am in the process of counting sperm samples and data will be analyzed using ANCOVA, with social context as independent variable, sperm number as dependent variable, and male body size as covariate.

022. Terrestrial Ecology & Management Oral Session II and Business Meeting
3:00 to 4:30 pm
Hummingbird House, 01
Terrestrial Ecology and Management
Terrestrial Ecology & Management Oral Session II and Business Meeting
Participants:

3:00 022.069 G **Insect Pollinator Diversity and Other Associates of Salt Cedar (*Tamarisk* sp.) at Alamito Marsh, Presidio County, Texas**, *Alexandria M. Hassenflu, Dept of BGPS, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University; Anne Marie Hilscher, Dept of BGPS, Sul Ross State University*
Tamarisk sp. were introduced to North America in the 1800's and has become an ecological dilemma due to its rapid spread. Many studies have looked at the negative effects of salt cedar from an ecological standpoint, but not specifically at its effects on pollinators. We used a combination of observational techniques, pan trapping, sweep netting, and hand capturing techniques to determine pollinators present on the flowers of salt cedar. The health of the plants was estimated to an average

over the three week period of intensive pollinator sampling. The purpose of the study was to collect quantitative data on the pollinators of *Tamarisk* at Alamito Creek, and identify them to family or better. This data will be used to create a baseline of pollinator diversity for this invasive plant in the area that can be used to monitor pollinator activity in future studies. Results include members of four orders and eighteen families, including a new locality record in the Trans Pecos region of Texas for a salt cedar associate.

3:15 022.070 N **Long-term monitoring of the subtropical tamarisk beetle (*Diorhabda sublineata*) on saltcedar (*Tamarix*) and athel (*Tamarix aphylla*) along the Río Grande**, *Christopher M. Ritzi, Sul Ross State University; Anne Marie Hilscher, Dept of BGPS, Sul Ross State University; Alexandria M. Hassenflu, Dept of BGPS, Sul Ross State University*
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 have occurred in the southern areas of the Rio Grande, and in an attempt to control this plant by biological means, the consortium consisting of the USDA, NRCS, and Sul Ross State University 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 have indicated that the tamarisk leaf beetles were capable of establishing on a close relative non-target species, the athel tree (*T. aphylla*). Six sites along the Río Grande River, from Lajitas, TX to Candelaria, TX, have been routinely monitored to determine the long-term impact of leaf beetle defoliation on saltcedar and the non-target athel trees in the region. Although defoliation had remained steady during previous years, significant defoliation events were not observed until September and October of 2014 and only patchy activity observed during 2015.

023. Physics Oral Session and Business Meeting
3:30 to 4:15 pm
Academic Building, 113
Physics
Physics Oral Session and Business Meeting
Participants:

3:30 023.071 U **Small Bubble Star Formation**, *Heather McCain, Schreiner University*
To examine the role small bubbles play in star formation, we perform an autocorrelation analysis between small bubbles and young stellar objects. Small bubbles are structures in the interstellar medium, identified by citizen scientists participating in the Milky Way Project. Using a Landy-Szalay correlation estimator, in conjunction with the Milky Way Project small bubble catalog, a catalog of young stellar objects, and other relevant catalogs, we compare their positional information to determine a possible correlation between small bubbles and known effects of star formation.

3:45 023.072 U **Small Bubbles Research**, *Robert Guy Vastano, Schreiner University*
Small bubbles are circular structures in the interstellar medium, discovered by the MilkyWay Project citizen scientists, using infrared data from the Spitzer Space telescope. This project aims to determine whether these small bubbles are in fact ionized hydrogen (HII) regions, created by newly born stars. This is accomplished using the SAOImage DS9 program to visually examine images of the small bubbles to the Anderson et al. (2014) catalog of HII regions, which was obtained using different infrared data from the WISE mission. Morphological and spatial comparisons, as well as correlation with other data sets known to contain signatures of newly formed stars are used to determine the nature of the small bubbles.

025. Poster Session I - Academic Bldg
4:30 to 6:00 pm
Academic Building, Academic Building Posters
Anthropology
Anthropology Poster Session
Participants:

025.073 N **Addressing Missing Data in 3D Scans of Caddo Ceramics**, *Robert Z. Selden Jr.,*

Center for Regional Heritage Research, Stephen F. Austin State University
Even the best three-dimensional (3D) surface scanning techniques often result in missing data for a 3D mesh. In the case of ceramic artifacts, this most often occurs due to a missing sherd from a reassembled vessel. Herein, one approach to addressing missing data is employed in preparation for an analysis of 3D geometric morphometrics. Those vessels scanned for this project include intact and reassembled Caddo burial vessels, which often articulate with the Native American Graves Protection and Repatriation Act (NAGPRA). The approach to 3D geometric morphometrics relies upon the use of reference geometry to populate a variety of splines that are split at specific intersections (base/body; body/rim, etc.). In this approach, Geomagic Design X is used to cut away an area of the mesh in a zone of similar geometry to the area of missing data. Subsequently, each of the three hole-filling functions in Design X (edit boundaries, fill holes, and defeature) is used to create and export three new meshes. These meshes are then imported into Geomagic Verify, where the original mesh can be contrast with each of the three hole-filling methods to identify the technique and method for filling each hole that deviates least from the original surface. Once identified, the method with the lowest deviation is then used to close the hole in the mesh prior to the analysis.

025.074 G **An Economical and Viable Method for Recording Cemetery Data**, *Rebecca Lynn Schultz, Texas Tech University*
Cemeteries are fragile and valuable pieces of history that need to be actively preserved and maintained. The purpose of this study is to create an economical and practical method for recording cemetery data using technologies that are readily accessible to the general public. Small communities (or private individuals) with limited resources may look to this project as a template for how to accurately and efficiently document cemeteries within the confines of their budget. The focus of this project is the Belknap Civilian Cemetery established in the early 1850's, located just east of historic Fort Belknap. There are several unmarked graves and misplaced headstones due to poor maintenance in past decades. The methods that will be used to record these data include: photography, theodolite or compass mapping, developing a database and archaeological field methods (scraping). The scraping will be used to expose unmarked grave plots, determined by differentiations in the deposition of the soil. A database will be created using Microsoft Access containing exact measurements of each headstone, epitaphs and physical descriptions. In the future, 3D imaging will also be used to document the physical appearance of each gravestone with Autodesk 123D Catch software. The intention is to create a website hosting the images to make them accessible to the public. The methods and technologies outlined in this project are easily accessible, and are economical and viable resources for recording cemetery data, and will serve as a guide for willing participants who wish to preserve and maintain these historic monuments.

025.075 N **Dart Point Morphology: Preliminary Thoughts from the USFS Collections in East Texas**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University*
In this poster, a preliminary approach to the geometric morphometric analysis of dart points from the Angelina, Davy Crockett and Sabine National Forests is outlined. Three-dimensional (3D) scans were generated in Geomagic Design X via the scanner direct control function. Those scans were subsequently processed to correct for any non-manifold poly-vertices, folded poly-faces, dangling poly-faces, small clusters, small poly-faces, non-manifold poly-faces, crossing poly-faces and small tunnels. Dart point outlines were extracted using a 3D mesh sketch of the aligned scan that were sectioned into four quadrants prior to the application of landmark/semi-landmark data points. These data were imported to R and analyzed using the geomorph package where variations in dart point shape and form, directional and fluctuating asymmetry were further explored. These preliminary results will be used to inform upon the development of this approach as it continues to be refined prior to the analysis of the full assemblage.

025.076 G **Digital Documentation, Analysis, and Preservation of Grave Stones from the Historic Pagel Settlement Cemetery, Lavaca County, Texas**, *Alyssa Brooke Bonorden, Texas Tech University*
Cemeteries are valuable historic resources, providing information about past events, religious beliefs, lifestyles, and genealogies vital to understanding our heritage. The Pagel Settlement Cemetery in Lavaca County, Texas is one such cemetery, serving as a testament to the impact of nineteenth-century German immigration on Texas demography and culture. Established in 1857 by the Lutheran Church, the Pagel Settlement Cemetery is the final resting place for over 50 German

and Austrian immigrants who settled near present-day Hallettsville, Texas. Historic cemeteries like the Pagel Settlement Cemetery are non-renewable cultural resources, oftentimes threatened by development, natural degradation, and vandalism. Using photogrammetric techniques, however, historic grave markers may be digitally documented and preserved as 3D models, thereby retaining the information they hold in the face of ever-changing landscapes. Using Agisoft PhotoScan, headstones in the Pagel Settlement Cemetery were digitally recorded as 3D models and used to elucidate aspects of German cultural heritage. This information, along with the models themselves, will allow descendant communities and researchers permanent access to a relatively ephemeral data source, and represents a valuable supplement to standard methodologies for historic cemetery documentation and preservation.

025.077 G **Eating oneself? Stable isotopic enrichment during weight loss and tissue turnover in humans**, *J Alex Canterbury, Texas A&M University; Chase W Beck, Texas A&M University; Crystal A Dozier, Texas A&M University; Megan L Greenfelder, Texas A&M University; Kristin Hoffmeister, Texas A&M University; Jude Magaro, Hunter College, CUNY; Ali Mendha, Texas A&M University; Angie Perrotti, Hunter College, CUNY; Casey Wayne Riggs, Texas A&M University; Anthony Taylor, Texas A&M University; Lori E. Wright, Texas A&M University*
In recent years, it has been demonstrated that different metabolic states can have a noticeable effect on the isotopic signatures of body tissues. Specifically, the metabolism of bodily tissues for energy (catabolysis) has been shown to affect isotope ratios through the recycling of carbon- and nitrogen-containing compounds. This has significant implications for the field of paleonutrition, as our interpretations of past diets are often based on stable isotope analysis, but rarely take the potential effects of dietary insufficiency into account. We present carbon and nitrogen stable isotope ratios of hair samples taken from three subjects who experienced tissue loss. Two of these subjects had recently undergone gastric band surgery, while the third had experienced muscle wasting as the result of a vehicle accident. We monitored isotope ratio changes over time prior to and following these metabolic milestones in a longitudinal and minimally invasive manner. All subjects displayed a marked enrichment in their δ15N values corresponding to their period of metabolic stress, consistent with tissue recycling during this time. However, all subjects showed no noticeable enrichment in δ13C corresponding to the stress event, implying that lipid catabolism did not provide most carbon for hair synthesis.

025.078 N **Exploratory Network Analysis: Attribute Suites and Caddo Ceramics**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University; Timothy K. Perttula, Center for Regional Heritage Research, Stephen F. Austin State University*
Using attribute data from ceramic sherds collected and analyzed over 30+ years of Cultural Resource Management (CRM) pursuits, we illustrate potential connections between archaeological sites using attribute suites associated with temper, utility wares and fine wares. Through a combination of normal and bipartite networks that leverage metrics associated with modularity, eigenvector centrality, and others, we discuss the spatial and temporal networks that are apparent in these data and the potential for these results to inform upon archaeological dialogues relating to theories of craft specialization, communities of practice and ceramic technological organization of Caddo potters. Results of this analysis hold promise for additional network analyses of whole or reconstructed Caddo vessels, where ceramic types and forms can also be integrated.

025.079 G **Incorporating Indigenous perspectives on resource management: The Alibates Flint Quarries National Monument traditional use study**, *Emma Frances Richburg, Anthropology*
Federal agencies are increasingly engaging with Native Americans communities in an effort to incorporate indigenous concerns in decision making regarding archaeological and cultural resources. The Alibates Flint Quarries National Monument Traditional Use Study represents such an endeavor. Funded by the National Parks Service Rocky Mountain Office it seeks to identify Native American tribes and their affiliation with the area. The AFQNM was established in 1965 to preserve sights associated with the Antelope Creek Focus, which existed from 1150 AD – 1450 AD. These include village sites as well as over 400 lithic quarries. While identifying federally recognized tribes with cultural affiliation to the Antelope Creek Focus inhabitants is a primary goal of the project, the project is concerned more broadly with identifying the Native American populations with ties to the general region which includes the Llano Estacado and the South Canadian River Valley during both the prehistoric and historic time periods. An additional goal of the project is to identify areas in which monument personal can collaborate with indigenous communities to develop interpretive

programming. One such topic is the utilization of native plants, consequently the project features a significant ethnobotanical component. This paper presents a preliminary findings based on an analysis of ethnohistorical sources and outlines plans for future ethnographic research.

025.080 N **Preliminary Analysis of Asymmetry in Caddo Ceramics: A Case Study from the Washington Square Mound Site**, *Robert Z. Selden Jr., Center for Regional Heritage Research, Stephen F. Austin State University*
While pursuing a study of 3D geometric morphometrics for ceramic burial vessels that often articulate with the Native American Graves Protection and Repatriation Act (NAGPRA) from the ancestral Caddo region, there have been no shortage of potentially meaningful observations, a few of which--those associated with rotational symmetry, directional and fluctuating asymmetry--are discussed here. Using Geomagic Design X (reverse-engineering software) and Geomagic Verify (inspection software), metrics associated with rotational symmetry were generated and analyzed. Directional and fluctuating asymmetry measures of the widest vessel profiles were generated in Design X and analyzed using the geomorph package in R. Preliminary results point toward gainful results that can be used to augment more traditional ceramic analyses as well as geometric morphometric studies of ceramic vessel shape.

Biomedical

Biomedical Poster Session

Participants:

025.081 U **Components of** *Equisetum arvense* **Cytotoxic to Cultured 4T1 Murine Breast Cancer Cells**, *Jake Augustus Brozek, Wayland Baptist University; Sarah Kelly, Wayland Baptist University; Adam Reinhart, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University*
The herb *Equisetum arvense* (horsetail) is commonly used in herbal remedies in cultures around the world. Strong antioxidant and anti-inflammatory effects have reported. Horsetail, however, has been scarcely explored as a potential anti-cancer treatment. It has shown promising results in the treatment of leukemia. Previous studies in our lab have shown that extracts from several common herbs with anti-inflammatory activity have cellular components cytotoxic to cultured 4T1 murine breast cancer cells. In this study, extracts of horsetail were prepared by refluxing powered *Equisetum arvense* in ethanol (Soxhlet extraction, 1.5 hours). The ethanolic extracts were concentrated and then fractioned via Sephadex LH20 chromatography (50% ethanol mobile phase; eluate monitored at 280 nm). The resulting fractions were assayed for cytotoxicity to cultured 4T1 cells, and the fractions pooled based upon cytotoxicity (MTS assay). Pooled fractions with strong cytotoxicity were further separated via HPLC (C18, 75-100% methanol gradient over 40 min.). The HPLC peaks were collected, concentrated and again tested for cytotoxicity. All six collected peaks showed significant cytotoxicity ($p<0.05$) compared to the controls. Analysis of the physicochemical properties of the six collected peaks is ongoing.

025.082 U **Geographic distribution of** *Ixodes scapularis* **in the Lower Rio Grande Valley**, *Flor Martinez, University of Texas Rio Grande Valley; Maximiliano Barbosa, University of Texas Rio Grande Valley; Ramiro Patino, University of Texas Rio Grande Valley; Maria Esteve-Gassent, Texas A&M University; Teresa P. Feria, University of Texas Rio Grande Valley*
Tick vectors are mainly responsible for the transmission of *Borrelia burgdorferi*, the etiological agent of Lyme Disease (LD). In North America, *Ixodes scapularis* is the most common LD vector. Most distribution studies of *I. scapularis* have been done in northeast US; however, the tick could be found in southern areas, such as the Lower Rio Grande Valley (LRGV), Texas, where little is known about its distribution. Therefore, the main goal of this research is to understand the geographic distribution of *I. scapularis* in the LRGV. We performed systematic tick collections in various state parks in the LRGV. For collections, we used the dragging and flagging methods in order to compare method efficiency. To this date, 47 tick samples were collected in the Estero Llano Grande, Falcon, and Bentsen state parks, covering the Hidalgo and Starr Counties. Samples were mainly collected in areas with low to medium vegetation height. Importantly, the flagging method was more successful in capturing ticks than the dragging method. Therefore, our results suggest that the flagging method should be used primarily during tick sampling in areas with low vegetation height. Ongoing research includes the determination of tick species using dichotomous keys, determination of *B. burgdorferi* infection rate, and modeling of tick distribution under climate change scenarios.

025.083 H **Invasive Pressure Measurements at Rest and During Supine Exercise in Young**

Adults, *Kelsey N. Brown, Brooke Army Medical Center; Christina A. Koscielski, Brooke Army Medical Center; Bernard J. Rubal, Brooke Army Medical Center*
Background: There is a scarcity of invasive hemodynamics data for assessing heart disease in young adults. Objective: This study reviews hemodynamic and metabolic findings from the cardiac catheterization records of 21 patients (19 M, 2 F) between 20 to 30 years of age without angiographic evidence of coronary artery disease who underwent cardiac functional assessment with multisensor high-fidelity manometric catheters. Methods: The study population consisted of 15 patients evaluated for chest pain syndromes, 2 for arrhythmias, 2 with non-diagnostic ECGs, and 1 to rule out hypertrophic cardiomyopathy. In addition to assessing hemodynamics at rest, 19 patients were evaluated during supine exercise (2250 ± 591 fpm), and 4 were evaluated after either a fluid challenge or the administration of contrast media. The hemodynamic data assessed included: right atrial, ventricular, pulmonary artery and pulmonary capillary wedge pressures, left ventricular and aortic pressures. Results: Rest and exercise (N=17) cardiac index (CI), heart rate (HR), oxygen consumption index (VO2-I), left and right ventricular systolic (LVPs, RVPs) and end-diastolic (LVEDP, RVEDP) pressures (mean ± SD) were: CI 3.7±1.0 vs 6.9±1.8 L/min/M^2 ($p<0.05$), HR 72 vs 118 bpm ($p<0.05$), VO2-I 141±27 vs 614±162 ml/min/M^2 ($p<0.05$), LVPs 117±12 vs 138±16 mmHg ($p<0.05$), LVEDP 9.6±2.4 vs 10±0.4 mmHg, RVPs 23±4 vs 34±5 mmHg ($p<0.05$) and RVEDP 6.5±2.7 vs 5.9±2.8 mmHg, respectively. Conclusion: Results provide age-specific findings applicable for the functional assessment of right and left heart function in young adults.

025.084 U **The effect of pH on the growth of probiotic bacteria: A simulation of the human gastrointestinal tract**, *Kizil Ather Yusoof, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*
Bacterial species within the *Lactobacillus* genus are known for their probiotic components and provided health benefits. The goal of this study was to evaluate the survival and growth rate of *Lactobacillus* under the varying pH conditions found during the various stages of the human GI tract. In this study *Lactobacillus* species were isolated from an over-the-counter probiotic supplement using selective media, namely Lactobacilli MRS broth and agar. The experiment was run with a collection of control tubes in which all of the tubes were set at a neutral pH level, and a collection of treatment tubes in which the stomach and small intestine tubes were manipulated. The media was manipulated with HCl to reflect gastric juices and bile that is held within the stomach and small intestine. Two experimental trials were run over a digestion period (about 8 hours) and measured in the spectrophotometer comparing the optical density to time the bacteria were in the media. Serial dilutions and plate counts were then done by colony forming units. Through the two trials it was found that probiotic bacteria are not negatively impacted by high acidity and are in turn promoted to grow in low pH. These results provide an insight to the amount of resistance that the *Lactobacillus* species has obtained and benefits that probiotics can provide for the digestive tract.

Botany

Botany Poster Session

Participants:

025.085 U **Adventitious Root Formation in Response to Flooding Stress in Andean Common Beans (*Phaseolus vulgaris* L.; Fabaceae)**, *Nicole Londero Monteiro, St. Edward's University; William J. Quinn, St. Edward's University; Michael A. Grusak, USDA*
Global production of common bean (*Phaseolus vulgaris* L.; Fabaceae) in 2010 was estimated at over twenty-three million metric tons by the Food and Agriculture Organization. However, with climate change potentially leading to altered environmental conditions, such as increased precipitation and extreme precipitation events, bean production may be compromised in certain growing areas in the future. We were interested in developing a method for screening diverse bean genotypes for their acclimation to flooding stress. As a potential indicator of flooding tolerance, we assessed adventitious root formation along the submerged hypocotyl of several Andean varieties of common bean. Plants were grown for 15 days in aerated and non-aerated hydroponic culture with approximately 5 cm of their hypocotyls submerged to simulate flooding conditions. Data collected showed that plants under non-aerated situations produced more adventitious roots than plants that had their roots aerated, except from genotypes Pink Panther and Chinook 2000. Additionally, data showed that some bean genotypes, like in K-59 and Charlevoix, had higher adventitious root formation under non-aerated conditions than other genotypes, like Sacramento and Chinook. Further studies on those differences in addition to other components about plant growth, such as nutrient content and seed yield, would allow bean researchers to recommend which bean genotypes would

be more appropriate for certain growing conditions.

025.086 U **Analysis of Fungal and Bacterial Root Microbiomes of** *Carex planostachys* **(Cyperaceae)**, *Louise Gaunt, St. Edwards; Charles Hauser, St Edwards University*
Roots are the primary sites of plant nutrient import and organic molecule export, which provide carbon and energy sources to nearby microorganisms and result in a "rhizosphere" that supports higher microbial numbers than do bulk soils. Multiple studies aimed at understanding the root microbiome have led to the hypothesis that plant species recruit microbial communities for beneficial reasons. We report here results characterizing the root microbiome of the species *Carex planostachys* (Cyperaceae) obtained at Wild Basin Creative Research Center. Total genomic DNA was isolated from fractions corresponding to bulk soil, neighboring soil, rhizosphere, and endosphere, and 16S (V4-V5) and 18S (ITS1-ITS2) regions were sequenced. DNA sequences were analyzed using Quantitative Insights into Microbial Ecology (QIIME). Preliminary analyses indicate a decrease in microbial diversity as the distance from the root decreases which supports the hypothesis that plant species recruit microbial communities.

025.087 U **DNA Barcoding of Guadalupe County Plant Specimens**, *Becky Lynn Woodward, Texas Lutheran University; Jacob Lara, Texas Lutheran University; Broderick Sargent, Texas Lutheran University; Stephanie Perez, Texas Lutheran University; Mark Gustafson, Texas Lutheran University; Alan Lievens, Texas Lutheran University*
Since 2007, a floristic study has been conducted at the Weston Ranch, an approximately 1600-hectare ranch in northern Guadalupe County, Texas. In 2014 and 2015, research efforts were expanded to include molecular studies. In particular, the focus was on using DNA barcoding for the classification of plant specimens. A voucher specimen was deposited in our herbarium and a photograph of the plant in the field was taken. DNA was extracted from leaf material and then a polymerase chain reaction (PCR) was used to amplify a region of the *rbcL* gene in the chloroplast DNA. The region of the *rbcL* used is a well-accepted DNA barcode for most plant species. The amplified region of the *rbcL* gene was then sent to an outside reference laboratory for sequencing. Sequencing was done in this way for several plant collections. The goal was compare the sequence obtained for each specimen with sequences that were already available on the searchable BOLD Systems Database. If the DNA barcode was not found in that database, the newly obtained DNA barcode was submitted to the BOLD Systems Database for inclusion. In addition to the barcode, other supporting information (e.g., photograph and the collection location) were submitted to the BOLD Systems Database. It was found that most of the Texas specimens that were analyzed did not have existing matches in the Database.

025.088 G **Growth of** *Tamarix* **species (Tamaricaceae),** *Tamarix chinensis/ramosissima* **(salt cedar) and** *Tamarix aphylla* **(athel): A comparison of hormonal application and hydroponic growth**, *Crystal Skolnick, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*
The growth habits of different species of *Tamarix*, a noxious plant, were studied. Clippings collected from the Rio Grande floodplain were processed to observe the success of sample root and shoot growth when exposed to different concentrations of Indole-3-Butyric Acid (0.1%; 0.3%, and 0.8%) in soil (pearlite and peat) and in hormone free watering in a hydroponic medium. All samples were monitored within a tented watering system with consistent watering periods of ten seconds every five minutes. Clippings from salt cedar (Tamarix species, Tamarix chinensis/ramosissima; Tamaricaceae) and Athel (Tamarix aphylla) samples showed both root and shoot growth; the earliest growth occurring in just under two weeks. Over several months, the hormone treated plants appeared to be more successful. Although plants from both groups survived transplant regardless of culture methods, plants without hormone starter perished and both species' control did not survive transplant. As of seven months post-transplant, all control and hydroponic plants had perished. Both species were equally successful with the different growth methods and had similar mortality rates. The hormone treated groups of both salt cedar and Athel were able to establish stronger roots than the hydroponic and control groups, and survived being transplanted outdoors. *Tamarix* spp. have demonstrated durability and diversity in growth, capable of being propagated in soil or water.

025.089 U **Identification of anthocyanins in wild-type and natural yellow-flowered mutants of** *Ipomopsis rubra* **(Polemoniaceae)**, *Jose Eustolio Cantu, Biology Major; Amanda Kenney, St. Edward's University*
Anthocyanins are plant pigments belonging to a class of molecules called flavonoids and are responsible for many of the red, purple, and dark blue colors seen in stems, leaves, and flowers. Some potential functions of anthocyanins include abiotic stress response, pathogen resistance,

herbivory deterrence, and/or pollinator attraction. The anthocyanin molecular pathway is highly conserved and well-characterized. The present research is broadly focused on understanding the potential ecological and evolutionary importance of variation in anthocyanin production in the biennial flowering plant *Ipomopsis rubra* (Polemoniaceae). *I. rubra* typically contains the red anthocyanin pelargonidin throughout its stem, leaves, and flowers, the latter being bright red. However, naturally occurring mutant individuals exist that have faint yellow flowers and a visible absence of red pigments throughout the herbaceous tissue. The present study is investigating where in the pathway anthocyanin production is halted. More specifically, the presence and absence of several anthocyanins are being quantified using HPLC in order to identify which anthocyanins are lacking and potential candidate genes underlying the mutant phenotype. Identifying which anthocyanins are lacking will lead to future work aimed at identifying their potential physiological and ecological functions in *I. rubra*.

025.090 N **Investigation of morphological differences leading to rust resistance in indiangrass (*Sorghastrum nutans*; Poaceae).**, *Paul Gray, Dept. of Biology, Stephen F. Austin State Univ.; Josephine Taylor, Dept. of Biology, Stephen F. Austin State Univ.; Alan Shadow, East Texas Plant Materials Center*

The rust fungus *Puccinia virgata* (Pucciniaceae) is an obligate parasite of *Sorghastrum nutans* (indiangrass) (Poaceae). Uredospores of *P. virgata* initiate infection via the formation of germ tubes that terminate in penetration structures, appressoria, over host stomatal openings. Previous research has shown that different varieties of indiangrass have varying levels of resistance to *P. virgata* that, at least in part, may be due to leaf morphological features. Scanning electron microscopy was used to characterize the morphological features of three indiangrass genotypes with varying degrees of rust resistance. Stomatal distribution, subsidiary cell spacing, and intercostal cell lengths were compared using the abaxial leaf surfaces from replicate plants in a growth chamber study. The susceptible variety Rumsey was characterized as having short intercostal cells that formed prominent papillae and wide spacing between subsidiary cells. Intercostal cells were significantly longer and subsidiary cells were more closely spaced in the resistant variety Osage. The correlation of this more topographically uniform leaf surface with a reduction in the number of uredospore germ tubes that successfully form appressoria over host stomata represents a morphological feature to be selected for in breeding programs to improve rust resistance.

025.091 U **Mapping mineral content in developing *Phaseolus vulgaris*, L. (Fabaceae) plants through ArcGIS.**, *Devin John Herd, St. Edwards University; Michael A. Grusak, USDA; William J. Quinn, St. Edward's University*

The common bean (*Phaseolus vulgaris* L. (Fabaceae)) is an important source of nutrients for a large proportion of people throughout the world. We used Geographic Information System software (ArcGIS) to model the movement of three minerals into young bean plants and their subsequent redistribution during development. Our intent was to use the software to display the change in mineral content in different plant parts over time and to establish a basis for quantitative analyses and extrapolation. We grew *P. vulgaris* cultivar Micran plants in a greenhouse at the USDA ARS Children's Nutrition Research Center, and harvested them periodically from 2 through 6 weeks after germination. At each stage, we measured the calcium, iron and potassium content of their roots, stems, leaves, petioles and leaf blades. The mineral data were imported into ArcGIS from an Excel spreadsheet, and the time-lapse feature of ArcGIS was used to model their movement during development.

025.092 U **Phylogenetic relationships and patterns of homoplasy in *Mentzelia* section *Bicuspidaria* (Loasaceae)**, *Christian H Hofsommer, Abilene Christian University; Denise Naude, Abilene Christian University; Stephanie Sariles, Abilene Christian University; Gabriela Simonsen, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

Mentzelia section *Bicuspidaria* (Loasaceae) is a group of 5-6 species of annual wildflowers found primarily in the southwestern United States and northwestern Mexico. We employed phylogeny reconstructions based on DNA sequences from the plastid *trnH-psbA, trnS-trnG, trnS-trnfM, ndhF-rpl32,* and *rpl32-trnL* regions and the nuclear *ITS* and *ETS* regions to investigate evolutionary relationships and patterns of homoplasy in *Mentzelia*. Our reconstructions indicate that section *Bicuspidaria* is monophyletic and that most species within *Bicuspidaria* are monophylletic. However DNA based reconstructions suggest that the taxon, *M. hirsutissima*, is paraphylletic. Furthermore, the two clades of *M. hirsutissima* sensu lato can be distinguished geographically but not morphologically. In contrast, the most morphologically distinct species in *Bicuspidaria*, *M.*

reflexa is closely related to other species within a subclade of *Bicuspidaria*, suggesting that the unique floral morphology of *M. reflexa* is an autapomorphy with an origin independent from similar characters that have evolved in other sections of *Mentzelia*.

025.093 U **Using the Internal Transcribed Spacer as a Comparative Guide to Distinguish *Physalis heterophylla* from *Physalis hederifolia* (Solanaceae)**, *Kindry Cruz Kirbo, Howard Payne University*

Often, herbaria contain either unidentified or questionably identified specimens, which are considerably more challenging to identify using traditional morphology than fresh samples due to the preservation. Identification of species through the use of DNA barcoding should therefore be investigated since the individual processing the material does not need to be an expert in such a broad field of knowledge. Also, lower grade preservations can be utilized as long as the DNA is intact. An investigation of the two species *Physalis hetorophylla* and *Physalis hederifolia* (Solanaceae) from the Howard Payne University herbarium was conducted. DNA from nine specimens of each species was isolated in addition to two specimens in which the identification was questionable. DNA was extracted using the CTAB with chloroform protocol and amplified using the internal transcribed spacer (ITS) region. By using the CTAB extraction protocol, amplifiable DNA was able to be obtained. It was found that the region of interest for these two species was approximately 360 base pairs in length. The PCR amplified DNA has been sent off for sequencing. Therefore, the concluding results of this study are still pending until the sequencing results are returned.

Computer Science

Computer Science Poster Session

Participants:

025.094 U **Spatial data management of species interactions in the Gulf of Mexico**, *Juan Martinez, Texas A&M Corpus Christi; James Simons, Texas A&M Corpus Christi*

The Gulf of Mexico Species Interactions (GoMexSI) project is an open source database. It takes advantage of Geographic Information Systems tools to create spatial queries for data acquisition. It is currently focused on the predator/prey interaction of fishes. Its main objective is to facilitate the obtaining of digital fish diet data in the Gulf of Mexico. From scientific references spatial data gets extracted. From these spatial references, which can be in form of a map, a list of coordinates, or text description, shapefiles are created using ArcMap. The shapefiles are used to store the location and attributes of the study. From this shapefiles draft maps are laid out for analysis and revision. These features are then coded using Google API and embedded in to a web map for a spatial query. The query will give as a result all the true instances of the location, species name, and prey, or predators of the species queried. The returned instances provide a link to a map with a marker identifying the position of the centroid of that study. Species distribution maps can be obtained indicating species diet data distribution combined with habitat data and diet data. Currently, data from 121 references have been analyzed and extracted, and a total of 2,024 unique interactions have been identified.

Mathematics

Mathematics Poster Session

Participants:

025.095 G **Modeling through model-eliciting activities: a comparison among different achievement level.**, *Jair Aguilar, The University of Texas at Austin*

This study investigated students' thinking, understanding, and mathematical development when solving mathematical classroom open-ended, real-life context tasks in which students were required to model a solution. Specifically, Thought-Revealing activities known as Model-Eliciting Activities (MEAs) (Lesh et. al 2001) were used to compare and contrast the reasoning and solutions of 11th grade students at different levels of performance in Monterrey, Mexico. Two dimensions of contrast and comparison were considered: The quality of the students' solutions and the sophistication of the mathematical construct. Preliminary findings include the ability of the low-performance students to propose and develop more creative solutions. Furthermore, solutions provided by the average students were not as different as the one provided by the low-performance. Finally, although the high-performance students used more sophisticated elements in their procedures, their solutions were incomplete and not well explained.

Neuroscience

Neuroscience Poster Session

Participants:

025.096 N **An Investigation into Aβ/Metal Binding via MALDI MS**, *George Perry, The University of Texas at San Antonio; Andrea Kelley, The University of Texas at San Antonio; Stephan B.H. Bach, The University of Texas at San Antonio*
Amyloid-beta, the most common peptide in Alzheimer's Disease (AD), is known to bind metals in the brain, specifically Cu(II), Zn(II), and Fe(II). This binding may be responsible for the onset and progression of AD causing toxicity, stemming from redox chemistry, and neurodegenerative effects known to be specific to the disease. It is imperative that the amount of metals bound and the ways in which binding occurs (which amino acids the metals bind to) be investigated. Hatcher et al. reported binding constants of Cu(II) to amyloid-beta in 2008 and Wortmann et al. provided binding constant data of Zn to amyloid-beta via electrospray in 2005, however, binding constant investigation procedures via matrix-assisted laser ionization/desorption mass spectrometry (MALDI MS) have yet to be established. The ability to investigate binding sites and quantify binding via MALDI MS would allow for the eventual quantification of binding from in-tact tissue sections which could shine light on the onset and progression of the disease, as it pertains to the metal binding sites. Because we have been able to establish a reliable fragmentation pattern for synthetic Aβ1-40 and Aβ1-42 via laser-induced in-source decay and have observed Cu(II) induced shifts in the synthetic fragmentation, we have applied these methods to investigate binding of Zn(II) and Fe(II) to amyloid-beta as well.

025.097 U **Effects of lithium chloride on nicotinic acetylcholine receptor expression in the regenerating model system,** *Lumbriculus variegatus***.**, *Gabriela Andrea Hernandez Gonzalez, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*
We utilize *Lumbriculus variegatus* as a model system to study cellular and molecular events of neural regeneration. Previously, our lab demonstrated that beta-catenin was expressed in regenerative tissue at early stages suggesting it may have a role in the regenerative process. To study this role, regenerating fragments underwent treatment with 14.8 mM Lithium Chloride (LiCl) to block GSK-3 and effectively increase expression of beta-catenin. LiCl treated animals did not regenerate head or tail segments during exposure. Regenerating fragments were then placed in Ozarka spring water following 1 week of LiCl exposure. Although delayed, worm fragments regenerated 7-8 head segments and varying lengths of tail segments, similar to control animals. Behavioral analysis of LiCl treated fragments indicated hyperexcitability with a reduced level of paralysis while exposed to 0.25mM nicotine. Immunohistochemical analysis clearly demonstrates an increased expression of anti-beta-catenin positive puncta in the muscle wall. Thus, we hypothesize that the hyperexcitability observed post-treatment may be due to increased expression of the nicotinic acetylcholine receptor (nAchR) as a result of transcriptional activity of beta-catenin. Utilizing monoclonal antibodies for the nAchR, we will analyze changes in concentration of nAchR in muscle wall following LiCl treatment. A potassium chloride control was also prepared to determine if changes in membrane potential or ion interference with the binding site of the receptor; could underlie the observed hyperexcitability. KCl-treated animals do not exhibit hyperexcitability. These data suggest the hyperexcitability observed is exclusive for LiCl-treated animals and is not due to change in membrane potential.

025.098 G **Effects of transcranial infrared laser stimulation in category learning**, *Celeste Saucedo, University of Texas at Austin; Nathaniel J. Blanco, University of Texas at Austin; F. Gonzalez-Lima, University of Texas at Austin; W. Todd Maddox, University of Texas at Austin*
Transcranial infrared laser stimulation consists of using infrared light to enhance neurobiological functions. It is a new non-invasive form of low-level light therapy (LLLT) that shows promise for wide-ranging experimental and neuropsychological applications. Applications of LLLT in humans in vivo are novel, but preliminary research indicates it may have a broad range of uses. The primary neurochemical mechanism of action of LLLT is photon energy absorption by cytochrome oxidase. LLLT has been shown to up-regulate the amount of cytochrome oxidase, enhancing neuronal capacity for metabolic production (ATP) used to support cognitive brain functions. Previous research suggests that LLLT applied to the prefrontal cortex can improve sustained attention and short-term memory. Work from our lab recently showed that transcranial laser stimulation can enhance performance on the Wisconsin Card Sorting Task, the gold standard of executive function in neuropsychology. In the current study, we directly investigated the influence of transcranial laser stimulation on two neurobiologically dissociable systems of category learning: a frontal cortex mediated hypothesis-testing system that learns categories using explicit, verbalizable rules and a striatally mediated procedural learning system that learns categories through gradual dopamine-

driven reinforcement learning. Participants received either active or placebo transcranial laser stimulation targeted at lateral prefrontal cortex. Subsequently, they learned one of two category structures—a rule-based (RB) structure optimally learned by the frontal system, or an information-integration (II) structure optimally learned by the striatal system. Results show enhanced learning in both active laser stimulation groups, with a stronger effect in the RB condition.

025.099 G **GABA receptor isoforms, a signature for neuronal activity?**, *Amrithesh Kumar Arun, Neurogenetics Lab, Texas A&M University - Kingsville; Rudolf Bohm, Texas A&M University-Kingsville*
Neuronal homeostasis is a phenomenon where neurons regulate their excitability as an adjustment in response to the activity in the system. In our study, we investigate homeostatic compensation in the form of selective preference to code for more sensitive isoforms of the Drosophila GABA gated channel when the system is made hyperactive. GABA (γ amino butyric acid), an inhibitory neurotransmitter that signals the opening of a Chloride channel to allow ions to be move into the cell, hyperpolarizing the membrane. According to neuronal homeostasis hypothesis, a hyper excitable environment will drive the neurons to choose an isoform of the GABA receptor so as to achieve more inhibition. We devised a PCR based assay which is representative of isoform preference, by using primers specific for each of the alternatively spliced exons of our interest. As a signature for neuronal activity, this assay will be used to study control of neurodegeneration by hyper excitable environments in our fly models of polyQ diseases.

025.100 U **Positron Emission Tomography (PET) Imaging of Pathological Markers in Alzheimer's Disease**, *Katherine Lynn Gillis, Washington University School of Medicine; Tammie Benzinger, Washington University School of Medicine; Karl Friedrichsen, Washington University School of Medicine; Christopher Owen, Washington University School of Medicine; Brian Gordon, Washington University School of Medicine*
Alzheimer's disease (AD) is the sixth leading cause of death in the United States and the leading cause of dementia among the elderly. This disease is characterized by two major pathological hallmarks: extracellular plaques of beta-amyloid (Aβ) peptides and neurofibrillary tangles (NFT's) composed of hyperphosphorylated tau protein. Recent advances in biomarker imaging allow for in vivo viewing of AD molecular neuropathology. In this study, we examine the relationship between tau distribution and cognitive function in order to test whether the spread of tauopathy from the transentorhinal region to the neocortex predicts the transition from preclinical to symptomatic AD. For this study, 43 individuals at high risk for AD underwent an AV1451 tau PET scan, which was processed with FreeSurfer brain segmentation software. AV1451binding potentials were plotted against cognition performance assessments and correlation analyses performed. Our results show a consistent correlation between AV1451 retention and cognitive function for episodic memory in the limbic regions ($r = -0.543$, $p < 0.001$) and isocortical regions ($r = -0.534$, $p < 0.001$). For attention/working memory, AV1451 retention again showed correlation with the limbic regions ($r = 0.347$, $p < 0.024$) and isocortical regions ($r = 0.444$, $p < 0.001$). Finally, tau accumulation had a stronger correlation with cognition (R2=-0.45) than amyloid deposition (R2=-0.13). These results indicate that AV1451 uptake correlates with cognition: the greater tracer retention, the worse cognitive performance. These findings support the hypothesis that the spreading of tau predicts cognitive function and may be the pathological change that leads to symptomatic AD.

025.101 N **Purification and Advanced Imaging of Amyloid Plaque Cores from Alzheimer Disease**, *GERMAN PLASCENCIA VILLA, UTSA; Arturo Ponce, UTSA; Joanna F. Collingwood, University of Warwick; Miguel Jose-Yacaman, UTSA; George Perry, UTSA*
Alzheimer´s disease (AD) is the most common cause of irreversible dementia among older people. In advanced AD it is evident the severe loss of neuronal connections, high degree of formation and spread of abnormal filaments aggregated of amyloid-beta (AB, forming amyloid plaques cores, APC), and tau protein (neurofibrillary tangles) and altered levels of neurotransmitters. In this work, we present the purification of APC by sucrose gradient ultracentrifugation and fluorescence-activated flow cytometry (FACS). Imaging of morphology and analysis of amyloid plaque cores from Alzheimer disease patients were performed through an integrative set of advanced analytical electron microscopy techniques. Particularly, to determine presence and chemical identity of inorganic materials associated to APC, confirming presence of nanostructured aggregates of iron oxide, and other metals such as Cu and Zn. Atomic-resolution aberration-corrected STEM imaging, coupled with energy dispersive X-ray spectroscopy (EDX) and energy electron loss spectroscopy (EELS) detectors allowed a precise identification and quantification of metals, confirming that iron-

based aggregates effectively corresponded to magnetite (Fe3O4). Magnetite nanoparticles located into APC showed a size range of 10-30 nm with superparamagnetic responses observed by in situ electron holography. Particularly, holography of Fe3O4 particles revealed the phase contribution of the ferrite mean inner potential associated to composition and density as circular contours. Advanced electron analytical microscopy confirmed iron as nanostructured particles, and revealed their ultra-structural location, chemical identify and functional properties with high spatial sub-nanometer resolution.

025.102 G **The impact of ozone air pollution on vision processing**, *Carlos A. Garcia, University of the Incarnate Word; Jordan M. Wetz, University of the Incarnate Word; Philip Aitsebaomo, University of the Incarnate Word*
Investigations in our laboratory suggest that the air pollutant ozone (O3) alters the synthesis of retinal dopamine (DA) and thus disrupts vision The electroretinogram (ERG) is used to monitor photoreceptors and second order neurons in the retina. The purpose of this study is to investigate the effects of O3 in the dark and light adapted retina of Long Evans rats. Age- and sex-matched rats were randomly separated into two groups (n=6 rats); three control (clean air) and three acute O3-exposed (0.4 ppm for 4 hours). In each rat, the scotopic and photopic ERG was recorded. Recordings were performed under general anesthesia (ketamine 70 mg/kg, xylazine 2.5 mg/kg, IM). The active corneal electrodes were designed for use in rats. A ground needle electrode was placed subcutaneously in the real flank of the animal. Pupils were dilated with 2.5% phenylephrine and 1% tropicamide eye drops. Lubrication and proper electrical conductance were maintained with 0.6% povidone and 1.4% plyvinyl alcohol (Refresh lubricant eye drops). Rats were dark adapted for 30 minutes before scotopic responses were measured. Results indicate reduced a and b-wave amplitudes (mean=7 microV and 4 microV respectively) in the dark adapted exposed group and a smaller amplitude of the photopic negative response (mean = 57 microV). This study demonstrates O3 disrupts photoreceptor and bipolar cell responses of the rod and cone systems. This work suggests O3-induced oxidative stress possibly aggravates retinopathies and contributes to vision deficits in sensitive populations living in air-polluted environments.

026. Poster Session I - Dining Hall
4:30 to 6:00 pm
Dining Hall, 02
Cell and Molecular Biology
Cell & Molecular Biology Poster Session
Participants:

026.103 U **Analysis of Β-catenin gene expression and identification of Β-catenin full coding sequence in the regenerating annelid *Lumbriculus variegatus,*** *Fernando Hernandez, University of the Incarnate Word; Robert Alan Miranda, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*
Many invertebrates possess exceptional arrays of regenerative abilities while most vertebrates possess limited regenerative abilities. The annelid *Lumbriculus variegatus* has regenerating abilities that allow it to regenerate a new worm from three segments of the original worm and recover both structural and functional abilities along its anterior-posterior axis. Since genomic work is limited in *Lumbriculus*, our research aims to better understand the gene expression and molecular mechanisms involved in its regeneration. Previous studies in our lab have shown that levels of the dual functioning protein Β-catenin are elevated in the regenerating head of our model organism. Β-catenin functions as both, a transcription factor activated by members of the Wnt signaling pathways, and as a component of E-cadherin-based adherens junctional coupling between cells. The increased expression of this protein suggests that Β-catenin is as an important factor in the mechanism of regeneration. To further analyze the role of Β-catenin, we have developed and validated a QPCR assay that measures *ß-catenin* expression in *Lumbriculus*. To further elucidate Β-catenin's protein structure and amino acid sequence, we performed a rapid amplification of cDNA ends (RACE) PCR to identify its complete coding sequence. Preliminary results from RACE PCR using gene specific primers indicate amplification of Β-catenin. We are currently working to optimize our results and identify the complete sequence. Our overall aim is to translate the data obtained from our model organism onto higher phyla, in hopes of subsequently identifying cellular and molecular regeneration mechanisms that may be conserved throughout these species.

026.104 G **Behavioral study of underlying neuronal defects in pomace flies**, *Erick Palacios,*

Texas A&M University-Kingsville; James Coy Bolton, Texas A&M University-Kingsville; Rudolf Bohm, Texas A&M University-Kingsville; Enrique Massa, Texas A&M University-Kingsville
Dysfunction in the neural circuits circumscribed by the expression of *seizure* (*sei*) and *fruitless* (*fru*) genes results in noticeable changes in fruitfly activity or courtship, respectively. Hence, these behaviors can be used to evaluate functionality of those circuits when they are restored or disrupted. This study aims to use behavior as a means to evaluate underlying circuitry: first, transcriptional regulation of DERG will be evaluated to determine which pieces of DNA are required to restore functionality to the seizure circuit; second, a candidate genetic screen will be performed for modifiers of Polyglutamine (PolyQ) induced dysfunction in the *fruitless* circuit, with the aim to ameliorate dysfunction. In both cases, an assessment of behavior will test the ability of genetic modifications to recover the function of an underlying neural circuit. For the transcriptional regulation of DERG, a series of nested promoter constructs of DERG were evaluated to determine which express in parts of the circuit that result in temperature induced seizures. For identifying modifiers of PolyQ induced neurodegeneration, expression of the Ataxin1 toxic protein containing a polyQ stretch was used to disrupt regular courtship. These flies were then crossed to mutant flies to identify genes that increase the number of offspring.

026.105 U **Differential effects by Butyrate and TSA on MEFs demonstrate features of Butyrate beyond HDAC inhibition**, *Rose Massey, Austin College; Astrid Grouls, Austin College; Vidur S Marwaha, Austin College; Lance F. Barton, Austin College*
PA28γ is a proteasome activator involved in protein degradation. PA28γ deficient cells display slowed cell cycle progression at the G0 to G1 phase transition and elevated PA28γ expression is correlated with rates of growth and prognosis in cancers. Butyrate is a short chain fatty acid known to decrease the expression of PA28γ among a number of other proteins and is currently being researched as a potential chemotherapeutic for cancer. Butyrate has been previously characterized as a Histone Deacetylase Chromatin Remodeling Complex (HDAC) inhibitor. In order to evaluate Butyrate's mechanism of cell cycle inhibition, we compared its effects with another HDAC inhibitor, Trichostatin A (TSA). The effects of both HDAC inhibitors on the viability of Murine Embryonic Fibroblasts (MEFs) were studied in the presence and absence of PA28γ. Western blotting examined levels of PA28γ and p38 in treated and untreated cells showed that butyrate reduces PA28γ expression while TSA does not. Cytotoxicity from both butyrate and TSA treatment was dosage dependent but independent of PA28γ expression. The viability and caspase assays showed that butyrate reduces viability by slowing growth while TSA increases apoptosis. Neither treatment had a differential effect on PA28γ-/- and PA28γ+/+ cells. This suggests that Butyrate is acting in a way additional to HDAC inhibition but that PA28γ may not be the primary pathway through which those changes are effected. Understanding the mechanism of action for butyrate will help both to elucidate how to best utilize it in treatment and potential targets for cancer therapy in the future.

026.106 U **Effect of Nutritional Stress Maternal Provisioning of Oocytes in** *Drosophila melanogaster*, *Vivian Le, St. Edward's University; Kamryn N. Gerner-Mauro, St. Edward's University; Lisa M. Goering, St. Edward's University*
Nutritional resources are a major determinant of fitness in many organisms including *D. melanogaster*. Prior research suggests that variation in dietary protein levels can affect *D. melanogaster* phenotype expression, specifically, reproductive phenotype expression. This suggests that dietary protein has an important role in maternal fitness and embryonic development. This study was conducted to examine the relationship between levels of dietary protein in maternal *D. melanogaster* and various phenotypes in both the mother and the embryo. Here, diets with varying protein levels (low, normal, high) are used to examine maternal provisioning of oocytes. Specifically, quantitative real-time PCR was used to quantify the amount of *yolk protein 1 (yp1)* mRNA deposited into oocytes. Our hypothesis is that flies fed a high protein diet will show an increase in *yp1* transcription relative to those fed a normal diet (and the reverse for flies fed a low protein diet). Ongoing research will examine maternal fecundity and embryonic patterning as well. These studies will provide a better understanding of the effects of nutritional stress on reproduction and early development.

026.107 G **Effects of Environmental Pollutants on Dermal Fibroblasts**, *Samantha Alper, Sam Houston State University; James M Harper, Sam Houston State University*
Bisphenol A (BPA) and Dibutyl phthalate (DiBP) are commonly used commercial plasticizers. In this study, we evaluated the effect of BPA and DiBP on cytotoxin resistance in three primary cell

lines: dermal fibroblasts from duck and mouse; and the human pulmonary fibroblast line WI-38. In brief, we found that prior exposure to BPA sensitized mouse and duck cells to the lethal effects on UV-C and cadmium respectively; BPA had no appreciable effect on mortality in WI-38 regardless of the stressor used. In addition, we found that DiBP had no effect on cytotoxin resistance regardless of species. We also found that BPA alone was toxic to mouse, but not duck or WI-38 cells in a dose dependent manner. Overall, these data suggest that environmental exposure to environmental pollutants such as BPA and DiBP may have species-specific effects on cytotoxin resistance.

026.108 U **Elucidating the role of PA28γ on Akt and ERK signaling pathways following staurosporine treatment**, *Dilan S Shah, Austin College; Karisma Y. Sheth, Austin College; Victoria J. Campbell, Austin College; Lance F. Barton, Austin College*
Cancer is the second leading cause of death worldwide, costing over $88 billion in 2011 in the United States alone. Proteasome activator 28γ (PA28γ) expression has been found to be increased in several types of cancer and is associated with poor prognosis and aggressiveness of certain cancers. The expression of extracellular signal-regulated kinase (ERK) pathway, found to be regulated by the Akt pathway, is also increased in over 50% of cancers, making it an important target for the therapeutic treatment of cancer. Staurosporine, a cell permeable protein kinase inhibitor with a dose-dependent nature, leads to inhibition of multiple kinase targets, including ERK and Akt. To elucidate the role of PA28γ on the Akt and ERK pathways, murine embryonic fibroblasts (MEFs) were treated with staurosporine to analyze variations in Akt/ERK expression as well as cell fate decisions. PA28γ deficient cells demonstrated hypersensitivity to staurosporine treatment, as analyzed by flow cytometry, caspase, and viability assays. Furthermore, western blotting indicated differential expression of phosphorylated ERK1/2 and phosphorylated Akt 308 and 473 between PA28γ proficient and deficient cells, suggesting an active role of PA28 in regulating ERK and Akt signaling, thereby modulating cell fate decisions. Future studies aim to clarify the mechanism of differential Akt phosphorylation as well as further classify the role of PA28γ in connecting ERK and Akt signaling to cell fate decision making.

026.109 U **Examining Genetic and Phenotypic Variation of Cis Regulatory Elements in** *Drosophila simulans* **and** *Drosophila melanogaster*, *Amber Randolph, St. Edward's University; Lisa M. Goering, St. Edward's University; Stephanie Pace, St. Edward's University*
The relationship between genetic variation and phenotypic diversity has been studied extensively in evolutionary-developmental biology. Genetic variation that is important for phenotypic diversity can be found in cis-regulatory elements (CREs); here we examine variation in the *bicoid* responsive CRE at the *orthodenticle (otd)* locus. This CRE is known to be important for proper anterior-posterior patterning in response to maternally supplied *bicoid*. Previous work in our lab has shown that within populations of *Drosophila melanogaster*, genetic variation in this CRE can be grouped into two haplotypes that also influence the expression of *otd* in a developing embryo. Moreover, there is a statistically significant shift in the expression of *otd* between *D. melanogaster* and its sister species, *D. simulans*. Our hypothesis is that this shift in expression pattern will be reflected in the patterns of genetic variation in the *D. simulans otd* CRE. Sequence analysis of this CRE in *D. simulans* reveals most individuals are of only one of the two haplotypes. We will compare the levels of genetic variation within *D. simulans* as well as the expression of *otd* among *D. melanogaster* and *D.simulans* lines harboring the different haplotypes.

026.110 G **Expression of B56 in the** *Xenopus laevis* **Embryonic Gut**, *Douja Chamseddine, Sam Houston State University; Joni Seeling, Sam Houston State University*
Through the emergence of organized structures from minute groups of cells, the mechanism for embryonic development is mitigated through the process of cell-cell signaling. One of the critical mediators of cell-cell signaling, especially during embryogenesis, is a family of proteins known as Wnt signaling proteins. Wnt signaling controls cell proliferation, stem cell populations, cell movements, and tissue polarity. Protein Phosphatase 2A (PP2A) is a heterotrimeric serine/threonine phosphatase that modulates Wnt signaling consisting of a catalytic C subunit, scaffolding A subunit, and regulatory B subunit. PP2A plays a vital role in development and functions as a tumor suppressor in colon and other cancers. B56 regulatory subunits of PP2A either inhibit, or are required for, Wnt signaling. The deregulation of Wnt signaling plays a vital role in colon cancer as well as in the development of the digestive tract. Wnt signaling is essential to specify the posterior end of the digestive tube, but low levels are essential to form anterior structures. To ensure proper gut development Wnt activity must be finely tuned. Since B56 subunits modulate Wnt signaling,

their structured expression may be vital to specify gut cell fate. To assess the role of the different PP2A subunits in gut development, their expression pattern was determined using *in situ* hybridization in the developing gut to illustrate the role PP2A plays in regulating Wnt activity and therefore cell fate.

026.111 G **Lyophilized Bone Marrow-Based Substrate Supports In Vitro Cultivation of Mouse Mesenchymal Stem Cells.**, *Laura M. Mueller, University of Houston - Clear Lake; Natasha Nielsen, University of Houston - Clear Lake; Rayan Eter, University of Houston - Clear Lake; Leonard J. Giblin, III, University of Houston - Clear Lake; Larry Rohde, University of Houston - Clear Lake; Richard Puzdrowski, University of Houston - Clear Lake*
Mesenchymal stem cells (MSCs) are multipotent stem cells that are of great interest due to their capacity to differentiate into a variety of cell types and their ability to modulate the immune response. Therapeutic applications require large numbers of cells; therefore, MSCs have to be expanded in vitro. Despite recognizable success, the lack of suitable substrate for MSCs that supports proliferation while maintaining an undifferentiated state has hampered the clinical use of MSCs. The extracellular matrix (ECM) has a profound influence on determining stem cell fate, either towards self-renewal or differentiation. Therefore, researchers have developed cell culture substrates composed of ECM components or have tried to reconstruct the ECM in vitro. Since these approaches have provided limited improvements, the purpose of our research is to investigate the use of minimally altered, decellularized bone marrow (BM)-based ECM as an effective cell culture substrate for BM-derived mouse MSCs. The present study found that lyophilized BM ECM-smeared cultivation plates support in vitro cultivation of MSCs while maintaining a homogenous, undifferentiated and genomically stable cell population. Analyses of the BM ECM smear composition demonstrates the presence of the major BM ECM proteins and glycosaminoglycans. Furthermore, double immunolabeling indicates a co-localization between the ECM protein fibronectin and MSCs. The results of this research will establish a BM-based ECM substrate with application potential in high fidelity cultivation techniques for stem cells once the currently ongoing studies have validated the long-term suitability of the BM-based substrate. (Supported by grants from the UHCL Faculty Research Support Fund).

026.112 G **Manipulation of the *fruitless* Gene in *Drosophila melanogaster* to Form a Mutant for Circuit Mapping**, *Elyse Dyan Grilli, Texas A & M University-Kingsville*
In *Drosophila melanogaster*, sex-specific splicing of the *fruitless* gene results in multiple transcripts coding for alternative amino terminal exons. Transcripts from the P1 promoter of the *fruitless* gene determine courtship behavior and sexual orientation (Ito et al., 1996). The P1 promoter is activated just before the male reaches adulthood, and the transcripts from the promoter are only transcribed in the adult males. Since all transcripts contain the male specific exon, this feature can be exploited to map the fruitless circuit. The ET-FLP-induced intersectional GAL80/GAL4 repression (FINGR) method is an approach to circuit mapping that employs the use of the yeast transgenes GAL4, UAS, GAL80, and Flippase to create genetic mosaics in vivo. FINGR allows for a gene of interest to be expressed only in target areas determined by which promoters the yeast transgenes are under. Using a GAL4 inserted into the male specific exon under the P1 promoter (Manoli et al., 2005), we can express function altering transgenes in FINGR picked subsets of the larger GAL4 defined target area. Mapping the circuit is vital to understanding male courtship behavior.

026.113 U **Purification of components from *Inula hilinium* (elecampane) which are cytotoxic to the 4T1 murine breast cancer cell line.**, *Sarah Kelly, Wayland Baptist University; Jake Augustus Brozek, Wayland Baptist University; Thomas McElwain, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam Reinhart, Wayland Baptist University*
The plant *Inula hilinium* (elecampane), is a widely used medicinal plant. 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 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 280 nm. 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 440 g/mol. The first round of *in vivo* studies has been completed with mixed results.

026.114 N **Quantification by ELISA of the Levels of DNA Topoisomerases in the Nuclei of HuT 78 Cells Treated with Interleukin-2**, *Paul David Fogloesong, University of the Incarnate Word; R. Sajana Nair, University of the Incarnate Word; Nikita K. Gupta, University of the Incarnate Word*

The activities of DNA topoisomerase I, DNA topoisomerase IIα, and DNA topoisomerase IIβ are stimulated in three transient peaks in nuclear extracts of HuT 78 cells, a human T cell lymphoma cell line, within 12 hrs after treatment of the cells with 1,000 units of interleukin-2 (IL-2)/ml. This study examined if the changes in the specific activities of these three enzymes was due to variations in the amounts of the proteins. The amounts of each of these enzymes in the nuclear extracts were determined by quantitative ELISAs using specific monoclonal antibodies, and the results were compared to the specific activities of the enzymes. There is no direct correspondence in the amounts of DNA topoisomerase I or DNA topoisomerase IIβ with their specific activities in the 12 hours following IL-2 treatment of the cells. Therefore, increased synthesis/degradation of these proteins cannot explain the observed variations in their specific activities in the nuclear extracts of HuT 78 cells treated with IL-2. However, the amount of DNA topoisomerase IIα increased after treatment with IL-2 with a peak observed at 6 hours after IL-2, but the amounts of the enzyme did not correlate with its specific activities. These results indicate that the mechanism for the observed activation of DNA topoisomerase I and DNA topoisomerase IIβ is not synthesis/degradation of the proteins, but rather post-translational modification. However, the changes in the activities of DNA topoisomerase IIα in the extracts appear to be due to both increased synthesis/degradation of that enzyme and also post-translational modification.

026.115 U **Quantifying *Wolbachia* and *Spiroplasma* Infection Rates in Monarch and Queen Butterflies**, *Kristen Brehm, Abilene Christian University; Isabel Laiseca-Ruiz, Abilene Christian University; Jamie E Thompson, Abilene Christian University; Rebecca Hunter, Abilene Christian University*

Monarch and queen butterflies are common, ecologically important components of terrestrial ecosystems throughout North America. Monarchs are of special interest due to their annual long-distance migration from the US to overwintering grounds in Mexico. Recent data suggest a decline in monarchs, possibly linked to a decrease in their food supply, loss of overwintering habitat and/or bacterial infection. Maternally-inherited male-killing bacteria infect many insect species, and are known to infect monarchs in the eastern US. The effect of these male-killing parasites on the health and structure of local butterfly populations is unknown. The purpose of this study was to screen for two maternally-inherited male-killing bacteria, *Wolbachia* and *Spiroplasma*, in local monarch and queen butterfly populations. During the falls of 2014 and 2015, 203 butterfly specimens were collected from around the campus of Abilene Christian University in Abilene, TX. Sex ratios and basic ecological information were recorded. PCR amplification using *Wolbachia*- and *Spiroplasma*-specific primers was used to screen for the presence of these parasites in butterfly tissue. PCR products were checked using gel electrophoresis with a size standard to ensure that amplified products matched the expected size, and representative samples were verified with DNA sequencing. Thus far, DNA has been extracted from 129 butterflies, and *Wolbachia*-specific primers have amplified *Wolbachia* from two monarchs and one queen. This is a low occurrence of *Wolbachia*, but matches what has been reported in other studies. We have yet to definitively identify *Spiroplasma* in our samples, but we suspect this is a primer specificity problem.

026.116 U **Relationship Analysis of Oligochaetes and related invertebrates using cDNA sequences of the alpha subunit of the Na+-K+ ATPase**, *Travis Odom, Collin College; Chris Doumen, Collin College*

The sodium potassium pump is a ubiquitous membrane protein with important functions in almost every living cell. To name a few, it regulates electrical potentials, cell volume and ion gradients necessary for secondary active transport systems. This ATPase performs an ATP driven anti-transport mechanism, and belongs to the P-class of ATPases. The pumps are composed of two different polypeptides, α and β, and become phosphorylated as part of the transport cycle. The sequence around the phosphorylated residue, located in the larger α subunits, is homologous among different pumps. Information about these proteins within the Annelid Phylum is quite sparse and the purpose of this study was to initiate a search for the DNA sequences of the alpha subunit among these invertebrates, especially the Oligochaetes. This information can then be used in the context of

molecular evolution of the Annelida.

026.117 U **Utilization of the qPCR assay to analyze Β-catenin mRNA abundance during regeneration in** *Lumbriculus variegatus*, *Timothy Dean, University of the Incarnate Word; Robert Alan Miranda, University of the Incarnate Word; Veronica Acosta, University of the Incarnate Word*

Many organisms possess some ability to regenerate lost limbs and restore function once regeneration has been completed. The annelid worm species *Lumbriculus variegatus* has this ability which is accomplished through two regeneration processes, morphallaxis and epimorphosis. What makes this organism ideal for regenerative research is its ability to restore complete function upon regeneration. Our lab has previously identified protein expression during the regeneration process of Lumbriculus as well as during asexual reproduction. The overall goal of this study is to determine what genetic mechanisms are responsible for the production of proteins essential for the regenerative process. Previous work in the lab identified a putative partial coding sequence for Β-catenin in Lumbriculus. Using this sequence we have developed primers for a qPCR assay to allow for the quantification of changes in Β-catenin expression through the course of the regeneration process in both anterior and posterior segments. Moving forward we may now evaluate these changes in expression as well as expression changes at different time points in the regeneration process. By doing so we will be able to better understand the role Β-catenin plays in the regeneration process at different time points as well as in anterior versus posterior segments, and thus gain an improved understanding of the mechanisms responsible for Lumbriculus regeneration.

Conservation Ecology

Conservation Ecology Poster Session

Participants:

026.118 G **Behavioral variation as a potential mechanism of invasion and competition in three livebearing fishes (Genus** *Gambusia***)**, *Claire Hemingway, Student*

The *Pecos gambusia* is a federally endangered species of livebearing fish native to the desert of the American southwest. Following human habitat modifications, Pecos gambusia populations have been on the decline. One of the main human alterations in these ecosystems is the introduction of two invasive, closely-related species, the western mosquitofish and the largrespring gambusia. Both have been introduced for mosquito control. In many areas of sympatry between the Pecos gambusia and either/both the western mosquitofish and largespring gambusia, Pecos gambusia appear to be locally extirpated or at very low population levels, suggesting that they are being outcompeted. All three species are similar in morphology and diet. Thus, I have begun to explore proximate, behavioral mechanisms by which variation in behavioral gradients and learning capabilities may be facilitating the spread of the invasive mosquitofishs and displacement of the Pecos gambusia. Thus far, I have demonstrated through laboratory experiments that the western mosquitofish exhibits high variation along certain behavioral phenotypes (e.g. shy-bold, asocial-social) that are associated with invasive success, and that reproductive behavior may be tightly linked to these behavioral phenotypes. I have also found evidence that anti-predatory behavior in both the western mosquitofish and the largespring gambusia may be important for spread of both of these species. These data will help to provide much needed insight into the dynamics of the desert springs ecosystems and the management efforts needed to preserve them.

026.119 N **Bioblitzing as a tool for monitoring native fishes of greatest conservation need**, *Melissa Casarez, University of Texas at Austin; Sarah Robertson, Texas Parks and Wildlife; Ben Labay, University of Texas at Austin; Dean A. Hendrickson, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Gary P. Garrett, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin; Cullen Hanks, Texas Parks and Wildlife*

For the past 2 years the Fishes of Texas Project team in collaboration with Texas Parks and Wildlife Department has conducted detailed aquatic bioassessments, “bioblitzes”, within identified Native Fish Conservation Areas (NFCAs) throughout the state. During bioblitzes, data is collected on aquatic and riparian communities, habitats, and recreational use of target sites. This work is done with the help of numerous community partners and addresses multiple goals, including: providing data and recommendations to local conservation management partners, developing a framework for continued citizen-science based surveys, and filling gaps in historical fish records. One recent study area was the Big Cypress Basin in which aquatic bioassessments were conducted at 4 sites and supplemental fish surveys were done at 14 sites. As with all the bioblitz sites, this data will help

narrow the focus of conservation monitoring efforts throughout the state.

026.120 U **Biodiversity survey of mammals on a ranch in Runnels County**, *Anthony Weldon Kocher, Hardin Simmons University; Darby Ross Thornton, Hardin-Simmons University; Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*
Biodiversity is the study of plant and animal species coexisting within an ecosystem. Information such as this can be used to understand how organisms interact with one another in specific regions. It can also be used to develop land management strategies that aid in preventing the disruption of these ecosystems and their biodiversity. The study area is on a ranch owned by Rolling N Properties in Runnels County, Texas. The area is located in a region where three ecosystems, the Rolling Plains, the Cross Timbers, and the Edwards Plateau, converge. Little is known about this area. Surveys were conducted from the spring 2015 to the spring of 2016 on the mammal species that may reside in the area with the use of box traps, camera traps, and visual observations of animal activity. Several mammals have been identified, including white-tailed deer, wild pigs, coyotes, bobcats, various rodents, and lagomorph species to include a dessert cottontail, a species unknown to this region.

026.121 U **Carpal glands in raccoons (***Procyon lotor***)**, *Cullen Wilder, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*
Because raccoons (*Procyon lotor*) are relatively social, in addition to vocalization, communication may be possible through odors. There is anecdotal evidence that raccoons use odor for communication. Anal rubbing, and neck rubbing after passing the head and neck through the forearms being reported. The latter indicating the possibility of glands in the forearm region. To assess the presence of glandular tissue in the forearm, we collected the forearm of four raccoons from hunters in Gregg and Harrison counties. Glandular tissue was found in two of four forearms indicating that this region may be of importance in communication among raccoons. In both instances, glandular tissue was located in association with hair follicles indicating secretion of material is probably along the hair shaft.

026.122 U **Dragonfly behavior and hyrdrofracking**, *Caitlin Magargee, Schreiner University; Brooke Ohlman, Schreiner University; Chris Distel, Schreiner University*
Human-modified habitats are globally ubiquitous but little is known on how animals choose to use them. We studied whether adult dragonflies choose breeding sites based on non-visible chemical content by presenting them with choices of clean water or simulated hydrofracking discharge, which was saltier. We also studied whether different kinds of salts frequently found in fracking discharge affected this decision. Dragonflies laid eggs in all treatments, but larvae in clean water showed the best growth and survival. These results suggest that surface ponds used for hydrofracking discharge may represent a population sink for dragonflies and other pond-breeding species.

026.123 U **Food habits of raccoons (***Procyon lotor***) in an urban system**, *Benjamin Rhodes, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*
While the food habits of raccoons (*Procyon lotor*) have been well documented, little is known of the food habits of the species with an urban ecosystem. Scats have been collected since 1 April 2015 in an urban system located at Marshall, TX on the Environmental Studies Area of East Texas Baptist University (ESA). To date, six latrines have been identified with the scat collected and analyzed for food habits of raccoons in an urban ecosystem. Through the summer and fall, the predominate food items in the latrines were crickets (Family Gryllidae) and seeds of grasses , both present in 67% of the latrines, in the vicinity of the ESA. Most common food items present in the diet of raccoons in this study were black rat (*Rattus rattus*; 50 %), and beetle (Order Coleoptera; 50%). Most percentage of mammal remains in the scats are in concurrence with findings from small mammal trapping that has occurred in the area for the previous 14 years. The presence of carpet in one scat indicates that raiding of human trash is occurring.

026.124 G **Foraging Ecology of Common Bottlenose Dolphins (***Tursiops truncatus***) in Galveston Bay**, *Sherah Loe, University of Houston- Clear Lake; Kristi Fazioli, University of Houston - Clear Lake; George J Guillen, University of Houston Clear Lake*
The bottlenose dolphin (*Tursiops truncatus*) is an ecologically important long lived apex predator found in Galveston Bay (GB). GB has the largest petrochemical complex and the second largest port in the United States. Dolphins face a high risk of exposure to oil and hazardous materials spills. Due to crucial data gaps, the National Marine Fisheries Service (NMFS) considers GB a high priority area for dolphin research. Dolphins have been documented in West Bay and lower GB

whereas previous studies have revealed only limited dolphin activity in other parts of the bay. Recent surveys (2013-2015) suggest dolphins regularly utilize upper GB year round. One of the most important factors affecting bottlenose dolphin movement patterns is the spatial and temporal distribution of prey resources. Determining the foraging ecology of these animals is crucial to understanding their life history. Stable isotope analysis (SIA) is a commonly used method to determine the trophic ecology of various species of animals including mammals. Our research objectives were to: 1) estimate dolphin habitats in the GB system used for foraging with photo-identification population surveys and habitat measurements and 2) estimate likely proportions of different prey items consumed by individual bottlenose dolphins using stable isotope mixing models (SIMM).This multidisciplinary approach will provide critical data to better understand habitat use, site fidelity, and foraging ecology of GB dolphins. Information presented on these topics is based on preliminary data collected as part of our monitoring program and analysis of historical data.

026.125 U **Seasonal variation in activity of raccoons (*Procyon lotor*) in an urban ecosystem**, *Sydney Keane, East Texas Baptist University; Troy A Ladine, East Texas Baptist University*
Activity patterns of raccoons (*Procyon lotor*) were assessed using 12 trail cameras at randomly selected locations in a forested area of an urban ecosystem. The study site was located on the Environmental Studies Area of East Texas Baptist University in Marshall, TX. Cameras were active from 14 October 2014 to 30 November 2015. A total of 3044 pictures were taken of 41 different species. There were 872 pictures of raccoons. Seasonal activity varied with more pictures occurring during winter (497 total pictures; 57.0% all raccoon pictures) and autumn (244; 28.0%) and the fewest pictures occurring during the spring (64; 7.3%) and summer (67; 7.7%). Timing of activity also varied with seasons. The majority of summer activity occurred close to sunset, and a bimodal activity during autumn with activity peaks close to sunset and sunrise. Activity during spring and winter were uniform through the night with slight peaks shortly after midnight. All seasons captured diurnal activity (6.1% of activity) with the greatest percentage (17.9% of total summer activity) of diurnal activity occurring during the summer months.

026.126 U **Sediment burial decreases weight loss and increases survival following simulated drawdown conditions in the aquatic invasive plant** *Hydrilla verticillata*, *Bridgett Nicole Pickman, Texas Tech University; Matthew Alexander Barnes, Texas Tech University*
Aquatic invasive plants modify nutrient cycles, outcompete native species, and interfere with human water use. Therefore, environmental managers aim to reduce populations of such species. Drawdown represents one practice used to control invasive aquatic plants by decreasing water levels and exposing plants to air. However, if plants are buried in sediment, they may not face desiccation stress adequate to limit survival. Using fragments of the federally listed aquatic invasive plant *Hydrilla verticillata* as a case study, to quantify the effects of sediment burial on plant desiccation response, we exposed plant fragments to simulated drawdown conditions on top of or buried under sediment in laboratory mesocosms. We observed weight loss over a 3-hour drying period, and then returned fragments to a common aquatic environment, where we monitored survival and growth over the following month. Sediment burial decreased plant fragment weight loss (ANOVA $p < 0.0001$). Furthermore, percent weight loss proved to be a reliable predictor of survival (logistic regression $p = 0.01$; AUC = 0.773), and buried fragments demonstrated rates of new growth indistinguishable from undried control fragments (ANOVA $p = 0.0002$). Overall, our results suggest that the effectiveness of management drawdowns may be limited if fragments remain buried in sediments. Tilling or other efforts aimed at exposing buried fragments to promote desiccation may increase the ability of drawdowns to reduce nuisance aquatic plant populations.

026.127 N **Stakeholder Opinions on Invasive Species and their Management in the San Marcos River**, *Florence Marie Oxley, Austin Community College; Tina Marie Waliczek, Texas State University-San Marcos; Paula S. Williamson, Texas State University-San Marcos*
The San Marcos River in Texas supports a wide diversity of aquatic organisms and provides critical habitat for eight endangered species. It is also a highly invaded ecosystem, with 48 documented introduced species. Several of these are invasive and known to negatively impact native species. Increasing pressure to control or eradicate invasive species exists in order to mitigate their impacts. Management programs can be controversial and, in some cases, have been delayed or stopped because of public opposition. Stakeholders who have a vested interest in an invaded ecosystem, , may be the most likely to express opposition or offer support for invasive species control. Understanding opinions can help guide educational outreach to gain public support for management programs. To assess stakeholder's opinions of invasive species, a survey instrument was distributed

and 335 completed surveys analyzed. The majority of survey participants believed non-native, invasive species should be controlled to conserve the environment (84.4%), where they damage native Texas species (75.9%), and, in particular, when they threaten rare Texas native species (89%). Management methods influenced levels of support for invasive species control. Herbicide use was poorly supported suggesting invasive plant management projects should avoid chemical control methods when possible. Methods to control invasive animal species resulting in animal death, including poisoning and shooting, were least supported. Invasive animal management projects in the San Marcos River would likely gain greater public support by employing nonlethal methodology.

Environmental Science

Environmental Science Poster Session

Participants:

026.128 U *Sand Dune Restoration and Vegetation Changes from 2005 to 2015 Using Applied Geographic Information Systems*, *Lucas Ben Gomez, UTRGV; Andre Munoz, UTRGV; Brenda Bazan, UTRGV; Gladis Hinojosa, UTRGV; Francisco Arredondo, UTRGV; Luis Garza, UTRGV*
South Padre Island, Texas, one of the longest barrier islands in the world, has suffered from long shore drift dilemmas due to sand dune loss (Journal of Coastal Research, 2008). The importance of sand dune restoration has become one of the major issues to address in beaches (Broome, 2015). Sand dunes provide protection against severe wave action and weather hazards, as well as serving as a habitat for many species(Morton, 2015). Vegetation shield the dunes from erosion and weathering(Broome, 2015). One major issue is that human activities around beaches have decreased sand dune barriers(Morton, 2015). Fortunately, there have been several sand dune restoration programs aiding the growth of the beach(Broome, 2015). To address this problem our team conducted a series of excursions that helped show a positive relationship between sand dunes and vegetation in South Padre Island. In addition, our project and research focuses on vegetation within the dunes and how much it has grown over the past 10 years. In order to conduct this research, we used Global Positioning System (GPS) devices to map our data in a Geographic Information Systems (GIS) software, and used various coordinate points to help map the vegetation on the beaches. We compare this information with previously collected data to help compare vegetation with sand dunes. Our results show a positive change throughout the South Padre Island dune vegetation. With this information we showed the importance of dune restoration, and the creations of new ways to benefits our beach ecosystems in the future.

026.129 U **A Decade of Dunes**, *Andrew Atkinson, University of Texas Rio Grande Valley; Mariel Gonzalez, University of Texas Rio Grande Valley; Samantha B Moore, University of Texas Rio Grande Valley; Vincent Ochoa, UTRGV; Romeo Rubiano, University of Texas Rio Grande Valley; Stefany Salinas, University of Texas Rio Grande Valley; Jovahn Quiroz, University of Texas Rio Grande Valley*
The Texas General Land Office reports that 64% of the Texas coast is eroding at an average rate of approximately two meters per year (2015). Additionally, some locations across the 590 kilometer shoreline are losing more than nine meters per year. Property values decrease, beach faces become less aesthetically pleasing, and tourism declines creating economic hardship. Coastal dunes become developed with suitably strong onshore winds, sufficient sediment supply of medium to coarse sorted sand, and plentiful dune vegetation to assist in the stabilization of particles (Woodroffe, 2002). Coastal nourishment programs on South Padre Island, Texas have been evaluated since the early 1990s, and have led to millions of dollars in expenditures to cope for erosional problems, but impacts of large storms still affect local structures (Pethick, 2015). This study compared dune profiles on South Padre Island, Texas over a nine-year period. It shows the public the importance of dune restoration in protecting the shoreline. The comparison provides records of pre-Hurricane Ike data from 2008, post-Hurricane Ike data from 2008, and transects completed in the fall of 2015. Transects were taken from six locations (2 un-vegetated berms, 2 with established vegetation on the dunes and 2 with revegetated dunes), with each location providing detailed profiles showing the dynamic morphological changes of sand dunes in a nine-year comparison. The dunes with established vegetation and revegetated have grown over the study period. The un-vegetated berms have been revegetated during the study period.

026.130 G **Effects of dust exposure on the opportunistic bacterial co-cultures**, *Mariam Konate, Texas Southern University*
There have been a number of recent studies measuring environmental dust accumulation in both

indoor and outdoor environments. Dust particles negatively affect human health, but the major drivers of these health issues are still poorly understood. Additionally, few studies have attempted to characterize the impact of dust exposure on prokaryotic cells, including those that comprise the human microbiome. Platinum group elements (PGEs) are rare natural elements which are being increasingly used in health and commercial products. Consequently, their concentration in the environment has been increasing shown by the composition of dust particles. The purpose of this study is to determine the physiological effects of dust particle exposure (containing PGEs as well as other contaminants) on co-cultured opportunistic bacterial pathogens that associate with the human microbiome. Bacteria are constantly facing ever-changing environments that threaten their existence. Recent studies conducted in our lab have shown that dust exposure influences bacterial growth, oxidative stress resistance, and virulence potential when in pure culture (Suraju et al., 2015). Little is known about the physiological effect of dust particles on bacterial co-cultures. To evaluate those effects, growth, biofilm formation, and sensitivities to oxidative stress were measured following exposure to various concentrations of dust particles. Our results suggest that dust influences bacterial co-culture (and bacterial eukaryotic cell co-cultures) growth, virulence potential (biofilm formation and bacterial growth when co-cultured with eukaryotic cells), and oxidative stress resistance.

026.131 U **Examining uptake of arsenic by rice plants: results from small scale bench studies**, *Sioned Kay Kirkpatrick, Texas Lutheran University; Alison Bray, Texas Lutheran University; Derrick Quarles, Applied Spectra*

Rice is the primary staple crop for more than half of the world's population. Although rice provides some essential vitamins, minerals, and carbohydrates, it has also been found to contain arsenic (As). Unique from other grains, rice is grown in anaerobic conditions that facilitate the mobilization of As to the plants, eventually resulting in grain contamination. Coupled with other risks of As exposure from water, this class 1, non-threshold carcinogen can lead to various cancers and other negative health effects (Meharg, et al. 2009). In this pilot study, methods to mitigate the uptake of As in rice plants were evaluated. Rice was grown in greenhouse conditions in soil spiked with As to approximately 20 mg/kg dry weight. All plants experienced flooded conditions for four weeks. Plants were subjected to flooded or unflooded conditions at different periods of the plants' life. The results suggest that this concentration was highly toxic to the plants and resulted in extremely stunted plant growth and high concentration of arsenic per rice plant (up to 1138.10 ug/g dry weight). It was found that regardless of the timing of the anaerobic growing phase, aside from the control aerobic plants, all of the treatments resulted in absorbed As relative to that of the control anaerobic plants. The plants grown in the controlled aerobic environment showed consistently higher concentrations of As. Additionally, an inverse trend showed smaller plants with higher As concentrations. These results have prompted a larger pilot study currently in progress, utilizing lower concentrations of As in soil.

026.132 U **Including Geospatial Information into Habitat Maps for Gulf of Mexico Species Interaction Data**, *Kalen Rice, Texas A&M University - Corpus Christi; May Yuan, University of Texas-Dallas; James David Simons, Texas A&M University-Corpus Christi*

Habitat mapping is an important aspect of ecosystem-based management. How can we carry out ecosystem-based management if we do not have any information on the habitat we are trying analyze? We need spatial information such as depth, vegetation cover, surficial geology, and location to help map the habitat of a species. Even small landmarks are useful in the process. We are using the Coastal and Marine Ecological Classification Standard (CMECS) to classify spatial habitat information for the Gulf of Mexico Species Interaction (GoMexSI) database. By extracting information from past and current research papers, we are able to map and model the geographical area of the habitat we are interested in. When adding habitat information to the database, the sites involved are georeferenced with as much ecological data included as possible. CMECS has two settings (biogeographic and aquatic) and four components (water column, geoform, substrate and biotic) which provides a basis for classifying habitat data. To organize these data, we use the GoMexSI database coding ("Site ID and Station ID") to relate between fish species and the habitat information, and geospatial data through the codes in the database. To date, we have classified 5883 fish combinations of species and habitat data from Mexico and Cuba, along with 29,232 combinations of fish and habitat at the U.S sites. These data were collected from 449 references including 4092 study sites, 449 study areas, and 3 survey transit lines out of approximately 800 available references.

026.133 U **Land use effects on biological activity in the San Antonio River**, *Gabriela Andrea Hernandez Gonzalez, University of the Incarnate Word; Gerald Mulvey, University of the Incarnate Word*

Recent concern over water availability has prioritized water quality monitoring and raised efforts for awareness of human activities. The purpose of this study is to analyze the relationship between watershed land use and biological activity in the San Antonio River. First, we look for a correlation between Nitrogen and Phosphorus levels and bacterial counts. Then, we associate these levels to land use of the Upper and Lower San Antonio River watersheds. The data we utilize was retrieved from the San Antonio River Authority database, containing measurements collected from monitoring stations located through the river. We use Nitrite (mg/L), Nitrate (mg/L), Nitrogen (Kjeldahl mg/L), Phosphorus (mg/L) and *E. coli* (MPN/100 mL) measures for correlation analysis of each station. The average sample size is 40 entries of measurements from 2003 to 2014. Subsequently, t-tests are performed to demonstrate statistical significance of the correlation. We utilize BASINS, a Geographical Information System (GIS) software, to visualize land use data from the Environmental Protection Agency categorized as Urban, Agricultural Land, Rangeland, or Forest Land. We further divide land use according to their high, medium, or low influence by station and relate them to water quality category levels. These levels are divided as high, medium, and low according to a station's variance from the mean of all stations measurements. Preliminary results show a direct correlation of bacteria and nitrogen levels in agricultural land, strengthening our hypothesis of human activity influencing biological activity in the river. Final results of the study will be presented in the poster.

026.134 G **Particulate matter contribution from metal recycling center**, *Allen Ladd White, Texas Southern University*

Title: Particulate matter contribution from metal recycling center Industrial sources produce high concentrations of particulate matter (PM), which are associated with cardiopulmonary diseases according to epidemiological reports. Supplementary passive air sampling and insight to weather conditions allow us to target a metal recycling facility producing visible quantities of dust in the center of several neighborhoods in the Greater East End of Houston, Texas. Sites were chosen to a decreasing gradient of 75, 150, and 305 meters away from the source believed to produce toxic levels of trace metals (Al, Cu, Pb, Ni, Ti, Zn, Sn, Pt, Rh, and Pd). PM samples were collected in two ways: by an 8533EP model DustTrak DRX aerosol monitor PM counter and by passive collection of particles using an oil-based trap and an adhesive surface. The non-work hours samples measured serve as an ambient control for PM 10 and PM 2.5 sources at 5-8 micrograms per cubic meter (μg/m3). The PM concentrations averaged well over the EPA standard of 12 μg/m3 for both PM 10 (45 μg/m3) and PM 2.5 (43 μg/m3) at 75 meters from the source. The passive collection samplers were used to determine the composition of the dust for trace metals. By performing a solid sample digestion method for trace metals analysis we will determine our samples composition using the Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

026.135 U **South Padre Island Beach Nourishment**, *Myrna Leal, University of Texas Rio Grand Valley; James Martinez, University of Texas Rio Grande Valley; Leslie Soto, University of Texas Rio Grande Valley; Sarah Nash, University of Texas Rio Grande Valley; Mariela Zavala, University of Texas Rio Grande Valley; Shelby Bessette, University of Texas Rio Grand Valley*

City beaches of South Padre Island have been nourished several times since the first nourishment in 1997. This year's beach nourishment began in October of 2015 and will not be completed until 2016. To accurately record the change in the beach created by the nourishment, we began by measuring the pre-nourishment slope and width of eight transects by using a transit level scope and measuring tape to collect elevation data every 5 meters per transect. Once the nourishment was complete we were able to accurately record the new beach slope and graph the difference. Our first completed transect showed a difference of over 80 meters of widened beach. We can use this first slope difference to estimate the future width of the other 7 transects. A nourished widened beach is a critical component to protecting the island from hurricanes, tropical storms, and daily erosion from wind and wave action, while providing a much needed recreational beach for tourists.

Freshwater Science

Freshwater Science Poster Session

Participants:

026.136 U **Bacterial Heavy Metal Resistance in Town Lake, Austin, TX**, *Teresa Marie Bilinski, St. Edward's University; Andrea Canales, St. Edward's University*

The goal of this research is to investigate the growth rates of Zinc (Zn)- and Chromium (Cr)-resistant bacteria in Town Lake. Sediment and water samples from three different sites in Town Lake were collected in Summer 2015. Environmental concentrations of Zn and Cr in samples was estimated based on published concentrations. Bacteria were isolated from samples by adding sediment and water to culture tubes containing 10% tryptic soy broth (TSB). After 24 hours, aliquots of each culture (from each site) were transferred into triplicates of the following treatment tubes: A) control, 10% TSB; B) 10% TSB + 1.36g/L Zn; C) 10% TSB + 1.5g/L Zn; D) 10% TSB + 1.7g/L Zn; E) 10% TSB + 1.36g/L Cr; F) 10% TSB + 1.5g/L Cr. The growth of bacteria in each culture tube was measured using both optical density at 600nm and colony forming units (CFUs). The highest bacterial growth rates occurred in cultures inoculated from Site 1, which had the greatest human impacts. An analysis of variance (ANOVA) demonstrated that bacterial growth was significantly higher in control cultures. This indicates that Zn and Cr suppress microbial growth. There was a significant difference in bacterial growth between metal concentrations, with the highest growth rates occurring within cultures with 1.36 g/L of Cr. There were significant differences in bacterial growth rates between the different collection sites; Site 1 had the highest growth rates. Future experiments could focus on characterizing the genetics of bacterial Zn and Cr resistance at Town Lake.

026.137 U **Can you see it now? Molecular screen for** *Angiostrongylus cantonensis* **in Uruguayan apple snails**, *Carissa Bishop, Southwestern University; Romi L. Burks, Southwestern University*
Freshwater mollusks occupy a central, intermediate position in food webs through direct connections, either as consumers or as prey. Certain mollusks, such as snails, indirectly facilitate trophic interactions by serving as intermediate hosts for parasites, including the nematode *Angiostronglyus cantonensis*. This roundworm causes encephalitic meningitis in humans, or brain swelling, when people consume raw or uncooked, infected gastropods. While humans become accidental hosts after ingestion of infected larvae, mollusks serve as vital intermediate hosts. We sought to quantify *A. cantonensis* infection prevalence within apple snails (*Pomacea* spp) collected from Uruguay. Uruguay represents the southern limit for *Pomacea* spp, known intermediate hosts for the parasite. We screened for the presence of *A. cantonensis* in apple snails by extracting tDNA from foot tissue and conducting a species-specific PCR targeting the ITS-1 gene (internal transcribed spacer-1). We identified infected individuals through visual comparison against three positive controls using gel electrophoresis. To date, we have found no positives samples but have only screened a small subset of potential hosts. We plan to amplify the ITS-1 gene for *A. cantonensis* in 700 apple snail tissue samples collected from 45 site locations across Uruguay during previous field excursions (2011-2015). We also want to expand our screen to include 250 samples from Brazil. Other researchers have detected *A. cantonensis* in apple snails from northern Brazil, but no study has yet examined southern Brazil. Our study will provide the first molecular screen for *A. cantonensis* within freshwater apple snails in Uruguay and southern Brazil.

026.138 G **Desiccation tolerance of introduced** *Pomacea maculata* **populations in Texas.**, *Adrian Medellin, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake; Paul Glasheen, Southwestern University; Romi L. Burks, Southwestern University*
Successful non-native species possess life history traits that allow them to exploit new areas and habitats. In invasive freshwater snails, one common adaptation is desiccation tolerance, where organisms can survive periods of drought through aestivation. Certain species of apple snails (Ampullariidae: *Pomacea* spp.) can tolerate relatively long periods of desiccation by sealing their shells with their opercula. Although native to South America, *P. maculata* has established populations across the southeastern United States, often leading to negative impacts on native aquatic vegetation and snails. Previous work on native apple snails in Uruguay (including some *P. maculata*) showed desiccation tolerance of up to 47 days when buried at ambient temperature. To indirectly compare desiccation tolerance between native and non-native populations, we collected *P. maculata* from the Houston area on three separate dates in October 2015 and buried them in dry sand after recording their weight. We checked snails daily for evidence of mortality, sexed snails upon death and also recorded the mean daily and nightly temperatures to which the snails were exposed. Snails survived desiccation up to 37 days (mean 9.65 ± 9.01 days). We observed that desiccation tolerance varied significantly by sex, mass, and the temperature that the snails experienced. Our data suggest that survival of invasive, non-native *P. maculata* involves aspects of both the species' ecology and temperature exposure. Additional snails are being monitored for desiccation tolerance to increase our sample size. We will also be testing survivors for normal

behavior after long-term burial to compare with native populations.

026.139 U **New Record of Mystery Snails in Harris County Texas**, *Bianca J. Perez, Southwestern University; Averi Harp Segrest, Southwestern University; Sofia Campos, Southwestern University; Romi L. Burks, Southwestern University; Russell Minton, University of Houston Clear Lake*
Increased globalization in recent decades has fueled species exchange between continents. Whether intentional or unintentional, increased connectivity encourages transport and introduction of non-native species through vectors such as the aquarium or food trades. These trades often transport non-motile groups including mollusks. Two species of Asian mystery snail, *Cipangopaludina chinensis* and *C. japonica* (Viviparidae), entered the United States through the food and aquarium trades and now occur in 27 states. Distinguishing between these two species only using morphology poses difficulty. Both species reach similar sizes and exhibit smooth light to dark green shells with 6-7 concave whorls and indented sutures. The USGS Nonindigenous Aquatic Species database lists three collections of *C. chinensis* in two Texas counties. No records of *C. japonica* from Texas exist, although this species occurs in surrounding states. During fieldwork [October 2015], we collected one male and one female *Cipangopaludina* spp. from the Missouri City Community Pond in Harris County, TX. Dissection of the female yielded 52 juveniles in the brood pouch. Phylogenetic analysis based on the cytochrome oxidase *c* subunit I (COI) gene will be used to determine whether individuals are *C. chinensis* or *C. japonica*. If they turn out to be *C. chinensis*, our collection will represent a new Texas county record and the southernmost collection in Texas. If they represent *C. japonica*, our collection will stand as the first collection of this species in Texas. Regardless of species identity, our finding suggests the presence of a potentially viable population of non-native mystery snails in Houston.

026.140 G **Reach level habitat association and life history of two crayfishes in Smith County, Texas**, *Andrew Glen, University of Texas at Tyler; Jared Dickson, UT Tyler; Neil Ford, University of Texas at Tyler*
Crayfish are important components of freshwater environments and are recognized as both keystone species and ecosystem engineers. Crayfish process significant amounts of organic matter, impact fauna across several trophic levels through energy transfer, and increase complexity of habitat through burrowing behavior. The American Fisheries Society Endangered Species Committee found that 162 of the 338 native crayfish in North America and Canada have some elevated level of conservation status. Forty-three species of crayfish are represented in Texas but are very poorly known in terms of ecology and life history. Over a 5-month period we sampled 6 creeks for two crayfish species (Procambarus kensleyi and Procambarus dupratzi) in Smith County, Texas using kicknets and minnow traps. Captured individuals were identified to species, and length, weight, and reproductive status were recorded. Habitat assessments were made using the Qualitative Habitat Evaluation Index (QHEI) to establish species habitat associations of each species. Both P. kensleyi and P. dupratzi were found to be significantly associated with instream cover, channel morphology, and mesohabitat quality. Sex ratios differed between species, with males representing 36% of the captured P. kensleyi and 42% of the P. dupratzi. P. dupratzi was found to exhibit reproductive activity at a smaller size (26 mm) than P. kensleyi (35.6 mm). Age and growth was determined by numeration of sizes into 2 mm bins. These species show traits similar to those found for other Procambarus species in other regions.

026.141 U **Seeking refuge in a warm subtropical reservoir: how are zebra mussels surviving these waters?**, *Devin Garcia, Temple College; Jason L Locklin, Temple College*
Zebra mussels (*Dreissena polymorpha*) are native to the Black, Caspian, and Azov Seas, and were first reported in North America in the Great Lakes (1988). Since that report, they have successfully spread south as far as central Texas despite their cold-water origins. Zebra mussels are well known for significantly impacting the ecological systems they colonize and are particularly challenging to manage. Their successful establishment at southern latitudes is reportedly due to an increasing tolerance for warmer waters. However, the southernmost populations may also be subject to population crashes during the warmest months, thus limiting their establishment is some southern systems. In this preliminary study, we document the vertical distribution of mussels and water temperature profiles in a subtropical reservoir in central Texas where mussels were first reported in 2013 and appear to be well established despite summer surface water temperatures reaching up to 33C. Because these mussels are native to cold waters, we predicted an increased mussel abundance in the hypolimnion during summer months and a more even distribution throughout the water

column after summer stratification breaks down. Unfortunately, temperature data indicate a lack of stratification during the study period. This was particularly a wet sampling season, which reduced residence time and likely contributed to a relatively consistent water temperature profile. Mussels, however, were more abundant at the bottom of the reservoir during much of the summer and fall. This preliminary study will guide a more extensive survey of the mussel population in the reservoir this upcoming year.

026.142 U **Using Indicator Microorganisms to Determine the Effects of Urbanization on Ecosystem Services**, *Maria Rodriguez, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*
The goal of this research was to look at the water quality inside a nature preserve, Wild Basin, using indicator microorganisms, such as fecal coliforms. Wild Basin is important because it is the home of an endangered bird (Setophaga chrysoparia) in Austin, TX and it provides various services for our environment. I was interested to understand how the quality of water is affected by the urbanized areas that surround Wild Basin. Particularly there are areas where runoff can easily flow into the preserve and introduce contaminants, which is something to be aware of. I took a microbiology approach to investigate this event and found four sites that had different environmental characteristics as well as different levels of urban impact. Water samples from these sites were inoculated into three different types of selective and differential media. This media promotes the growth of gram-negative bacteria and suppresses the growth of gram-positive. Results from this method showed that, fecal coliforms were more abundant in areas with the highest impacts from human activity. The results have important implications because high number of fecal coliforms can indicate the presence of pathogenic strains of bacteria which can not only affect organisms in Wild Basin but also present a health risk for people that use waterways for recreational activities.

026.143 U **Individual-level foraging competition between Gambusia congeners under varying flow regimes**, *Ralph Khayat, St. Edward's University; Haley Christians, St. Edward's University; Valencia Mobley, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
The partitioning of niches refers to the process by which natural selection drives competing species into different patterns of resource usage or different niches. This process is primarily caused by intraspecific competition, which occurs when closely related species are introduced into non-native habitats. *Gambusia* congeners (*G. geiseri* and *G. affinis*) have been introduced into spring systems within Texas, and may out-compete one another depending on the environmental context. One such context that varies between native habitats of *G. geiseri* and *G. affinis* is flow. *G. geiseri* is a spring-dwelling mosquitofish and relies on stable spring conditions with some flow. Preliminary results (Marsh-Matthew and Vaughn, unpublished) suggests that *G. geiseri* can better compete with *G. affinis* under higher flow conditions. Further, Chad Hargrave's lab at Sam Houston State has shown that flow also influences competitive ability of the endangered *G. nobilis* when faced with the introduced *G. geiseri* (Delaune and Hargrave, unpublished). To date, competition studies between *Gambusia* congeners have focused primarily at the community level. Here we take an individual-level approach to understanding the influence of flow on foraging competition of *G. affinis* and *G. geisieri*. These data will provide a potential mechanism for competition between these congeners, which could have important conservation implications for this group.

Saturday, March 5

035. Poster Session II - Academic Bldg
8:00 to 9:30 am
Academic Building, Academic Building Posters
Geosciences
Geosciences Poster Session
Participants:

035.144 G **An ecological functional assessment of extant African rodents using postcrania**, *Timothy L. Campbell, Department of Anthropology, Texas A&M University; Kersten Bergstrom, Department of Anthropology, Texas A&M University*
Reconstructions of African Plio-Pleistocene paleoenvironments that use fossil micro-mammals (<500 g) as proxies for past environmental conditions have almost exclusively relied on assessments of relatively well-preserved craniodental elements and taxonomic based methods to infer past environmental conditions. As such, post-crania are generally not considered or are used exclusively for taphonomic analyses of the various biotic and abiotic factors that resulted in the fossil

accumulation. Numerous studies across a wide range of taxonomic groups, however, have demonstrated that postcrania can be used in ecological functional based paleoenvironmental reconstructions. In this study, 15 rodent postcranial measurements from 130 individuals representing 18 extant genera are utilized to generate 13 functional ratios in order to test the association between limb morphology and locomotor patterns. Principal component analysis is used to distill the data with the first four axes retained that collectively captured 93% of the variance. PC Scores from these axes are then used in a canonical variance analysis. Results utilizing 7 defined locomotor patterns as predictor variables demonstrate significant differences among groups and a 74% correct classification rate is obtained through cross-validation. Good separation and 100% correct classification is found for semi-aquatic, fossorial and saltatorial groupings, however, these groups are represented each by a single genus. Misclassification rates within the other four groups range from 45-21%. While these results suggest that ataxonomic functional groupings of African rodents may be useful in paleoenvironmental reconstructions, a larger sample size with greater taxonomic breadth is needed in order to fully assess the utility of this approach.

035.145 U **Late holocene stable carbon and nitrogen isotopic variation of bulk organic matter deposited in blackwood sinkhole, abaco, the bahamas**, *Kristin Nicole West, TAMUG*
δ13Corg and δ15Norg isotopes in an already analyzed core from Blackwood Sinkhole in the Northern Bahamas show that shifts in organic matter deposition coherently change with regional landscape change, because different isotopic values correlate to different sources of organic matter. In the research project, I will helped to replicate that signal by preparing an additional core for analyses.The core was sub-sampled at 1 cm intervals. Small amounts of the subsamples were then measured on a CHN analyzer for total carbon and nitrogen values. The next process was then to remove inorganic carbonate through liquid acidification. Lastly, the samples were prepared and sent to Baylor University for organic carbon and nitrogen isotope measurements. The hypothesis is that there will be a duplication of the previous signal, and we will be able to enrich our data to make results suitable for publication. This research will contribute to understanding more about how coastal environments respond to changes in climate and regional vegetation and hydraulic changes, which is a priority of both scientists and policy-makers.

035.146 G **Origin of folding at Ernst Tinaja, Big Bend National Park, TX**, *Ryan Robert Silberstorf, Stephen F. Austin State University; Chris A. Barker, Stephen F. Austin State University*
Ernst Tinaja is a narrow canyon in eastern Big Bend National Park, TX, with intensely folded and locally faulted Cretaceous strata. Rising prominently to the east are the Sierra del Carmen mountains, cored by an uplifted, thrusted monocline with Laramide origin and B&R overprinting. West of Ernst Tinaja is Tornillo graben forming the center of the Park. Within this basin rise the Tertiary (32Ma) Chisos Mountains. A few miles north of Ernst canyon are folded and thrusted Ouachita Paleozoics. Thus Ernst Tinaja sits at the nexus of several major structural/volcanic trends in North America. The folds in Ernst Tinaja are in thin-bedded Boquillas layers that immediately overlie thick, unfolded Buda limestone. Some clayey Boquillas layers thicken slightly in fold hinges, but folds are otherwise mostly parallel, flexural-slip, open to tight, possibly drag folds. Sigmoidal shapes in the Boquillas were probably created during folding and are thus low-temperature ductile features. Orientation of mesoscale thrusts in the Boquillas match flexural-slip directions. Several steep breccia zones cutting the canyon are probably B&R extensional features. The objective of this research is to make a detailed study of folding and faulting in Ernst Tinaja in order to better understand the geologic history of the area. This is a preliminary report of field work conducted for a Master's thesis at Stephen F. Austin State University.

035.147 G **Possible Cool Water Origins of an Unnamed Permian Unit in the Alexander Terrane of Southeast Alaska**, *Mitchell Alexander May, Sul Ross State University*
In the Alexander Terrane in the Prince of Wales region of Alaska, an overlooked Permian carbonate unit crops out on the eastern shore of Suemez Island. The first mention of the unit appear in the United States Geological Survey from 1920's, but the unit was only mentioned not described, measured, or mapped. After conducting fieldwork in the summer of 2015, the Permian section has been measured, lithologic and fossil samples taken, and it is in the process of being described along with the cataloging and identification of taxa. Preliminary results indicate the Permian unit is a slight folded, blue to gray limestone with cool or cold water origins that has undergone pervasive silicification. Macro-fossils are sparse but include bryazoans and brachiopods. The bedding in the unit may indicate seasonal storm events where brachiopods are concentrated in beds with a chaotic orientation and a possible mixing zone of siliceous materials and carbonate materials from the shelf

slope. Utilizing the fossils and sedimentary structures, correlation of the overlooked unit to other Permian units in the Alexander Terrane is possible. The project will provide potential information about depositional environments, paleoecology, and paleoclimate of the Permian unit. If correlated to other Permian units, the project could also provide an insight to oil/natural gas producing Permian units within the Alexander Terrane.

035.148 U **To What Extent Do Early Paleogene Sandstones in Big Bend National Park Document a Change in Volcanic Provenance?**, *Ryan Kubena, Sul Ross State University; Jesse Kelsch, MS, Sul Ross State University*
Clasts within Paleocene and Eocene sandstones in Big Bend National Park were analyzed petrographically and counted to track change through the Paleogene of the presence and relative importance to provenance of a variety of volcanic sources. The Paleocene Black Peaks, early Eocene Hannold Hill, and middle Eocene Canoe Formations dominantly record the erosion of deformed Cretaceous limestones while the upper part of the Canoe Formation contains the first locally derived volcanic clasts. In this undergraduate research project, variation in size, composition and relative abundance of volcanic lithic fragments throughout this sequence are documented and compared to known eruptive centers in the Trans-Pecos Volcanic Field and western Mexico. These observed changes correlate to paleocurrent data and depositional style.

Physics

Physics Poster Session

Participants:

035.149 N **Calculating Resonance States for the Helium Atom**, *Steve Alexander, Southwestern University*
A new implementation of the complex coordinate method is presented. It uses an explicitly correlated wavefunction to obtain both the eigenvalue and the eigenvector of a resonant state. We have used this method to calculate the lowest doubly excited states of helium and we compare our results to those obtained by other methods.

035.150 U **Constructing an Outdoor Robot Using Wheelchair Motors**, *Yash Ghandi, Southwestern University; Eric Rodriguez, Southwestern University; Isabella Ferranti, Southwestern University*
Robotics is a subject that naturally combines physics, engineering and computer science. For this reason, there are a large number of commercially available components that can be used to build small, indoor robots that will perform a wide variety of tasks. Building larger robots that can function outdoors is a bit more difficult because many of the parts aren't readily available or they are prohibitively expensive. This poster describes a 250 pound robot that we built during the summer of 2015 using wheelchair motors. How these motors were controlled and powered is discussed in detail.

035.151 U **The link between Fourier waves and emotional responses to music.**, *Lydia Grace Ryan, Temple College*
According to traditional musical understanding, certain combinations of musical tones evoke certain emotions in listeners. From a scientific perspective, when multiple tones are sounded simultaneously, their sound waves combine into one wave with a complex pattern. For some combinations of tones, this sound wave has a fairly regular period and amplitude. For other combinations, this sound wave has a more irregular period and amplitude. I propose to study the relationship between these sound waves, and the emotional reactions that the chords invoke in listeners. To account for cultural factors and different amounts of musical ability, listeners will be divided into three groups: musical adults, non-musical adults, and children 13 or younger. The sound waves will be analyzed and compared to the emotions that they invoke in these listeners.

035.152 U **Towards Understanding Variability in Be Stars**, *Archit Vasan, Austin College; Amy Glazier, Austin College; Brian Schrandt, Austin College; David Whelan, Austin College*
Emission-line B-type (Be) stars exhibit emission lines in their spectra caused by a circumstellar disc. For many Be stars, the emission signatures vary in strength and character over time, but the causes of this variability are not well understood. In order to shed light on the question of why Be stars' discs vary in the ways that they do, we have studied a subset of Be stars surveyed by the Apache Point Observatory Galactic Evolution Experiment (APOGEE). We find that spectral type and rotational velocity do have a possible influence on variability in Be stars. Although stars with early spectral types and large ratios of rotational to critical velocity are not exclusively coincident with

both V/R variability and disc dissolution/reemergence, the majority of our stars that depicted either type of variability could be classified as such. Further, stars that show shorter periods of variability also tend to have earlier spectral types and rotational velocities that are closer to their critical velocities.

035.153 U **Using a GPS Chip to Control the Path of a Robot**, *Isabella Ferranti, Southwestern University; Yash Ghandi, Southwestern University; Eric Rodriguez, Southwestern University*
Building robots that can perform a wide variety of useful functions is becoming easier because of the increasing availability of inexpensive components and a vigorous online community of makers. In this poster we will describe how we created an autonomous outdoor robot and controlled its motion using a GPS chip and an electronic compass.

036. Poster Session II - Dining Hall
8:00 to 9:30 am
Dining Hall, 01
Chemistry and Biochemistry
Chemistry & Biochemistry Poster Session
Participants:

036.154 U *In vivo* **investigations (efficacy and pharmacokinetics) of a new cyanide antidote**, *Valerie Luz Coronado, Sam Houston State University; Lorand Kiss, Sam Houston State University; James Ross, Sam Houston State University; Janna Lowry, Sam Houston State University; Taylor Petrash, Sam Houston State University; Ching-En Chou, Sam Houston State University; Secondra Holmes, Sam Houston State University; Deeptika De Silva, Sam Houston State University; Ilona Petrikovics, Professor, Sam Houston State University*
Cyanide prevents oxygen utilization and ATP formation in cells. The heart and brain are the first organs to feel the harmful effects of cyanide because they consume the most oxygen. The body naturally converts cyanide into thiocyanate, a less toxic anion, but without the help of an administered antidote, it cannot handle larger doses of cyanide. Commercially available antidotes have both advantages and disadvantages, therefore we tested for new antidotes with better profiles. CNAX is one of our promising cyanide antidote candidates. Our aim was to compare the efficacy between CNAX and commercially available antidotes along with measuring its partitioning to the brain. To determine antidotal efficacy, mice were injected with calculated doses of cyanide in combination with the antidotes. The antidotal potency ratio (APR), which compares the lethal dose of cyanide with and without an antidote, was calculated to show the in vivo efficacy of the antidotes. A pharmacokinetic study for CNAX was carried out to test its partitioning to the brain. Mice were injected with CNAX, and brains were collected at different time intervals. Brain samples were homogenized and analyzed using gas chromatography-mass spectrometry.

036.155 U **An investigation into air sample testing using a miniature atmospheric chamber and gas chromatography-mass spectrometry**, *Joseph Harrison Meadows, East Texas Baptist University; Kristin Butterworth, East Texas Baptist University*
Atmospheric chambers have been used in various fields of chemical study in conjunction with Gas Chromatography-Mass Spectrometry (GC/MS) for a myriad of purposes. Many of these studies have dealt with the application of atmospheric chambers in environmental chemistry. This study seeks to verify the efficacy of a custom-made, low-cost atmospheric chamber in analyzing gas-phase samples using GC/MS. The focus of the chamber testing revolves around a mixture of air and pure acetylene. Chamber assembly and preparation was conducted through a series of leak-tests and input/output design alterations. Additionally, a GC/MS method for the analysis of acetylene was derived from an existing ethanol headspace analysis method. Finally, the chamber was tested for the ability to introduce a sample mixture into the chamber and successfully remove the sample using a 1000μL gas-tight syringe. Results of the chamber evaluation are promising and warrant further development and research.

036.156 U **DNP conjugation of receptor targets for diseased cell receptors**, *Darean Bague, Schreiner University*
The size, structure and functional group diversity, increased folding energies, and malleability of proteins allow them to bind to disease-relevant receptors that challenge, or potentially evade, small molecule-reagents. The development of proteins that recognize a therapeutically-relevant target is simple in comparison to small molecule discovery. Antibody-recruiting molecules (ARMs) are capable of enhancing antibody binding to disease-relevant cells or viruses. The ability to bind to a

diseased cell surface receptor and triggering immune system for demolition of the diseased cell contains the potential to expand the utility of the functions of proteins in general research and therapeutic aspects. The DNP-NHS labeling reagent enables conjugation of DNP by targeting primary amino groups (N-terminus or lysine residues) under very mild conditions. The aldehyde reagent 2-Pyridincarboxaldehyde obtains versatility as a site-specific bioconjugation reagent and maintains high product yield. This research overall aims to synthesize a modified DNP antibody-recruiting molecule from the combination of the DNP-NHS and 2-PCA reagents.

036.157 U **Detection of heavy metals in commercial teas**, *Tamara D Kotin, Texas Lutheran University; Amber Duelm, Student*
This research was conducted to analyze the concentrations of manganese, cadmium, and lead present in green and black teas via tea digestion and brew methodologies paired with Flame A.A. Spectroscopy to determine whether the levels of these metals generate potential health risks in populations where tea drinking is common. In addition, this research aimed to extrapolate the extent of heavy metal pollution present in soils of countries with the largest exports of tea; China and India. Branching from studies marking tea as a potential source of metal toxicity, this research intended to clarify whether factors such as country of origin, tea type, or organic vs. non-organic cultivation techniques influence the concentration of metals present in various tea samples. Manganese concentrations ranged from 225-1514ppm, with Mother's Milk having the lowest average concentration and HEB Organic Green tea having the highest average. Cadmium concentrations ranged from 0-0.334ppm, with Yorkshire Black tea having the lowest concentration and Mother's Milk having the highest. Digest and brew data revealed that Indian teas contained significantly higher concentrations of cadmium than Chinese varieties, organic contained significantly higher concentrations of cadmium than non-organic varieties, and green contained significantly higher concentrations of manganese than black tea varieties. While precise causation for the differences are not clear and further studies should be conducted to validate the results, the high concentrations of Mn and Cd observed in the plants in this study are undoubtedly risk factors for overexposure in humans and reason for concern about the ecological health of these regions.

036.158 U **Determination of element concentrations (and risk assessment) in fish purchased from stores in Nacogdoches, East Texas, USA**, *Kefa Karimu Onchoke, Stephen F. Austin State University; Christopher Franclemont, Stephen F. Austin State University*
Fish samples purchased from markets in Nacogdoches city, Texas, USA, were analyzed for total metal (Ag, Al, As, B, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, S, Se, V, Zn) concentrations using inductively coupled plasma-optical emission spectroscopy (ICP-OES). Risk assessments for carcinogenic and non-carcinogenic health risks was also performed to determine the overall health risk associated with the consumption of the fish. On average, most of the fish samples analyzed had arsenic, cadmium, chromium, and lead concentrations above the maximum USEPA contaminant limits of 0.0013 mg As/g, 0.0002 mg Cd/g, 0.008 mg Cr/g, and 0.004 mg Pb/g. Arsenic, cadmium, chromium and lead concentrations detected in the samples were in the range of 0.007413 mg/g - 4.103 mg/g, 0.00002413 mg/g - 0.007310 mg/g, 0.0003158 mg/g - 0.08300 mg/g, and 0.002624 mg/g- 0.01482 mg/g, respectively.

036.159 U **Discovering a novel inhibitor for inosine 5 monophosphate dehydrogenase in** *B. anthracis* , *Lisa Strong, The University of Texas at Austin; Ashley Ciosek, The Freshman Research Initiative at the University of Texas at Austin; Josh Beckham, The Freshman Research Initiative at the University of Texas at Austin*
Bacillus anthracis is a Class A bioterrorism weapon that currently has no effective antibacterial drug. This study aims to find a potential drug that effectively inhibits Inosine 5' Monophosphate dehydrogenase (IMPDH), an essential enzyme in B. anthracis. IMPDH transfers a hydride from NAD+ to inosine 5□-monophosphate creating xanthosine 5□-monophosphate. XMP continues in the GMP pathway to yield guanine, which is essential for cell survival. In order to identify top compounds, virtual screening of IMPDH was performed using a crystal structure from the Protein Databank (ID: 3TSB, 2.38Å). Screening entailed using the GOLD docking program on a Ti3D computer cluster, saving the top 10 ligands. The GOLD screening methodology was validated using control ligands where good scores were determined to range from 72-90 and 5 out of 6 of the positive controls scored higher than the negatives. After validation, the Chembridge diversity ligand library with 100,000 compounds was screened where the top ten ligands ranged from 82-92. Results will be validated through enzyme inhibition assays. The protein for testing will be expressed in E.coli BL21 (DE3) cells from the coding DNA sequence expressed in E.coli DH5α cells. The

protein will be purified and tested for functionality. A final inhibition assay will measure the decreasing appearance of NADH to show inhibition and to find potential drug candidates for IMPDH in Bacillus anthracis.

036.160 U **Discovery of novel inhibitors for verona-integron encoded metallo-beta-lactamase in** *Pseudomonas aeruginosa*, *Steven Duc Tran, University of Texas at Austin; Josh Beckham, The Freshman Research Initiative at the University of Texas at Austin*
Pseudomonas aeruginosa is a bacterium that causes a wide variety of infections in hospital patients and those with impaired immune systems. Infections by this organism are treated with antibiotics; however, with increasing bacterial resistance to antibiotics, this becomes more difficult. In particular, infections by multidrug-resistant strains of *P. aeruginosa* can be a serious issue as it extremely difficult to find antibiotics that can inhibit the bacteria. Of the various ways that bacteria can develop resistance to antibiotics, the most common is the development of an enzyme that can neutralize the drug. In *P. aeruginosa*, this enzyme is VIM-2, a metallo-beta-lactamase that hydrolyzes the beta-lactam ring in beta-lactam antibiotics to neutralize their effectiveness. In this research, novel inhibitors for VIM-2 will be found using virtual screening and enzyme/inhibition assays. High throughput virtual screening was used to screen large libraries of ligands against the virtual structure of the enzyme. Top scoring ligands from this computational method will then progress onwards to in vitro inhibition assays. To complete these assays, the beta-lactamase VIM-2 gene was cloned into the pNIC-Bsa4 vector and expressed in *Escherichia coli* BL21(DE3) cells. VIM-2 activity was verified in enzyme assays using the Nitrocefin substrate.

036.161 U **Fluorescence Assay of Wild-Type, W60Y, and W96F β-2-Microglobulin Aggregation**, *Christopher Alcorta, Austin College*
Beta-2-microglobulin (β2M) is a small 99-residue nonpolymorphic structural protein of the Class 1 MHC that is composed of β-stands and β-turns. When native state β2M is induced to misfold, it aggregates with other misfolded β2M to form amyloid fibrils. Formation of these fibrils is more energetically favorable than native-state β2M, which therefore draws more native protein into the growing amyloid plaque. These protease-resistant plaques can accumulate on the surfaces of articular tissue and cause dialysis-related amyloidosis, a condition where accumulated plaques cause articular destruction, which leads to joint pain and bone cyst formation. Aggregation patterns of wild-type β2M and two mutants, W60Y and W96F, were studied using Thioflavin T Fluorescence to determine the effect of the replacement of a natural tyrosine with another aromatic residue on aggregation rates. Experiments were ran at 12hr intervals at 25ºC where amyloid events were induced by acid hydrolysis at a pH 2.5. Wild-Type β2M showed faster aggregation with a max peak at 7hr while the W60Y and W96F showed slower aggregation patterns, reaching max peaks at 11hr and 12hr respectively, and distinct lag phases. These data suggest that both Trp at position 60 and 96 are important in stabilizing the aggregation process.

036.162 G **Investigating the membrane penetration of a novel cyanide antidote in a blood-brain barrier model (BBB-Parallel Artificial Membrane Permeability Assay)**, *Chathuranga Chinthana Hewa Rahinduwage, Sam Houston State University; Brooke Mendenhall, Sam Houston State University; Magen Ross, Sam Houston State University; Waleska Baca, Sam Houston State University; Ilona Petrikovics, Professor, Sam Houston State University; Lorand Kiss, Post Doctorate Researcher*
Cyanide is a rapidly acting toxic substance with primary target organs of the brain and the heart. It is a strong requirement from a cyanide antidote to act efficiently and reach immediately the most susceptible brain. The blood-brain barrier is responsible for the protection of the brain and it hinders most of the drugs to reach the brain. Our goal was to investigate the permeability of the new Cyanide Antidote X1 (CAX1) through the blood-brain barrier by using the Parallel Artificial Membrane Permeability Assay (PAMPA) model. PAMPA sandwich was prepared for the permeability measurements by putting together the donor and acceptor 96-well plates and impregnating the artificial membranes with BBB-PAMPA lipid cocktail. 100 μg/ml of CAX1 was placed into the donor phase and stirring was applied during the incubation. Samples were collected from the acceptor phase after 30, 60, and 90 minutes and from the donor phase after 90 minutes. The CAX1 containing samples were analyzed by HPLC. The permeability for CAX1 through BBB-PAMPA was 11.04 x 10-6cm/s and the membrane retention was 86.8%. From this in vitro result the passive blood-brain barrier penetration can be predicted and further cell culture or in vivo studies are needed to clarify the role of the active transport in CAX1 penetration. These studies were funded by the Robert A. Welch Foundation at Sam Houston State University (x-0011); and USAMRICD

(Contract No.W911NF-11-D-0001).

036.163 U **Investigating the solubility of a novel cyanide antidote and its binding potency to the walls of containers**, *Sarah R. Crews, Sam Houston State University; Tze K. Mak, Sam Houston State University; Melissa Sutrisno, Sam Houston State University; Lorand Kiss, Post Doctorate Researcher; Ilona Petrikovics, Professor, Sam Houston State University; David E. Thompson, Professor, Sam Houston State University*

Cyanide (CN) is a toxic agent. It inhibits the mitochondrial electron transport chain causing cell death. The current CN antidote therapies all have limitations. A new CN antidote candidate, sulfur donor X (SDX), was investigated in our group. This molecule is highly lipophilic and its water solubility is restricted. Our aim was to determine the aqueous solubility of SDX and improve it by adding surfactants, furthermore to measure the surface binding of SDX. The shake-flask method was used to determine the equilibrium solubility of SDX. Different concentrations of SDX were prepared in Ringer-Hepes buffer, ethanol, 0.5 mg/ml Polysorbate 80, and 0.5 mg/ml Cremophor RH40. After preparing the SDX solutions/suspensions, the samples were shaken for two days at room temperature (RT), and then regimented for one day at RT. Centrifugation with 14000rcf for 10 minutes at 24°C was applied to separate the insoluble liquid drops of the SDX. The SDX concentration was determined by UV spectrophotometer (200-400nm). The solubility of SDX was approximately 100μg/ml in Ringer-Hepes buffer and significant surface binding of SDX to glass was noticed. The surface binding of SDX was compared in three containers: 1) glass vial, 2) regular Eppendorf and 3) low-protein-bind Eppendorf. A certain degree of surface binding was observed in each type of container, but SDX had less affinity to plastic than to glass. These results are important for further studies with SDX, and to determine the optimal storage condition. Foundations: Robert A. Welch Foundation at SHSU (x-0011); USAMRICD (No.W911NF-11-D-0001).

036.164 U **Lithiation of triacetic acid lactone methyl ether**, *Tristan Thomas Adamson, Schreiner University*

Triacetic acid lactone methyl ether (4-methoxy-6-methyl-2H-pryon-2-one) is a precursor molecule used for the synthesis of natural products. This molecule has been used as a nucleophile in the synthesis of these products. Last year we successfully prepared the methyl ether using the Wadsworth's Synthesis in a 95% yield. Previously, two different electrophiles (deuterium oxide and trimethylsilyl chloride) have been attached (Younis and Al-Shihry, 2000). Using the methyl ether product as our starting material, we prepared the anion at the C3 carbon of 4-methoxy-6-methyl-2H-pryon-2-one using nBuLi in THF under anhydrous conditions at -78° C. Next, we quenched the anion in our first electrophile, dimethyl diselenide. After the work-up and isolation of the crude product, it could not be confirmed by NMR that any desired product was obtained. The next electrophile we attempted was benzoyl chloride. The C3 anion was prepared the same way as the previous reaction, and then it was quenched in benzoyl chloride. After work-up and isolation of the crude product (90.6% yield), the NMR provided evidence that some desired product had been obtained. However, after flash chromatography, we were unable to isolate the pure monoacylated product. This research is still in progress. Other electrophiles that will be investigated in the spring include methyl disulfide, methyl iodide, bromomethyl, and acryloyl chloride.

036.165 U **Novel spectroscopic and electrochemical determination for water bound environmental contaminants**, *Nguyen Luu, University of Houston-Downtown; Mian Jiang, University of Houston-Downtown*

Water bound contaminants are high risks to human health and societal sustainability because of their ease of spreading and biocompatibility. These residues are usually oxidizing species, stemming from agriculture and defense industry. Quantification of these these contaminants has significance ranging from the drinking water compliance, to waste minimization. In this work we developed a new assay for these oxidants using UV-Vis spectroscopy, fluorescence, and electrochemistry. We systematically examined the conventional protein-staining dyes Azures and found they respond sensitively towards oxidants including nitrite, azide, and hypochlorites. These thiazine-containing dyes are quenching upon introducing the oxidants. By utilizing electrochemical and kinetic analysis, this quenching can be developed into a new assay for the oxidants. The preliminary study revealed the complicated responding mechanism. While these oxidants (analytes) can directly oxidize these dyes, they actually play a role more like quenchers to the existing fluorescence of the dyes impacted by the presence of a stronger third oxidizer agent. The follow-up study has optimized the analytical system. The highest sensitivity has been obtained in acidic media with ternary component system matrix. Our new protocols for nitrite and hypochlorite are representative and can be extended into

other oxidizers, which adds new means to the water bound environmental protection. This work was supported by NRC-MSIP, NOAA B-WET, NASA-TSGC-NIP, and Welch Grant (BJ-0027).

036.166 U **Phenolic content, anthocyanin levels and antioxidant properties of acai berry (*Euterpe oleracea*) supplements and products**, *Mei M. Earling, Southwestern University; Emily D. Niemeyer, Southwestern University*
Acai berries (*Euterpe oleracea*) contain high levels of phenolic compounds, particularly anthocyanins, the flavonoids responsible for blue-red pigmentation in plants. Anthocyanins have diverse functions within plants and possess antioxidant properties and radical scavenging abilities that correlate with disease prevention in humans. Although much research has been conducted on fresh berries, little is known regarding the chemical composition of commercial products and supplements derived from acai berries. In this study, we determine the phenolic contents, anthocyanin concentrations, and antioxidant capacities of commercially available acai berry products in different forms. Modified spectrophotometric assays were used to quantify the total phenolic and anthocyanin contents of acai berry products, and individual anthocyanin concentrations were analyzed by high-performance liquid chromotography (HPLC). In addition, antioxidant capacities were determined using the ferric ion reducing antioxidant power (FRAP) assay. Our results suggest differences in total phenolic content exist among the acai berry products studied. This presentation will examine how the particular form – powder, pill, liquid supplement, or frozen – affects the phenolic content, total and individual anthocyanin concentrations, and antioxidant capacity within acai berry products.

036.167 U **Purification of beta-2-microglobulin W60A mutant**, *Alison Chao, Austin College*
Beta-2-microglobulin (β2m) is a small, globular 99-residue protein that is part the major histocompatibility class I complex (MHC-1). MHC-1 is important in the immune response and is found on every nucleated cell. Normally, when a cell undergoes apoptosis, β2m is shed from the surface of the cells, released into the blood, filtered through the kidneys, and excreted. When kidney failure occurs, the protein can not be cleared from circulation and the increased β2m levels triggers the disease dialysis-related amyloidosis (DRA). In DRA, β2m will misfold and aggregate into insoluble amyloid fibers that will aggregate in the joints; this will result in joint pain and decreased mobility. Our goal is investigate why β2m misfolds in the disease DRA. In order to understand the misfolding process, we first have to understand the normal folding and unfolding process. Prior research in our lab has shown that when replacing Trp60 with phenylalanine greatly increases the protein's stability. Mutagenesis was performed on Trp60 to express tyrosine (W60Y), methionine (W60M), and serine (W60S). Our next project is to express and purify Try60A mutant (replacing tryptophan with alanine at site 60) to obtain a mutated purified protein and unfold/refold the protein to characterize it thermodynamically. The purpose of this mutation is to test the effect of substituting a small aliphatic reside on the protein folding dynamics of β2m.

036.168 U **RecA sequence specificity among selected drug-resistant mutation-prone sites in Mycobacterium tuberculosis**, *Mason Ryan Taylor, Wayland Baptist University*
Drug resistance in Mycobacterium tuberculosis is often attributed to single nucleotide mutations, frequently caused by poor follow-up on drug regimens. While tuberculosis has no known mismatch repair mechanism, it uses RecA to repair DNA by attaching to damaged DNA and using undamaged DNA from elsewhere in the genome as a template to create a replacement sequence. The primary purpose of this study was to determine if RecA preferentially attaches to specific sequences of nucleotides. This was accomplished by running electrophoretic mobility shift assays on four different 83-nuceotide single-stranded DNA segments and their complements, each centered on sites of common drug-resistance mutations. Analysis revealed differences in the percent of DNA bound to RecA between each segment (including complementary oligonucleotides). This gives evidence that RecA does exhibit some kind of sequence specificity, which could possibly play a role in creating errors in repair that lead to drug resistance.

036.169 U **Reconstitution and characterization of occludin-incorporated nanodiscs**, *Jay S Jeon, Austin College; Maria S Bewley, Pennsylvania State University; Xingxheng Wang, Pennsylvania State University; John M. Flanagan, Pennsylvania State University*
Nanodiscs are small, well defined structures comprised of two ~25kDa engineered membrane-scaffolding proteins derived from Apolipoprotein A1 and lipids. These complexes have been used in studies examining the effects of lipids in membrane on a number of lipid-modulated biological reactions and for reconstituting membrane proteins into native-like environments. For membrane proteins, they have many advantages over the more traditional, small liposome reconstitutions or

detergent solubilization including greater stability of the incorporated protein over detergents, increased membrane protein activity due to more native-like curvature, increased specific binding conformation, and single orientation with respect to the disc and a smaller lipid:protein ratio. These aspects make them preferable for electron microscopic analysis. In this study, we demonstrate the reconstitution of Occludin, a membrane protein found in tight junctions into nanodiscs. Additionally, we show the initial characterization of these discs by EM and SEC.

036.170 U **Structural insights into the regulation of JAK3 activity: Evidence from molecular modeling of full human JAK3 protein**, *Jaimie Albach, Texas A&M University at Galveston; Abigail Grant, Texas A&M University at Galveston; Jhenny Galan, Assistant Professor*
Janus kinases are a family of 4 non-receptor tyrosine kinases (JAK1, JAK2, JAK3, TYK2) sharing conserved structure and function of 7 domains (JH1-7). Each protein contains a catalytically active kinase domain (JH1) at the C-terminal with an inactive psuedokinase domain (JH2), as well as an N-terminal SH2-FERM domain (JH3-7). The FERM domain is thought to interact with kinase domain to facilitate cell signaling pathways through receptor binding and phosphorylation at various cytokine receptors responsible for cell development. Jak3 specifically is implicated in cytokine receptor interactions which contribute to development of hematopoietic cells, linking the protein to a number of cancers, autoimmune, and inflammatory disorders. For this reason, JAK3 has been a target for development of therapeutic compounds to effectively suppress autoimmune diseases. There have been efforts to develop JAK3 selective inhibitors, however due to lack of x-ray crystalline structure of the full protein, studies investigating interactions of potential inhibitors with JAK3 have been limited to just the kinase domain. Further, mechanisms and molecular interactions modulating JAK3 function remain to be fully revealed. In this study, we report a full 3D structural model of JAK3 generated using homology modeling techniques and molecular dynamics simulations. Detailed structural analysis of the model will be presented including key reside interactions and domain modulation, specifically, investigation of FERM domain modulation on the kinase domain. This study is an important step in understanding JAK3's integral role in cell signaling pathways and may aid in discovery of novel inhibitors with higher JAK3 selectivity through structure-based drug design.

036.171 U **Synthesis of Metal-Impregnated Xero- and Aero-gel Catalysts for Carbon Dioxide Reduction**, *Christopher Jackson, Saint Edward's University*
For long-term space travel and inhabitation, carbon dioxide reduction technology is necessary to reclaim oxygen from metabolic carbon dioxide and is vital to reduce the delivery mass of metabolic oxygen. Traditional processes for carbon dioxide reduction result in the deposition of solid carbon onto a steel wool catalyst and resulting inhibition of the catalyst. Because of this, a large mass and volume of additional catalyst would be required to support a Martian surface-like, crewed mission. Therefore, aerogels are being investigated as catalytic supports due to their high surface area and porosity, which allows them to achieve the same performance with significantly less mass and volume. Gels composed of silica, alumina, and carbon were impregnated with various metal-containing compounds, tested for bulk kinetic activity in the carbon-depositing step of the Bosch CO2 reduction process, and analyzed using scanning electron microscopy before and after catalytic testing. The results of this study suggest that aerogels are a viable candidate to decrease cost and waste material generated by catalyzed carbon dioxide reduction, increasing the possibility of long-term space travel.

036.172 U **Synthesis of a Novel Solid-State Regenerating Chlorinating Agent**, *Brittany Pollok, Texas Lutheran University; Megan Sweeney, Texas Lutheran University*
Alkyl halides can be used in a variety of different products. This includes degreasers, pesticides, artificial sweeteners, fire extinguishers, refrigerants, and reagents for other compound synthesis. Because these compounds are versatile finding a way to easily and efficiently produce them is important. Many of these procedures call for chemicals that are extremely water sensitive and difficult to store. The polymer DCX can easily convert alcholols to alkyl halides. DCX does not react with the water in the air and is easy to store. This project focuses on a transforming alcohols into alkyl halides using the polymer, DCX, as an intermediate molecule that can be recycled.

036.173 U **The influence of structure on combustion of organoclays**, *Celeste Keith, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*
Bomb calorimetry was used to measure the energy of combustion of a series of organoclays. The clays were modified with ammonium salts including; decyltrimethyl ammonium bromide (DTMA), tripropyl ammonium iodide (TPA), and methyltrybutyl ammonium bromide (MTBA). Each of these

salts has approximately the same number of carbon atoms simply arranged in a different way. When intercalated into the clay, theoretically, the combustion should result in approximately the same energy. Any substantial differences are due to the differences in structure of the organic cation. The orientation of the organic cation in the interlamellar region of the clay was examined using x-ray powder diffraction, which provides the spacing between the clay layers.

036.174 U **Variations in phenolic composition and antioxidant properties among lemon balm (*Melissa officinalis*) cultivars**, *Maxime Boneza, Southwestern University; Emily D. Niemeyer, Southwestern University*

Phenolic acids are known for their ability to fight oxidation as well as their antibacterial properties. Although lemon balm (*Melissa officinalis*) is known for its high phenolic content, its phenolic acid composition and antioxidant properties are less well studied, particularly within fresh plants. Therefore, in this research, we quantify the levels of total and individual phenolic acids in fresh lemon balm and determine how these compounds and the overall antioxidant capacity vary as a function of cultivar and commercial seed source. High-performance liquid chromatography was used to analyze eight phenolic acids commonly found in *Lamiaceae* herbs. Total phenolic content was investigated with the Folin-Ciocalteu assay and antioxidant capacity was determined using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. Total phenolic content among the cultivars ranged from 4.2 gallic acid equivalents (GAE) in mg/g dry weight (DW) for 'Lemonella' to 38.0 GAE (mg/g DW) for common lemon balm. Rosmarinic acid was the individual phenolic acid in highest concentration among the cultivars studied and varied from 0.74 mg/DW for 'Lemonella' to 52.14 mg/DW for common lemon balm. Seed company was found to have a significant effect on the radical scavenging capability of lemon balm extracts ($p < 0.05$) while cultivar did not ($p = 0.985$). This presentation will examine the overall impact of seed company and cultivar on total and individual phenolic concentrations, and will discuss how these compounds contribute to measured antioxidant capacities in lemon balm.

036.175 U **Spectroscopic determination of heavy metals in spinach and kale**, *Eddie Scott, Texas Lutheran University; Patricia Snow, Texas Lutheran University*

The purpose of this study was to see what amount of spinach or kale was safe to ingest due to their heavy metal content. Each type of plant matter had a specific amount of exposure to Cadmium, Nickel, Lead, or manganese. In order to fully understand how concentrated each sample was, they were run through a flame atomic absorbance machine. The samples were made with 2% nitric acid to be compared with the 2% nitric acid standards. Though based on a small sample size, the data suggest that organic spinach was extremely high in cadmium compared to conventionally grown spinach since it was 9 times the conventional spinach concentration. Kale had no measureable concentration of cadmium. The daily recommended amount of Cadmium in spinach is 1 kg/mg/per body weight a day. Given the maximum concentration cadmium found was 5.72 μg/g dry weight spinach leaves, the amount of spinach consumed would be about 40 leaves per salad, which means for the average 70 kg person that is approximately 1/3 of the daily limit of cadmium a day. While these values do not suggest an imminent threat from consumption of spinach, future studies will pre-dried spinach for long period storage.

Marine Science

Marine Science Poster Session

Participants:

036.176 U **Behavior of the Cleaner Fish *Elacatinus spp.* and their Clients in Roatan, Honduras**, *Kennedy L Chudej, McLennan Community College*

Gobiidae is the largest family of marine fish. The four most common species and primary cleaner fish in Roatan, Honduras are the *Elacatinus louisae*, *E. lori*, *E. colini* and *E. lobelia*. *Elacatinus* use coral and sponges for cleaning stations and protection. At cleaning stations, cleaner fish remove ectoparasites and client fish benefit through reduction of ectoparasite loads. This study was conducted to determine the behaviors and ratios of *Elacatinus* and client fish at individual cleaning stations in Roatan, Honduras. Research dives were conducted from May 17-22 at 5 established dive sites within the Sandy Bay Marine Park. Each site was surveyed twice and on different days. Water conditions, cleaning substrate, species frequency, and behavior were recorded. Corals, primarily *Orbicella annularis*, were most frequently used as cleaning station substrates. The most frequent cleaning behaviors were nibbling and chasing. Zig/Zag swimming and cleaning inside operculum and gills were the least frequently observed behaviors. The most frequently observed client behaviors were: pectoral fin display, tilting right, tail stand, and opening mouth. Fanning operculum,

quivering fins, and freezing were the least frequently observed client behaviors. The most frequently observed client fish were *Chromis cyanea* (Blue Chromis), *Sparisoma viride* (Stoplight Parrotfish), and *Acanthurus couruleus* (Blue Tang). In the future, cameras with viewing screens should be used to better capture fish behaviors underwater.

036.177 U **Frequencies for Dark Spot Syndrome on three coral species in Roatan, Honduras**, *Gabriela Garcia, McLennan Community College*

Dark Spot Syndrome is prevalent in the Caribbean and appears as discolored spots that can range from brown, purple, blue or black. Though the affected tissue has been linked to physical and microbiological causes, the causative agent is still unknown. DSS rarely causes whole colony mortality. There is no documentation on prevalence of DSS its growth rate, or its coral preference in Roatan, Honduras. The study was conducted to determine the coral species affected by DSS and area coverage of DSS on the Mesoamerican Reef in Roatan, Honduras. Sampling occurred from May 17 - 22, 2015 at five established dive sites within the Sandy Bay Marine Park. Each dive site was visited twice, on different days. Randell-Robertson Marine Survey Technique (RRMST) was adapted for optimal Siderastrea siderea, Siderastrea radians, and Stephanocoenia intersepta observations. For each coral species observed, the date, dive site, water condition, coral species, volume, depth, temperature, and coral health were recorded. A 0.5x 0.5 meter quadrant was placed on corals affected with DSS for area calculation. Of the sampled corals, 33% were affected with DSS. Siderastrea siderea and Stephanocoenia intersepta were the only corals observed, with DSS only found on S. siderea. The northernmost dive site, Barry's Reef, had the highest percentage (69%) of corals affected by DSS. There was weak but statistically significant correlation (Pearson's correlation r=0.66258; d=24) between the average area of DSS and the volume of the affected corals across all dive sites.

036.178 H **Laboratory based primary productivity and respiration in the seagrass,** *Halodule wrightii* **Aschers. (shoal grass) under low salinity**, *Gisselt Gomez, The University of Texas-Pan American; Oscar Trujillo, The University of Texas-Pan American; Kirk Cammarata, Texas A&M University Corpus Christi; Hudson DeYoe, The University of Texas Rio Grande Valley; Jason Parsons, The University of Texas Rio Grande Valley; Joseph Kowalski, The University of Texas Rio Grande Valley*

Increased frequency and intensity of storms can cause rapid decrease in estuarine salinity that can impair plant function and survival. We measured primary productivity, leaf and rhizome/root respiration in the euryhaline seagrass, *Halodule wrightii* (shoal grass), using rapid and long-term exposure to low salinities in laboratory microcosms. There was a clear inverse trend in primary productivity. Low salinity (5) was decreased by >30% compared to controls (32). Despite the negative influence of low salinity, differences were not statistically significant. Rhizome/root respiration rates followed primary productivity trends, but with greater variability through time. Leaf respiration rates were 3x greater in the 5 treatment, compared to the control. The reported euryhaline nature of *H. wrightii* is supported, as these plants, grown in microcosms, show pronounced resilience under hyposaline stress.

036.179 U **Microplastic and anthropogenic fiber ingestion by marine pinfish (***Lagodon rhomboides***) collected from inshore marine sites adjoining Freeport and Galveston, Texas**, *Kaitlyn Rieper, Baylor University; Peyton Thomas, Baylor University; Susan Power Bratton, Baylor University*

While previous research has documented ingestion of macro- and microplastics by aquatic fauna in both freshwater and marine ecosystems, relatively little is known of the environmental and ecological factors influencing the entry and diffusion of plastics and artificial polymers into aquatic foodwebs. Microplastics, including artificial polymers, are defined as 50 nm to 5 mm in length. The purpose of this study was to utilize stomach content analysis to determine the level of microplastic ingestion, for 298 pinfish (*Lagodon rhomboids*) collected from 6 locales from the inshore waters of the Texas coast from Galveston to Freeport, TX. The pinfish averaged 14.9 cm in length, and the mean frequencies of stomachs containing anthropogenic particles was 47%. Maximum percentages for pinfish with microplastics present per sample were 77% and 76%, and they averaged 1.09 particles per fish. Sample sites in the center of urbanized zones, including Galveston, TX, had the greatest frequencies of ingestion. The mean stomach weight per sample was significantly positively correlated (p=.01) to both the percent of individuals ingesting microplastics (cc=.742) and the mean number of plastic particles ingested per fish (cc=.697). The majority of the particles were thread shaped, with blue and grey the dominant colors, and thus are properly classified anthropogenic or

manufactured fibers. We propose a classification of these materials, based on the type of processing, whether they are monofilament or multi-filament, and their chemistry, such whether they are cellulosic or petroleum products.

036.180 G **Ownership of Submerged Lands in Coastal Waters: A Case Study of Texas**, *Anna Wood, Texas A&M Galveston; Ashton Danielle Burgin, Texas A&M Galveston Campus*
Defining ocean bottom ownership through the distinction of the shoreline between state and privately owned land on the coast of Texas presents a unique problem addressed in multiple recent court cases. Property laws in Texas are influenced by the historic Spanish and Mexican interpretations of the public trust doctrine. The public trust doctrine identifies resources within the public trust unavailable for private ownership. This understanding of the doctrine defines legal boundaries by the levels of highest-high tide, which fluctuate with erosion or accretion of the shoreline. The constantly changing nature of the shoreline triggers boundary disputes that require individual evaluation completed on a case-by-case basis. Three court cases analyzed within this study are: Luttes v. State, Kenedy v. Dewhurst, and Hanna Reef v. STORM. These cases illustrate the individualistic nature of bottom ownership disagreements through their own adaptation and interpretation of the laws written to address the distinction between public and private shoreline. Each case references laws such as the Submerged Lands Act, The Coastal Zone Management Act, and the Rivers and Harbors act to support either plaintiff or defendant claims. The case examination highlights the unsystematic application of such laws and the uncertain future of ocean bottom debates.

036.181 U **The affects of climate patterns on *Sargassum* landings in the Gulf of Mexico**, *Victoria Bartlett, Texas A&M University at Galveston; Brandon Nicholas Hill, Texas A&M University at Galveston; Thomas Linton, Texas A&M University at Galveston*
Do atmospheric patterns affect *Sargassum* landings, and if so, which of these represent the most crucial factors? This research is vital to the industries in Galveston that thrive on tourism. Tourists are turned off from the beach because of heavy landings of *Sargassum*, and without tourists, the growth of Galveston may begin to decrease. The SEAS (*Sargassum* Early Advisory System) Team at Texas A&M University at Galveston has been looking into the impact of *Sargassum* washing up on Galveston Beaches and surrounding areas. Although these "wracks" have been occurring for as long as Galveston has been an established city, studies have only recently begun looking into the causes of these events and why they happen one year, but not the following year. This project will include researching the possible factors that contribute to these intermittent events. Three climate patterns (El Nino, La Nina, and North Atlantic Oscillations) are suspected to have an impact on the circulation and direction of *Sargassum* from the Sargasso Sea in the Atlantic Ocean. In order to provide evidence that supports this theory data will be collected on what years *Sargassum* events have hit Galveston and when they haven't; determining what years were affected by El Nino, La Nina, and the North Atlantic Oscillations. From this data, a regression model will be used to extrapolate a correlation between landings and climate patterns. This information can be used to better advise coastal areas of landing events and generate faster emergency responses.

036.182 U **The effects of oxygen levels on hemoglobin expression in Ophiactid brittle stars**, *Julia Grace McElwee, Lamar University; Ana Beardsley Christensen, Lamar University*
The brittlestar, *Ophiactis simplex*, is known to express variable amounts of two hemoglobins in its water vascular system: individuals may have bright red tube feet, while others have colorless tube feet. The level of expression seems to parallel seasonal changes. Individuals possessing more bright red tube feet are found during summer and more with colorless tube feet during the winter. This suggests expression is controlled by environmental variables. This study examines if varying oxygen level changes the expression of the hemoglobins. Specimens with the least amount of color were chosen (assumed to have least hemoglobin expression) for the experiment. Before subjecting them to the experimental conditions, 10 animals were tested via PCR with hemoglobin primers to get a baseline expression. Two of the specimens expressed the hemoglobin B gene, one of which also expressed Hb A. Animals were then either kept at 7.26 mgO2/L (control PO2) or 5.4 mgO2/L (low PO2) for two weeks. The experimental group visually showed an increase in expression by having red tube feet. Arms were removed from each specimen and placed into RNALater to be further used in a qPCR which will allow the expression levels to be determined.

036.183 U **Water Quality and Health of Coral Reefs**, *Laura Mae Hinson, Texas A&M*
Coral reefs are the "rainforest of the sea" and are both economically and ecologically valuable resources (Swart, 2013). Coral reefs provide habitat, medicine, food for humans, and provide

aesthetic value for millions of tourists (NOAA, 2015d). Corals have experienced significant decline worldwide likely due to anthropogenic pollution, invasive species, climate change, hurricanes and abnormal weather phenomena such El Niño and La Niña (Hendee et al., 2001; Santavy, 2011). High concentration of dissolved oxygen, increased bacteria levels and salinity, and turbidity are few degraded water quality indicators that affect coral ecosystem (NOAA, 2015b). The lack of consistent data on changes in coral distribution and water quality parameters has been impediment in identifying the direct link between degraded water parameters and coral ecosystem. This research aims to understand the impacts of deteriorating water quality on coral abundance in the Florida Keys National Marine Sanctuary (the Keys). The Keys represents one of the largest coral ecosystem in the US and is known for variety of coral species, including stony corals and octocorals. Data for were obtained from the Keys National Marine Sanctuary Water Quality Protection and the Coral Reef Monitoring Programs and cover 1996-2006 period. Preliminary results indicate that coral areas are significantly reduced to increased temperature. High nitrogen concentration and turbidity levels negatively impact coral coverage, however the effects were estimated to be statistically insignificant. Findings from this research contribute to understanding of the functioning and resilience of corals and provide policy suggestions on how to enhance coral protection in the Keys.

Science Education

Science Education Poster Session

Participants:

036.184 G **Biology faculty attitudes regarding online education**, *Beverly Kopachena, Texas A&M University-Commerce; Charlotte Larkin, Texas A&M University-Commerce*

In recent years online education has become increasingly popular in higher education. While online education is popular with students and administration, not all faculty agree with this method of teaching. In particular, among biology faculty, attitudes toward online teaching are markedly divided; some embrace online teaching and some do not. Therefore, the purpose of this proposed study is to investigate what factors lead to these disparate views among faculty in the biological sciences. The population for this study includes full time community college and university faculty teaching undergraduate and graduate biology courses in northeast Texas. A survey will be conducted that includes questions related to demographics as well as opinions regarding online course delivery and teaching. Results of the surveys will be analyzed and discussed in relation to the current literature.

036.185 U **Educating Young Children about Green Energy Education and Awareness**, *Hudspeth A Elizabeth, Lamar University; Mamta Singh, Lamar University*

A solar electricity company in California, Sungivity, found that 88% of parents thought teaching their children about clean energy is as important as teaching them about good manners. 47% thought it was so important that it needed to be taught at age two. If we give a child a cell phone chances are they would be able to figure out how it works quicker than adult. Why is this? It is because technologies such as phones, iPads, SmartTVs, tablets are introduced to them at an early age. Because technology is now such a constant in a child's life, they are experts at figuring out how it works. So what if we did the same thing with important concepts such as Green Energy? The present study investigated the green energy education awareness among children at early age using pre-service teachers personal experience in the classroom supported via educational research in this filed. The results suggested that at an elementary grade level, children are literally developing in their brains the ability to form memories and connections of new and old learning, therefore, when energy concept was introduced in a kindergarten classroom, they were able to grasp the concept.

036.186 N **Examining Secondary Students' Mental Models of a Local Environment after an Experiential Learning Field Trip**, *Sara Elizabeth Jose, Oso Bay Wetlands Preserve & Learning Center*

This study is grounded in experiential learning theory that states secondary students will construct a new model of the environment using prior experiences combined with new information gained during an environmental education field trip. It is hypothesized that the outdoor field trip will be a useful tool for presenting new knowledge due to the active engagement of students. This mixed methods research study utilized a quantitative draw-and-explain assessment (Draw a Local Environment Test; DALET) to measure change in students' mental models and teacher interviews regarding the classroom environment before and after the field trip. The secondary students had an existing mental model of the delta as a wildlife preserve that would host dense concentrations of local animals and that the environment would include both abiotic and biotic factors. In contrast

student post-test drawings exhibited a lack of wildlife, replica drawings of the field trip workspace, and the delta as an enclosed water body. It is clear from the increase in extent scores that the NDP education program is succeeding in raising familiarity with geography and species. Recommendations are made for building the DALET into classroom curriculum to drive experiential learning. Suggestions for formal collaboration are also given to informal science educators in order to increase message transmission to field trip students.

Systematics & Evolutionary Biology

Systematics & Evolutionary Biology Poster Session

Participants:

036.187 N **A re-analysis of Cryptodiran relationships: What insights can be gained by utilizing genealogical concordance?**, *David E. Starkey, The University of the Incarnate Word*
A wide variety of analytical methods have been used in an attempt to resolve the relationships among turtles using single or multi-gene mitochondrial or nuclear data sets. As a result, the relationships among extant Chelonian families are thought to be fairly stable. Several recent studies have attempted to fully resolve these relationships by incorporating complete mitochondrial genomes, as well as nuclear genes, to investigate these relationships using supermatrices. There are a variety of strategies that have been employed in these analyses. One method suggests removing all taxa that cannot be unambiguously placed in the phylogenetic tree, whereas other methods favor incorporating all taxa in order to avoid issues such as long-branch attraction. However, these studies are quite expansive and the computer requirements are beyond the scope of many research laboratories. Therefore, the present study was undertaken in order to determine how well complete mitochondrial genomes could resolve the phylogeny of turtles utilizing a criteria known as genealogical concordance (GC). A search of GenBank revealed that complete mitochondrial genomes have been generated for 13 of 14 extant Chelonian families. Preliminary data shows evidence of significant diversity among turtle families regarding both gene order and tRNA structure. Furthermore, there is significant diversity present in gene structure (i.e., length) in 5 of 13 coding genes. After preliminary studies, genes found to be appropriate (according to GC) for use in systematic analyses will be utilized to reexamine the relationships among extant Cryptodiran turtles in order to assess hypotheses generated using supermatrix analysis.

036.188 U **Circumscription of a Potentially New Species of land snail from South Padre Island, Cameron County, Texas**, *Eli Ruiz, University of Texas Rio Grande Valley; Marco Arturo Martinez Cruz, The University of Texas Rio Grande Valley; Russell Minton, University of Houston Clear Lake; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley*
Abstract: Unique populations of land snail of the genus *Praticolella* have been found in the coastal portions of Cameron County, Texas. We aim to circumscribe the Cameron County populations by analysis of the 16S mtDNA, examination of shells and internal morphology. We are also conducting a habitat survey for the Cameron County populations based on soil types found in the region. Sequence data found the Cameron County populations form a monophyletic clade distinct from other *Praticolella* species. The circumscription of the Cameron County species is of taxonomic importance and will help in conservation efforts; due to the restricted habitat of these snails and rapid development of this region, if it is found to be a new species it will be classified as critically imperiled.

036.189 U **Development of nuclear markers for phylogeny reconstruction in the rodent genus** *Thomasomys*, *Maya J Feller, Abilene Christian University; Amberly N Grothe, Abilene Christian University; Paulina Sanchez, Abilene Christian University; Jessica A James, Abilene Christian University; Joshua Brokaw, Abilene Christian University*
Thomasomys is a genus of 30 – 40 rodent species distributed primarily in northwestern South America. Previous investigations based on the mitochondrial cytochrome b gene provided well resolved nodes at the species level. In contrast, most deep nodes needed for reconstructing the geographic and ecological history of *Thomasomys* had short branches and low bootstrap values, suggesting a rapid radiation early in the diversification of *Thomasomys*. In order to further test these phylogenetic hypotheses, we have designed new primers and obtained sequences from the nuclear *RAG1* (recombination activating gene 1) and *AP5* (intron 2 from the acid phosphatase type V gene) regions. Early results suggest that these markers are less variable than previously used mitochondrial markers but contain significant amounts of phylogenetically informative characters. Although increased phylogenetic resolution has been minimal, these nuclear genes have provided independent support for our mitochondrially based hypotheses.

036.190 N **Distribution and systematics of Vietnamese** *Pollicaria* **(Gastropoda: Pupinidae)**, *Russell Minton, University of Houston Clear Lake; Phillip Harris, University of Alabama; Ernest North, University of Houston Clear Lake; Do Van Tu, IEBR, Vietnam Academy of Science and Technology*
Pupinidae are a family of large (up to 50 mm) operculate land snails found in South and East Asia, Indonesia, and Australia that are identifiable from other Cyclophoroidea by their unique genitalia. The genus *Pollicaria* Gould, 1856 is endemic to mainland Southeast Asia and possesses a distinctive yellow-orange body. The most recent revision of *Pollicaria* by Kongim et al. (2013) lists six species in the genus including two, *P. rochebruni* and *P. crossei* from Vietnam. Based on the literature, these two Vietnamese taxa are morphologically distinguishable by size and color; *P. rochebruni* is larger with a reddish-brown shell, while *P. crossei* is smaller with an orange shell. Using museum specimens along with the authors' collections, we build upon Kongim et al.'s work in three ways. First, we offer a revised distribution map for Vietnamese *Pollicaria*, including holdings from major U.S. museums. Second, we provide a morphology-based phylogeny of the family that suggests the Vietnamese species are not sister taxa. Finally, using ribosomal DNA sequences we confirm the systematic position of *Pollicaria* in Pupinidae and Cyclophoroidea. Taken together, these data provide the most detailed examination of the natural history, taxonomy, and evolution of Vietnamese *Pollicaria* to date.

036.191 U **Effects of male body size and competitor size on male fitness in** *Gambusia affinis***, a livebearing fish**, *Kayla Simone Richard, St. Edward's University; Hilary Evans, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Livebearing fishes serve as model organisms for studying the interaction between male body size and male-male competition. *Gambusia affinis* male body size varies, which drives the evolution of alternative mating strategies within the species. In *G. affinis* small males exhibit sneaky mating tactics rather than the traditional aggressive coercive behavior of bigger males. This study aims to analyze male-male competition in relation to body size and to answer the question at what point large males lose their mating advantage. In this behavioral experiment large focal males and small stimulus males were placed in several treatments with a female while their mating behaviors were scored. In the treatments, the focal males were placed in increasing higher densities of small stimulus males. Previous studies have found that male body size in Gambusia affinis predicted frequency of gonopodial displays toward females.

036.192 U **Friend, foe, or frenemy: Testing the dear enemy hypothesis in a sex role reversed pipefish,** *Syngnathus scovelli*, *Nancy Pamela Cisneros, St. Edward's University*
Most animals compete for resources, specifically territorial species, which is a result of evolution via natural selection. This competition typically occurs through aggressive competitive behaviors or honest signals. However, because aggressive and honest behaviors are costly, organisms have evolved mechanisms for reducing the cost of these behaviors, one example being the dear enemy hypothesis. The dear enemy hypothesis predicts that individuals will respond less aggressively to neighbors (familiar individuals) than to non-neighbors (strangers). Here we test the dear enemy hypothesis in a sex role reversed system – focusing on territorial females – to broaden our understanding of the assumptions of this evolutionary principle. In a previous experiment we found that, in the pipefish *Syngnathus scovelli*, females establish dominance hierarchies upon first interaction. Notably, aggressive behavior decreased over time, suggesting that females decrease their competitive behaviors as a function of familiarity, providing impetus for testing the dear enemy in this system. We hypothesize that aggressive, territorial, sex role reversed females will display less aggressive behaviors to neighbors and display more aggression towards strangers. Thus, we predict that after the establishment of a dominant and subordinate relationship between two females, familiar females should exhibit higher aggressive behaviors toward a newly introduced female. The study is in progress and results will be presented.

036.193 U **Mitochondrial genome heterogeneity in Stylommatophora and new insights into the discovery of a new species of Polygyridae land snail.**, *Marco Arturo Martinez Cruz, The University of Texas Rio Grande Valley; Russell Minton, University of Houston Clear Lake; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley*
One of the preferred methods in evolutionary relationship studies is the utilization of mitochondrial sequences. By investigating mitochondrial genomes and their arrangements, not only can we elucidate the diversifying and developmental history of an organism, but also discover organisms that have remained elusive or unidentified, but who are of great ecological and economical

importance. Through mitochondrial gene order identifications and sequence alignments constructed from complete and partial mitochondrion sequences deposited to GenBank, and newly generated mitochondrial genomes of select Polygyridae, we intend to describe differences amongst mitochondrion genomes belonging to Stylommatophora, a diverse clade of land snails. Data generated include gene cluster rearrangements, as well as gene cluster recognition, mitochondrial genome size dissimilarity, and differences in gene identity. These data might also contribute to the circumscription of a yet uncharacterized species belonging to *Praticolella*, a group of common Texas land snails.

036.194 U **Phylogeny of the rodent genus *Thomasomys* based on mitochondrial markers**, *John Iragena, Abilene Christian University; Jeremy M Aymard, Abilene Christian University; Samantha N Studvick, Abilene Christian University; Kathryn D Mitchell, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

This study incorporates recently sampled taxa into an ongoing study of phylogenetic relationships in the genus *Thomasomys*. New samples from *T. baeops, T. cinnameus, T. rhoadsi, T. taczanowskii, T. ucucha,* and *T. vulcani* were collected in the summer of 2014 from Carchi Province, Ecuador. These were analyzed based on mitochondrial cytochrome b (*Cytb*) and cytochrome c oxidase subunit 1 (*CO1*) gene sequences to test previous taxon descriptions for species of *Thomasomys* and facilitate creation of an updated key for the mammals of Ecuador. We extracted DNA and performed PCR to amplify the *Cytb* and *CO1* genes. We quantified DNA from PCR products, sent samples to be sequenced, and edited and aligned sequences using Sequencher 5.2.4 and SE-AL 2.0. Maximum likelihood searches will be performed with gaps treated as missing data and each codon position treated as a separate partition in order to test whether currently recognized taxa represent monophyletic species.

036.195 U **The first record of Wormian bones in lizards**, *Lauren Rudie, shsu; Sarai Nicole Mesa, Sam Houston State University; Juan Daza, shsu; Patrick Lewis, Sam Houston State University*

Wormian bones, sometimes referred to as supernumerary bones, are accessory bones found between the elements that create the cranial sutures, and display great variation in size, shape, and placement. Their formation has been suggested as being driven by both genetic and environmental factors, and their origin is generally associated with inadequate ossification centers. Wormian bones have been discovered in various mammals, notably in humans and chimpanzees. In this study we evaluated the presence of wormian bones in the small burrowing lizard genus *Zygaspis* from southern Africa. The cranial anatomy of six species within the genus *Zygaspis (Z. kafuensis, Z. vandami, Z. violacea, Z. quadrifrons, Z. niger, and Z. ferox)* were examined for the presence of wormian bones. We used high-resolution 3-D models of the skull generated with the computer software Amira 5.6 to isolate and view the bones. We found three Wormian bones in the interdigitated frontoparietal suture of *Z. kafuensis*. This is the first known record of Wormian bones in lizards and it is one of the few reports of these bones in reptiles. The presence of these bones in a head-first burrowing reptile suggest a possible morphofunctional role. Additional studies on a variety of reptilian taxa are needed, particularly burrowing groups with interdigitated sutures, to further our knowledge of the occurrence of Wormian bones and ultimately help us better understand these rare cranial elements.

036.196 G **Use of computed tomography survey to reveal hidden structures and a survey of supernumerary molars within *Pongo pygmaeus***, *Kelsey Jenkins, Sam Houston State University; Justin Levy, Sam Houston State University; Kersten Bergstrom, Department of Anthropology, Texas A&M University; Ruby Jean Velasquez, Texas A&M University; Patrick Lewis, Sam Houston State University; Timothy L. Campbell, Department of Anthropology, Texas A&M University*

In recent years the availability and affordability of high-resolution computed tomography (mCT) has revolutionized many fields, including paleontology and anatomy. For example, fossils once hidden in matrix or too fragile to be safely excavated can be examined, animals too small or delicate for successful dissection can be studied, and rare animals can be researched without fear of damage. The application of mCT technology in resolving anatomical questions has allowed for previously hidden characters relevant to taxonomy, systematics, and biological variation to be incorporated. These characters have altered our understanding of many groups, particularly within the vertebrates. Here we present the discovery of a supernumerary molar found in an orangutan (*Pongo pygmaeus*) jaw (USNM 142195) studied for over 100 years by many researchers without notice. While the presence of such molars is known, the rate of their occurrence, the variability in their morphology, and their spatial relationship to other molars is vague. The discovery was made using a public data

set of mCT images and studying the scans for the presence of such anomalies using Amira 6.0 software. This discovery highlights the critical need for mCT scans to be performed and the resulting data sets released for research. Biologically relevant features may otherwise be missed in specimens, including those thought to be well studied. Furthermore, this study demonstrates the value of using modern digital imaging technology in identifying internal features and serves as an example of how readily accessible digital data can lead to new discoveries in anatomical biology.

036.197 U **Variation in the jaw joint of** *Zygaspis* **based on x-ray computed tomography**, *Sarai Nicole Mesa, Sam Houston State University; Lauren Rudie, shsu; Sarah Bivens, Sam Houston State University; Juan D Daza, Sam Houston State University; Patrick Lewis, Sam Houston State University*

Amphisbaenians are burrowing, legless reptiles, sometimes called worm-lizards. They possess distinctive head shapes (round, spade, shovel and keel shaped) which correlate to their different digging strategies. The relationship of head morphology and digging style is well documented, but the role of the jaw in burrowing is unclear. To better understand the jaw's role in this behavior, we undertook a study of variation in the mandibular joint of the South African genus *Zygaspis*. Variation in elements of the mandiblular joint, particularly the quadrate, dentary, and compound bones which largely define the jaw joint, were examined. Specimens of *Z. vandami, Z. violacea, Z. ferox, Z. kafuensis, Z. niger* and *Z. quadrifrons* were borrowed and scanned using high-resolution X-ray computed tomography (CT) at the CT lab at the University of Texas in Austin to examine intraspecific variation. All specimens were adults and the right element was used in all cases. Only one specimen per species was available. Scans of each element were studied using the computer program Amira 6.0. Individual bones of the jaws were isolated, three-dimensionally rendered, and compared for morphological variation. Variation in relative size of the elements and in the degree of articulation were noted, as were differences in the angle of the coronoid process. Research continues with more specimens being examined and more detailed anatomical characters studied. Results will ultimately be helpful for a better definition of how the jaw varies interspecifically in this group and what role it may play in moving through sediment.

036.198 U **Identification of a Newly Discovered Population of** *apple snails* **(***Pomacea* **spp., Family Ampullariidae) in the Rio Grande Valley**, *Victoria Garcia Gamboa, University of Texas Rio Grande Valley; Kathryn Elizabeth Perez, The University of Texas Rio Grande Valley; Romi L. Burks, Southwestern University*

Apple snails (Ampullariidae) represent the largest and most diverse freshwater snails native to tropical and subtropical habitats. Two species of interest include *Pomacea canaliculata* and *P. maculata*, both globally successful non-native, invasive species with high reproductive rates that threaten crops including rice and taro. In the United States, *P. canaliculata* occurs in pocket populations in Florida, Arizona, Hawaii and California. *Pomacea maculata* exists in substantially greater and larger populations across the southeastern U.S. than *P. canaliculata*. In Texas, most reported populations of *P. maculata* occur around Houston, stretching south towards Galveston. *Pomacea canaliculata* and *P. maculata* appear very similar in that their egg masses and adult shells look alike. To date, all snails collected and identified in Texas consist of *P. maculata*. In mid-November 2015, we received a report of pink egg masses at a Brownsville, TX fish hatchery. We collected seven egg masses, which we suspect to be either *P. canaliculata* or *P. maculata* due to bright pink color and egg shape. The egg masses hatched and we immediately preserved hatchlings for future identification by sequencing the cytochrome oxidase I (COI) gene. Operculum width measurements of five hatchlings (average 1.47 ± 0.12 as 1 SD) do not initially support identification as *P. maculata* hatchlings as these usually emerge from clutches at a smaller size (1.1 mm). Robust genetic confirmation of either species will be the first Ampullariidae identified in South Texas, indicating the need to address management and transport of non-native species in TX.

Terrestrial Ecology and Management

Terrestrial Ecology & Management Poster Session

Participants:

036.199 U **An analysis of the impact of biometeorology on the activity levels of small mammals**, *Sarah Elizabeth Bowen, Hardin-Simmons University; Elizabeth Lopez, Hardin-Simmons University; Nathalie De la Torre, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

Understanding the impact of biometeorology on the activity levels of small mammals plays an important role in helping ranchers develop land management strategies. The Rolling N Properties

Grassland initiative is a project focused on studying the various ecosystems associated with the property and restoring each to its native flora and fauna. In collaboration with this grassland initiative, our study focuses on how biometeorological variables impact the activity levels of small mammals. Using standard capture and release methods along with biometerological data concurrently collected from the weather station located on the property in Runnels County, we cross-referenced date, time, frequency, and species to determine potential correlations between abiotic conditions and small mammal activity levels in this area. The study running from March 2015 to the present, found a range of diversification among activity levels in several small mammal species captured to include Neotoma albigula and Peromyscus leucopus, both interspecifically and intra-specifically.

036.200 U **Baseline survey of small mammals and bacterial pathogens in the southeastern Rolling Plains**, *Hannah Seah, Abilene Christian University; Gomez Daisy, Abilene Christian University; Nathan R Neill, Abilene Christian University; Joshua Brokaw, Abilene Christian University*

The southeastern boundary of the Rolling Plains lies near the geographic center of Texas at the confluence of three ecoregions: Rolling Plains, Cross Timbers, and Edwards Plateau. Elements of these ecoregions, including edaphic conditions and vegetation intergrade in our survey site southeast of the Callahan Divide in Callahan County. Biodiversity knowledge in this region is sparse due to large amounts of private land ownership. Through recent acquisition of a conservation easement by the Texas Land Conservancy, we have been given the opportunity to document biodiversity, including small mammal species, to serve as baseline data from which change related to land use and climate can be monitored. Our primary objective was to document the diversity of species of small mammals (primarily rodents) in the southeastern Rolling Plains across various habitat types. Because rodents are reservoirs for a variety of tick- and flea-borne bacterial pathogens, we also aimed to document bacterial pathogens that are associated with rodents in the southeastern Rolling Plains. We collected tissue samples from rodents captured in Sherman live traps during late spring and early fall of 2015. We used PCR and DNA sequencing to identify captured rodents and any detectable bacterial pathogens in the genera *Borrelia* (causative agent for Lyme disease and other diseases), *Rickettsia* (causative agents for spotted fevers and typhus), and *Yersinia* (causative agent for plague). Due to the ecotone nature of our survey site, the inventory of pathogens in this region could contribute to greater understanding of disease transmission and migration in central Texas.

036.201 G **Biometeorology survey of large mammals on a ranch in Runnels County**, *Lauren Spindler, Hardin-Simmons University; Hannah Stouffer, Hardin-Simmons University; Cody Berryman, Hardin-Simmons University; Charelle Marshall, Hardin-Simmons University; Alyssa Stegner, Hardin-Simmons University; Wendi Wolfram, Hardin-Simmons University*

Biometeorology studies the relationship between living organisms and environmental factors. Abiotic conditions such as barometric pressure, lunar phases, temperature and time of day impact the activity levels in both ungulates and carnivores. These environmental factors can assist in identifying the most favorable conditions for various mammals. Abiotic conditions were analyzed for both ungulates and carnivores identified from camera traps on the Rolling N Properties in Runnels, County Texas, to determine their impact on activity levels. We used barometric pressure, lunar phase, temperature and time of day as environmental variables to determine each mammal's optimal conditions for activity from August 2015 to the present. Because biometeorology plays an important role in animal activity and their relationships in an ecosystem, understanding the influence of these variables, can provide more detailed information to assist in better land management strategies.

036.202 G **Blood Hormone and Lipid Level Influences on Ectoparasite Abundance in the Southern Plains Woodrat (***Neotoma micropus***)**, *Missy B Schenkman, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University; Joseph B. Schenkman, Midland College*

The Southern Plains Woodrat (*Neotoma micropus*) is host to a wide range of parasites, both external and internal. It is well known that many of these parasites are vectors of zoonotic diseases, however not much is known about the factors that influence parasitic abundance and prevalence. The goal of this proposed study is to determine if there are relationships between this host's sex hormone and lipid levels and its external parasite load (such as ticks, mites, lice, and fleas). A sample size of sixty *N. micropus* will be captured using live trapping at various locations in Midland and Ector Counties in Texas. Woodrats will be anesthetized in the field with the use of isoflurane to allow for ectoparasite collection via the brushing method and blood drawn via intracardiac puncture of the left

ventricle. All ectoparasites collected will be identified to lowest level possible and the number present recorded. Blood serum hormone levels will be obtained through ELISA testing and the lipid levels (specifically total cholesterol and triglycerides) will be evaluated with the use of a HESKA Dry-Chem 4000. Data will be analyzed for a correlation between the blood serum hormone and lipid levels with the parasite load on each host using multiple regressions.

036.203 U **Concentration Effects of Plant Growth Promoting Rhizobacteria on** *Nolina lindheimeriana* **in Differing Organic Matter**, *Jessica Williamson, St. Edward's University; Teresa Marie Bilinski, St. Edward's University*

Plant growth promoting rhizobacteria (PGPR), such as *Pseudomonas*, benefit plants by promoting root hair growth to increase root absorption, increasing nutrient availability, and producing phytohormones that also increase plant growth. The goal of this research was to observe the effects of PGPR concentration on the native Texas plant, *Nolina lindheimeriana*, planted in soil with different levels of organic matter. We isolated *Pseudomonas* PGPR from *N. lindheimeriana* root samples. We confirmed the identity of the isolates using gram staining and microscopy. Using colony forming units and optical density measurements (at 600nm), we quantified the amount of *Pseudomonas bacteria* present on the plant roots. Next we re-potted nine *N. lindheimeriana* each in the following organic matter levels: low, intermediate (normal) and high. Then we watered each plant every two days with either: 100mL of water and 100mL of *Pseudomonas* broth (control); 100mL of water and a concentrated *Pseudomonas* bacterial solution in 100ml of *Pseudomonas broth*. Compared to the controls, adding a high concentration of PGPR to the plants resulted in an increase in plant growth and root growth. However, the stimulation by PGPR was greater in high organic matter than in low organic matter. Overall, a higher concentration of PGPR, namely *Pseudomonas* spp., had a positive influence on the growth of *N. lindheimeriana*, particularly in high organic matter compared to low organic matter soil.

036.204 U **Differentiating Bell County Snail Species by Identifying Species-Specific or Genus-Specific Genomic Differences in** *Rumina decollata*, *Sarah Elizabeth Velo, University of Mary-Hardin Baylor; Kathleen Wood, University of Mary Hardin-Baylor*

Two separate snail species surveys were conducted in Bell County, Texas in 2003 and 2013, identifying between 15 and 20 different macro-snail species. Identifying these species by their morphological structures can be extremely difficult, and could be more easily done using DNA sequence information, although there is not a lot of DNA information in the National Center for Biotechnology Information (NCBI) database. In order to accomplish differentiation of the species, PCR was completed with three different primer pair sets to amplify fragments of the mitochondrial cytochrome C oxidase subunit I gene (COI), the 16S mtDNA, and the 18S rDNA. PCR and sequencing was completed on a sample of *Rumina decollata*, a snail species that was imported to Bell County and is commonly found in this area. A DNA product was obtained from all three PCR's, which were then sent off for sequencing and analyzed using nBLAST to determine if there were any similar sequences in the NCBI database. In the future, the sequences obtained will be pieced together to obtain an entire sequence for *Rumina decollata*. This information could aid in the future identification of other snail species by their genomes instead of by morphological features.

036.205 U **Habitat Use by Ladder-backed Woodpecker (***Picoides scalaris***) in the Caprock Canyonlands in Floyd County, Texas.**, *Victoria Kristine Solis, Wayland Baptist University; Andrew C. Kasner, Wayland Baptist University*

Observations of Ladder-backed Woodpeckers (*Picoides scalaris*) in various tree species were recorded in Floyd County at a site located in Blanco Canyon, near Floydada, TX to determine the habitat associations of males and females. Transects were established and observation data was collected six times over the course of three weeks in spring 2015 from March 13th to April 8th with a total of 12 female sightings and 12 male sightings. Association with certain tree species and perch locations on trees were recorded for males and females to determine any differences in foraging habitat use. For male observations, 50% were in hackberry trees (*Celtis*), 25% were in mesquite trees (*Prosopis*), 25% were in elm trees (*Ulmus*), and 0% were in chinaberry (*Melia*) or cottonwood (*Populus*) trees. For female observations, 75% were in mesquite trees, 9% were in cottonwood trees, 8% were in hackberry trees, 8% were in chinaberry trees, and 0% were in elm trees. For perch location in males, 41% were on secondary limbs, 25% were on tertiary limbs, 17% were on canopy limbs, and 17% were on primary limbs. For female locations, 42% were on primary limbs, 33% were on tertiary limbs, 25% were on secondary limbs, and 0% on canopy limbs. Males were found primarily in hackberry trees on secondary limbs, while females were found mostly in mesquite trees

on primary limbs. Additional surveys will be conducted from December 2015 to February 2016 to gather similar information on habitat use for the wintering season.

036.206 G **Managing Daily Temperature Range of Soil to Increase Microbial Processes**, *Kholoud Ghanem, Texas Tech University; John Zak, Texas Tech University*
As the growth and activity of soil microbes regulates soil health and critical ecosystem services understanding how climate variability impacts soil microbial dynamics will become a critical component of soil stewardship in a changing climate. For agroecosystems in semi-arid environments, developing management strategies that increase soil microbial activity that builds stable nutrient dynamics without increasing water use is paramount for sustainability of these landscapes. We have examined how changes in planting bed design regulates the Daily Temperature Range of soils in a dry-land production system in West Texas and consequences to soil microbial activity and cotton production. Bed design will either increase DTRsoil, leading to less microbial activity or have no impact depending upon weather conditions for a growing season. However, for periods when air temperatures are hot, decreasing DTR will increase soil microbial activity and result in increased cotton production without any increase in water inputs to the system.

036.207 U **Relationships between small mammal assemblages and land management in the southeastern Rolling Plains**, *Catherine C Longest, Abilene Christian University; Nathan R Neill, Abilene Christian University; Gomez Daisy, Abilene Christian University; Jamie E Thompson, Abilene Christian University; S James Nix, Abilene Christian University; Joshua Brokaw, Abilene Christian University*
Prairie restoration is an increasingly important facet of land management in central Texas. In order to understand the ecological impacts of changes in land use, complex relationships between abiotic and biotic variables must be described. In this study we investigate relationships between soils, vegetation, and small mammal populations under four different management histories in the southeastern Rolling Plains. Surveys were conducted on four adjacent range sites with the following management histories: 1) unrestored oldfield with discontinued cultivation, no grazing, no vegetation management, 2) kleingrass/pricklypear/mesquite pasture with introduced forage, intensive grazing, minimal vegetation management, 3) mesquite shrubland with native vegetation, unrestrained grazing, no vegetation management, and 4) restored prairie: reintroduced native tall grasses, no grazing, shrub mitigation management. Sampling was conducted during spring, summer, and fall from a 50 x 50 m grid positioned in the interior of each site. Soils were sampled for chemical and physical properties from the corners and center of each grid; vascular plant species composition was sampled using 9 meter-square quadrats from the edges and center of each grid; and the small mammal assemblage was measured using a 5 x 10 grid of Sherman live traps. Small mammal assemblages differed substantially across treatments and seasons. Lowest mammal quantity and diversity occurred in the unrestored oldfield. Mammal assemblages at other sites varied seasonally, with greatest overall diversity occurring in the restored prairie.

037. Botany Oral Session II and Business Meeting
10:00 to 11:30 am
Academic Building, 111
Botany
Botany Oral Session II and Business Meeting
Participants:

10:00 037.208 G *Euphorbia cryptorubra* **(Euphorbiaceae), a new species in** *Euphorbia* **section** *Anisophyllum* **from Texas, U.S.A and Chihuahua, Mexico**, *Nathan Taylor, Sul Ross State University; Martin Terry, Department of Biological, Geological and Physical Sciences, Sul Ross State University*
Euphorbia cryptorubra (Euphorbiaceae) is an undescribed species that grows SE of the Quitman Mountains, Texas, and near Ojinaga, Chihuahua where it is presumed to be restricted. The new species is a glabrous annual belonging to section *Anisophyllum* (previously genus *Chamaesyce*) represented by ten specimens that key to *Euphorbia golondrina* in Correll and Johnston's *Manual of the Vascular Plants of Texas*. E. golondrina differs from E. cryptorubra in its rougher seed coat, mostly oblong leaf blades, habitat requirements, and distribution. E. cryptorubra has been previously identified as E. golondrina, E. geyeri var. wheeleriana, E. simulans and E. theriaca.

10:15 037.209 G **A Preliminary Report of 3, 4, 5-Trimethoxyphenethylamine Concentrations in Over-The-Counter Topical Products Purported to Contain** *Lophophora williamsii* **(Cactaceae).**,

Robert Joseph LeBlanc, Department of Biology, Geology, and Physical Sciences; Martin Terry, Department of Biological, Geological and Physical Sciences, Sul Ross State University
Samples from commercial over-the-counter products that were claimed explicitly or by implication to contain *Lophophora williamsii* (Cactaceae), an overharvested species of cactus, have been collected. The purpose of this investigation is to determine the presence or absence of *L. williamsii* metabolites in these products. The samples will be extracted with organic solvent with acid-base washes and analyzed by high pressure liquid chromatography (HPLC). This will indicate the presence of the stable and abundant alkaloid mescaline (3, 4, 5-trimethoxyphenethylamine) in samples of ostensibly *L. williamsii*-infused oils and ointments that were distributed as topical remedies. If detectable levels of mescaline are found in a given extract, then we can infer that *L. williamsii* is present in the corresponding topical products.

10:30 037.210 N **Habitat preference for Comanche Peak Prairie Clover (***Dalea reverchonnii***; Fabaceae), a rare North-Central Texas endemic.**, *Allan D. Nelson, Tarleton State University; Sam Kieschnick, City of Mansfield, Texas*
Comanche Peak Prairie Clover (*Dalea reverchonnii*) (Fabaceae) is hypothesized to be a Walnut limestone glade endemic in North Texas. We compare a population discovered in 2010 on a Walnut limestone glade in Parker County, Texas to populations found in a peripheral prairie barren. For three lyears, numbers of *D. reverchonii*, diameter of plants, number of flowering spikes, as well as richness and coverage associated with plants significantly differed between glade and barren populations. Associated species also were different in the two habitats. Length of the longest spike was not significantly different when comparing *D. revorchonii* in glade and barren populations. This data provides support for the hypothesis that *D. reverchonii* is found mostly in and is best adapted to Walnut limestone glades.

10:45 037.211 N **Identification of bacteria colonizing the roots of** *Acacia smallii* **(Fabaceae).**, *Kathleen Wood, University of Mary Hardin-Baylor*
Acacia smallii (Fabaceae), or huisache as it is commonly known, is a treelike shrub frequently seen on rangeland in south Texas and is considered a nuisance species of *Acacia*. In Bell County, Texas, there are isolated examples of huisache and a couple of concentrated stands in south Belton and on Fort Hood. One of the competitive advantages of huisache as compared to other similar sized shrubs is root nodulation by nitrogen-fixing bacteria. In an attempt to identify the bacteria colonizing huisache roots, sterile huisache seedlings were inoculated with soil taken from the root zone of a local huisache shrub. Root nodules developed on several seedlings, yielding eight bacterial isolates. PCR amplification and sequencing on DNA from these isolates was done using the primers FGPS 1490 and FGPL 132 to amplify a highly variable region of the 16S-23S rDNA intergenic (IGS) region. Initial results suggest the possible presence of a *Sinorhizobium* species in these nodules.

038. Cell & Molecular Biology Oral Session II and Business Meeting
10:00 to 11:30 am
Academic Building, 112
Cell and Molecular Biology
Cell & Molecular Biology Oral Session II and Business Meeting
Participants:

10:00 038.212 U **Comparative Genomic Analysis of Two** *Paragonimus* **Species**, *Joe Dylan Sosa, St. Edward's University; Samantha N McNulty, McDonnell Genome Institute at Washington University; Bruce Rosa, McDonnell Genome Institute at Washington University; Takeshi Agatsuma, Department of Environmental Health Sciences, Kochi Medical Schoo; Hiromu Sugiyama, Laboratory of Helminthology, Department of Parasitology, National Institute of Infectious Diseases; Peter Fischer, Department of Internal Medicine, Washington University School of Medicine; Makedonka Mitreva, The McDonnell Genome Institute , Department of Internal Medicine Washington University, School of Medicine,*
Paragonimiasis is a food-borne zoonosis acquired by consuming raw or undercooked crustaceans infected by flatworms of the genus *Paragonimus*. The disease is a major public health concern in Southeast Asia and West Africa where it is easily mistaken for tuberculosis due to its similar symptoms on the respiratory tract. To better understand these parasites and facilitate development of therapeutics and diagnostic tools we annotated and compared the draft genomes of two parasitic flatworms, *P. miyazaki* (915.81Mb, 12,762 genes) and *P. westermani* (923.28Mb, 12,530 genes), and assessed their gene expression. Functional analysis resulted in annotation for 92.5% of predicted

genes in *P. miyazaki* and 91.2% of predicted genes in *P. westermani*. Comparing the gene complements of these two species, related trematodes, hosts, and outgroups indicated that *Paragonimus*-specific genes were enriched for functions related to iron and oxygen scavenging, suggesting a possible novel mechanism for oxygen scavenging in *Paragonimus* relative to other platyhelminth species. Orthologous gene pairs showed consistent expression levels in adults of the two species. In *P. miyazaki* specifically, genes with significantly higher expression in parasites isolated from peritoneal or pleural cavities versus parasites isolated from host organs were enriched for functions including protease activity, while genes higher in parasites taken from the lung or liver were enriched for functions related to microtubule-based movement and catabolic processes such as glycolysis. This study provides a foundation for future studies of these two *Paragonimus* species and other trematodes.

10:15 038.213 U **Effect of nutritional stress on fecundity in** *Drosophila melanogaster*, *Kamryn N. Gerner-Mauro, St. Edward's University; Vivian Le, St. Edward's University; Lisa M. Goering, St. Edward's University*

The fitness of an organism is due in part to the available environmental resources. Variability in resources can alter the development and/or physiology of an individual; previous studies in *Drosophila melanogaster* have shown that protein deficiencies can lead to variation in development. In this study, we have raised *D. melanogaster* on diets which vary in the amount of protein. Flies were raised for two generations on normal, low, or high protein food; subsequently, fecundity was measured in an egg laying assay. Our predictions were that females raised on low protein food would lay fewer eggs than those raised on normal food, while females raised on high protein food would show an increase in fecundity. Preliminary results suggest that females raised on low protein food do lay fewer eggs per day. Both low and high protein diets affected time of development and adult yield. Additional studies will examine whether nutritional protein stress affects maternal provisioning of oocytes and early development of embryos laid to mothers raised on different diets. These studies will provide a better understanding of the effects of nutritional stress on reproduction and early development.

10:30 038.214 U **The Role of Eip63E in** *Drosophila* **Axonal Transport**, *Pearl Anne Henry, Schreiner university; Susan Klinedinst, Schreiner University*

A critical element of the neuronal cytoskeleton is the network of microtubules that provides structural support, allows motility and serves as a transportation network for the organized movement of molecules within the neuron. The microtubule cytoskeleton is critical for the normal functioning of the nervous system and 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 is a kinase that has homology to a family of mammalian cyclin dependent kinases (Cdks) called PFTAIREs, whose function is currently poorly understood. Cdks are traditionally involved in regulating cell cycle progression, however some Cdks functions include neuronal apoptosis, neuronal migration, axon guidance, synaptic transmission, and membrane transport. We have begun to characterize the role of Eip63E, which has been shown to genetically interact with both molecular motors, dynein and kinesin in *Drosophila*. We hypothesize that the Eip63E PFTAIRE functions as a regulator of one of these neuronal functions of Cdks. Our data thus far indicates that Eip63E functions in axonal transport and is required for the proper delivery of presynaptic vesicles and active zones to the presynaptic axon terminal.

10:45 038.215 G **The effect of cancer-associated PP2A A subunit mutations on the wnt signaling pathway**, *Lauren Sommer, Sam Houston State University; Joni Seeling, Sam Houston State University*

One way cells communicate with one another is through the Wnt protein. In multiple cancers, specifically colon cancer, the Wnt pathway is deregulated. Protein phosphatase 2A (PP2A) functions as a tumor suppressor. PP2A is composed of three subunits: an A scaffolding subunit, B regulatory subunit, and C catalytic subunit. One of the three families of B subunits, B56, has been shown to regulate Wnt signaling. Mutations of the A subunit have been identified in various types of colon, lung, breast, skin, and ovarian cancer. Many of these mutations have been found to inhibit the A subunit from binding to the B and/or C subunits. In some cancers, a mutation in the A subunit inhibits it from binding B56. We hypothesize that due to this inhibition, Wnt signaling activity is increased. Using *Xenopus leaves* as a model organism, four mutated versions of the A subunit found

in human cancers, E64G, P53S, R418W, and V436A were co-injected with Wnt into the dorsal side of the embyros. We found that the E64G mutation, which inhibits A subunit binding to the B56 subunit, causes an upregulation of Wnt signaling. E64G is a dominant mutation which causes excessive dorsalization. This upregulation of Wnt signaling is analogous to that which causes tumor formation. Identifying the cause of tumor formation will help in the design of therapeutics that could block tumor growth by restoring normal PP2A B56 activity.

039. Chemistry & Biochemistry Oral Session III and Business Meeting
10:00 to 11:30 am
Bluebonnet House, 01
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session III and Business Meeting
Participants:

10:00 039.216 G **Application of biochar for removing heavy metals from aqueous solution**, *Sergio Ivan Mireles, Graduate Student; Marissa Davila, The University of Texas Rio Grande Valley*
Abstract Biochar, also known as "biomass-derived black carbon", is a highly porous charcoal produced by the combustion of biomass with limited or no oxygen (pyrolysis). Although biochar has been used as a soil amendment for quite some time, the idea of using other feedstocks (for example, plant biomass, manure, biosolids) to make engineered biochars is relatively new. This project reviews different biochar materials produced from locally-sourced biomass and waste products from agricultural operations. Our preliminary result on the biochar use for removing zinc (Zn) from aqueous solution showed that highly porous structure in biochars adsorbed dissolved Zn very effectively. In a single- point adsorption experiment equilibrated with 50 mg/L Zn solution for 24-h, biochar made of wood materials adsorbed Zn up to 99% out of solution. In particular, biochar made of oak tree was a superior adsorbent, outperforming commercial activated carbon. Column experiment leached with Zn solution also confirmed that biochars are very effective in adsorbing aqueous Zn even in flowing condition. Our results suggest that biochar could be an excellent and cost- effective additive to conventional filtration systems (sand or pumice) to treat metal-contaminated water. This project will determine whether biochar produced from waste and natural biomass has the potential of removing other heavy metal contaminants (e.g. arsenic, lead, cadmium) that could be discharged from point and non-point water pollution sources.

10:15 039.217 N **Physical compatibility of co-solubilized vancomycin, piperacillin, and tazobactam in aqueous solution**, *Sean C Butler, The University of Texas at Tyler; Neil Gray, UT Tyler; Rachel Mason, The University of Texas at Tyler*
Combining vancomycin (V) with the b-lactam/b-lactamase inhibitor pair piperacillin/tazobactam (PT) has shown a synergistic enhancement of pharmacokinetic and pharmacodynamic properties compared to either antibiotic alone when the combined concentrations are maintained above minimum inhibitory concentration (MIC) for an extended period of time. In addition, the combined V/PT drug regimen has shown superior activity against methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-intermediate *S. aureus* (VISA) in severely ill patients. Current dosing protocols, involving V and PT, take advantage of both synergistic benefits and prolonged infusions have been implemented at some institutions. Limited access to intravenous lines often leads to the simultaneous administration of all three drugs through a common Y-site. Safely co-administering these drugs requires a thorough understanding of their physical compatibility when co-solubilized in aqueous solutions. While some studies have addressed mutual solubility of these drugs, results are inconsistent or focus on a narrow concentration range. Here we use nephelometric turbidity measurements of simulated Y-site injection samples and static solutions of known concentration to examine the physical compatibility of these solutions over a wider range of conditions.

10:30 039.218 G **Removal of zinc from aqueous solution using charcoal-based adsorbents**, *Sergio Ivan Mireles, Graduate Student*
Many industrial facilities pose a risk of high levels of zinc (Zn) in their stormwater discharges. Galvanized metal surface, motor oil, hydraulic fluid, and tire dust are the major sources of Zn from the industrial facilities. Zinc from stormwater harms fish and other aquatic life. The purpose of this study is to compare different types of relatively low-cost charcoal-derived adsorbents ("biochar") in removing Zn from stormwater: commercial activated carbon, oak tree biochar, and wood biochar. Kinetic studies and adsorption isotherm experiments for Zn were performed using the three different char materials. The kinetics study (up to 48 hours) under both stagnant and mixing conditions

showed that the oak tree and wood biochar outperformed activated carbon in removing Zn out of solution. The adsorption isotherm study suggested that oak tree biochar removed most of the Zn in the solution up to 250 mg/L, suggesting a great potential as a filter media for Zn. The adsorption maximum of other char materials ranged from 5,000 to 10,000 mg Zn / kg. Our results indicate that a combined use of biochar with other filter materials such as sand can enhance the removal of Zn in stormwater runoff.

10:45 039.219 N **Smart coatings for the surface decontamination of chemical warfare agents**, *Neil Gray, UT Tyler*
In the current war against terrorism, potential attacks against American warfighters by terrorists using chemical, biological, or radiological agents (CBRAs) are of major concern. Such attacks may include the use of radiological dispersion devices (RDD), also known as "dirty bombs"; the use of chemical or biological weapons; or the dispersal of CBRAs from a crop duster or other weapons-free processes. Worldwide control of many CBRAs is problematic, increasing their availability to terrorists or rogue nations hostile to The United States. Though several methods have been reported for the decontamination of CBRA-contaminated surfaces, they often produce significant amounts of contaminated waste and involve extensive fumigation or washing processes that are too involved for regular use by military personnel in the field. We have had significant success in the development of water-based, contaminant-sensing, decontaminating coatings for the detection and removal of a variety of hazardous radiological and toxic metal contaminants at a surface. Here, we will report our continued progress on the design and development of contaminant sensing, decontaminating coatings as tools for the decontamination of fouled surfaces. Specifically our initial progress towards the development of reactive coatings for the detection, chemical destruction, and removal of chemical warfare agents from contaminated surfaces.

040. Environmental Science Oral Session II and Business Meeting
10:00 to 11:30 am
Tech House, 01
Environmental Science
Environmental Science Oral Session II and Business Meeting
Participants:

10:00 040.220 N **Congener Specific Determination of Polychlorinated Biphenyls (PCBs) in Human Milk**, *Prof. Mohamed Hamza EL-Seaid, Professor, Chromatographic Analysis Unit Director, College of Food and Agricultural Sciences, King Saud University, Riyadh, Saudi Arabia*
We analyzed 33 polychlorinated biphenyls (PCBs) congeners in 48 human mother milk samples by GCMSTSQ800, collected during 2014 from the donors living in Eastern and Central provinces in Saudi Arabia. The PCB profile was dominated by higher chlorinated congeners. Non-Ortho PCB congeners, which have the highest toxic equivalents factor (TEF) values, were detected in 35% of individual samples. The toxic equivalents factor for Mono-Ortho substituted PCB congeners indicated higher exposure to toxic PCBs in Eastern province rather than the Central due to main petroleum industry activities, but estimated daily intakes for both provinces indicate that infants consuming mother's milk are not at risk of adverse effects caused by PCBs tested under this study. Our study builds the first database in Saudi Arabia research of human milk samples.

10:15 040.221 N **Lowered soil respiration and lowered climatic sensitivities under two different savanna encroachers**, *Ann Thijs, St. Edwards University; Marcy Litvak, The University of New Mexico; Christine Hawkes, The University of Texas at Austin*
When grasslands and savanna ecosystems are invaded by woody species, the shift in plant functional type has the potential to change the carbon dynamics of these ecosystems significantly. Here we report on the effects of two different co-occurring encroaching species, Ashe juniper and nitrogen fixing Honey mesquite, on belowground carbon pools and respiration processes in a Central Texas savanna ecosystem, under the same climatic and edaphic factors. Our specific objectives were to (1) compare soil respiration rates under different vegetation types under different climatic conditions; (2) examine differences in soil carbon pools and microclimate; (3) quantify the sensitivities of the respiration processes to soil temperature and soil moisture using different models; and (4) estimate annual soil respiration flux under all three vegetation types. The shift from grassland to savanna in this ecosystem is accompanied by a reduction in soil respiration under both encroaching species. Up to 75% of the observed variation in respiration was explained by a logistic temperature model combined with linear soil moisture dependence. Q10 values ranged from 2.13

under juniper to 2.78 in the grassland areas. Based on model results, soil respiration in grassland soils is more sensitive to soil moisture at high temperature, than in soils under both encroaching trees. The decreased soil respiration and lower sensitivity to climatic factors under both encroachers, as well as increased SOC storage under juniper, all point in the direction that an increase in both Ashe juniper and Honey mesquite, increases the carbon sink strength of central Texas savannas.

10:30 040.222 N **Shoreline Diptera as Potential Bioindicators of Metals in Freshwater and Marine Habitats**, *Frank Joseph Dirrigl, Jr, University of Texas Rio Grande Valley; Thomas Eubanks, University of Texas Rio Grande Valley*
Dipteran (Insecta) abundance along freshwater and marine shorelines deserves consideration for their use as bioindicators. The bioindicator potential is high when dipteran life cycles include an aquatic stage that is susceptible to metal exposure in water and sediments. We collected select dipterans along sandy beach and caliche dominated shorelines to determine the ability of anatomical parts to bioaccumulate metals. A Zeiss EVO LS10 Scanning Electron Microscope measured metal concentration using its metal identification system (SEM-EDAX). The produced SEM-EDAX results allowed us to determine the microscope precision and accuracy of laboratory reared Drosophila. Additionally, we present SEM-EDAX metal accumulation data from field collected dipterans. Together, the results and our review of dipteran ecology and life cycles allowed us to determine the potential of shoreline insects as bioindicator organisms. The abundance and ease of collecting shoreline dipterans and their ability to bioaccumulate metals in their tissues make these insects readily available to environmental monitors and for ecological risk assessments.

10:45 040.223 N **Turbidity reduction of construction site runoff using synthetic and biopolymers**, *Jihoon Kang, University of Texas Rio Grande Valley*
Erosion and sediment control using chemical flocculant is used on some construction sites, typically larger sites where there is a high potential of water quality impairment to nearby streams. The most common flocculant is polyacrylamide (PAM), but others are being used (e.g., chitosan). PAM is a water-soluble synthetic polymer and high molecular weight, linear, moderately anionic PAMs have been found to be the most effective and non-toxic for turbidity control in construction sites. Chitosan is a biopolymer, which is non-toxic and biodegradable. My presentation will address several key elements and recent advances to achieve successful turbidity control in construction sites using PAM or chitosan. The flocculants can be added to runoff water either actively or passively. An active dosing system is similar to a small-scale water treatment plant while a passive dosing system relies on dissolution of flocculants. There are many places to introduce PAM (granule, solid block, etc.) passively into water flowing downhill, and it can be an inexpensive and effective method. Our field-scale test demonstrated that granular PAM application to fiber check dam reduced turbidity up to 67 % compared to influent. The particle size in runoff after the PAM treatment increased greatly, indicating a greater potential of sediment removal when the runoff water is impounded in sediment basin. Comparative performance results between PAM and chitosan will be presented.

041. Freshwater Science Oral Session II and Business Meeting
10:00 to 11:30 am
Mockingbird House, 01
Freshwater Science
Freshwater Science Oral Session II and Business Meeting
Participants:

10:00 041.224 N **American Eel in Texas – what we do, don't, and need to, know**, *Dean A. Hendrickson, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Ben Labay, University of Texas at Austin; Gary P. Garrett, University of Texas at Austin; Melissa Casarez, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin*
American Eel is undoubtedly one of the most-studied North American fishes. Many recent discoveries add new insights that re-write important aspects of the "text book" knowledge of the species' complex life history. Despite much new information, debate about its conservation status continues, and new threats have further complicated management. Though USFWS recently decided it does not merit listing as "Endangered," in 2012 Canada changed its assessment of the species' status from "Special Concern" (since 2006) to "Threatened" and IUCN upped its classification in 2013 to "Endangered." Ontario has considered it "Endangered" since 2007. All U.S. Atlantic states vowed to work together to produce, in 1999, the American Eel Benchmark Stock Assessment,

which mandated standardized recruitment monitoring and later, mandatory catch and effort monitoring. Given all that activity and data generation, it is remarkable that still so little is known about the populations of the Gulf of Mexico (GOM) and its tributary rivers that making any management decisions in that large, neglected part of the species' range is virtually impossible. The Fishes of Texas Project team has collated scattered data on regional occurrences it can find and concludes it important to promote a broad scale (GOM) collaborative community effort to acquire and share data and carefully curated specimens and, hopefully, develop a GOM-wide collaborative research and management plan like that implemented by Atlantic states. Here we'll review the literature and state of knowledge about the species in Texas and GOM, and suggest ways to begin work toward such an effort.

10:15 041.225 N **Collaborations for the Future of Texas Water, Watersheds and Environmental Literacy: Community Partnerships with Texas Tech University's Llano River Field Station**, *Tom Arsuffi, Texas Tech University Llano River Field Station; Tyson Broad, TTU Llano River Field Station; Robert Stubblefield, TTU Llano River Field Station; Karen Lopez, TTU Llano River Field Station*

Texas Tech University's Llano River Field Station (LRFS) is the place that brings diverse stakeholders together to address and provide solutions to critical natural resource and water issues in a vast (25+counties) called the "Texas Hill Country" including the Edwards Plateau, characterized by a large number of springs, an important natural resource in a semiarid region, forming the headwaters of seven major Texas river systems. Located in a large rural area, LRFS provides a comprehensive spectrum of collaborations focused on recognizing, understanding and finding solutions to regional problems related to watershed and range science, freshwater systems and the environment, with national and international implications. Community partners include federal and state agencies, municipalities, universities, K-12 schools, landowners and other local groups who share expertise, planning and resources. Faculty, students and staff members at LRFS and community partners establish collaborative and interdisciplinary relationships to a) further enhance natural resource science and conservation, and watershed best practices, and b) provide exemplary STEM based pedagogy, curriculum and environmental education. LRFS' Outdoor School, the Texas Natural Resource/Environmental Literacy Plan, Upper Llano River Watershed Protection Plan, Texas Water Symposium, and Discovery Point Trail are just some of the significant outcomes of these collaborations. Results show that engagement and innovation "make a difference" and that "places" like the Texas Tech University Llano River Field Station can play a significant role in convening communities to address important cultural and ecological issues for current and future generations, and also provide economic benefits through quantifying ecosystem services and ecotourism.

10:30 041.226 N **Healthy watershed approach to protecting streams : Role of science, stakeholders, education, and partnerships**, *Tyson Broad, TTU Llano River Field Station; Tom Arsuffi, Texas Tech University Llano River Field Station; Kevin Wagner, Texas Water Resources Institute*

Watershed is a productive scale to evaluate perturbations to streams. Such disturbances affect stream flow and water quality. To manage and maintain the ecological health of the Upper Llano River, Texas, the Texas Tech University Llano River Field Station and Texas A&M Water Resources Institute are working with the Llano River Watershed Alliance and other stakeholders 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 the complexity of the watershed ecosystem through an integrated assessment of the landscape and biotic condition, abiotic parameters, critical watershed functional attributes and modeled water yield from implementation of best management practices (BMP). The WPP uses a stakeholder process for decision-making; economics and feasibility of BMPs; landowner concerns; types and scale of treatment measures needed; and implementation. Holistic BMP strategies include brush control for water supply enhancement, upland grazing management, feral hog trapping, and riparian and stream bank restoration. Agency partnerships, stakeholder/landowner involvement and watershed education are critical components to successful implementation of BMPs that increase watershed capacity to absorb perturbations.

10:45 041.227 N **Review of the Texas fish list of Species of Greatest Conservation Need**, *Gary P. Garrett, University of Texas at Austin; Dean A. Hendrickson, University of Texas at Austin; Ben Labay, University of Texas at Austin; Cohen E. Cohen, University of Texas at Austin; Melissa Casarez, University of Texas at Austin; F. Douglas Martin, University of Texas at Austin*

The Fishes of Texas team is working with Texas Parks and Wildlife Department to review and update the Texas fish list of Species of Greatest Conservation Need. We first looked at changes in distribution over recent decades and then summarized current status by soliciting input from researchers across the state. Based on these discussions, we propose retaining 58 of the current species, removing three species from the list and adding an additional 16. Most of the additions are due to newly recognized species, but some are the result of declining range and status. There are still 11 species that have not been resolved and deliberations with TPWD staff and others are ongoing. Details of the proposed changes as well as the unresolved species will be discussed.

042. Graduate Student Competition I
10:00 to 11:30 am
Packard Hall, East Room
Graduate Student Paper Competition
Graduate Student Competition I
Participants:

10:00 042.228 G **A Missing Link: The Reproductive Biology of** *Winslowia tuscumbiana*, *Kathryn Parsley, Texas State University; Michael Dunn, Cameron University*
In a recent paper, Dunn et al. (2012) reconstructed the whole plant *Winslowia tuscumbiana*, from the Mississippian of northern Alabama. *Winslowia* was collected from the siltstone overburden of a limestone quarry and the only organs that were recovered were one type of cormose base, one type of branching stem, one type of ligulate microphyll, and one type of sporophyll, with one type of spore that conformed to a megaspore. Therefore, they assumed the plant was a heterosporous lycopsid, and that the microspores and microsporophylls were not recovered. This project hypothesizes that the dominant spores of the matrix that produced the macrofossils should be the microspores of *Winslowia*, and that they should conform to the dispersed spore genus *Lycospora*. Ten samples were processed at Global GeoLab Limited in Canada and those 10 slides were analyzed for this project. All of the spores of one slide was completely analyzed, and the other nine were analyzed by transect. However, only 30.56% were *Lycospora*, while *Cyclogranisporites* comprised 36.18% and *Granulatisporites* made up 23.44% of all spores counted. Therefore, no microspore makes up the majority, and our hypothesis is not supported. An alternative hypothesis is that *Winslowia* was homosporous instead of heterosporous, as the current model of lycopsid phylogeny suggests.

10:15 042.229 G **Cloning and Expression of** *Pseudomonas aeruginosa* **Elastase with plasmid recombinant vector**, *Derek Thomas Draper, University of Texas at Tyler*
Cystic Fibrosis (CF) is an inherited and incurable disorder that disrupts the normal production of mucus in the lungs. This disorder is characterized by sticky and thick mucus that causes patients to suffer from recurrent, chronic pulmonary infections and inflammation. One such pathogen is *Pseudomonas aeruginosa*. This bacterium produces a proteolytic enzyme, elastase (PE) that disrupts the tight junctions of epithelial cells in the lungs. Because of an increased paracellular permeability and a thick mucus environment suitable for bacteria growth, patients in later stages of CF can no longer fight off the disorder and the probability of continuing a healthy life is decreased. To study the mechanisms of tight junction disruption by PE, research needs to be performed using a pure and enzymatically active enzyme. High demand for purified PE in our lab and associated cost contributes to a major cost in the funding. Therefore, this proposal represents a valid protocol and experimental design to produce elastase using recombinant technology via plasmid a vector. Genomic DNA is isolated from *P. aeruginosa* and selected regions are amplified using PCR with lasB gene specification. After insertion of DNA into plasmids, *E. coli* are transformed to support the recombinant vector and produce a viable elastase product. Elastase will be isolated and purified for future research experiments.

10:30 042.230 G **Comparative helminth community structure in two species of arctic-nesting waterfowl: black brant (***Branta bernicla nigricans***) and greater white-fronted geese (***Anser albifrons***)**, *Nicole Traub, Sam Houston State University*
Waterfowl can have relatively high parasite burdens resulting in demographic consequences for the hosts; however, little is known about the timing and pathways of infection and if there is inter- and intra-specific transfer on the breeding grounds. This study investigates the helminth communities of two waterfowl species, greater white-fronted geese (GWFG) (Anser albifrons) and Pacific black brant (BLBR)(Branta bernicla nigricans), breeding in Sub-Arctic (Yukon Delta National Wildlife

Refuge(YK)) and Arctic Alaska (Beaufort Sea coast(N)) collected during July–August 2014. BLBR and GWFG breed sympatrically, but differ in both migration route and wintering areas. Thus, similarities in helminth communities between species suggest inter-specific transmission of helminthes on the breeding grounds. We sampled brant from both N and YK to evaluate the relative contribution of site on helminth community structure. We collected both species from N to assess evidence of interspecific transmission. To date, 100% of necropsied hosts are infected. Eleven species of helminths have been identified from 5 microhabitats (gizzard, proventriculus, duodenal loop, gastric ceca, and small intestine). Preliminary findings suggest that parasite communities are somewhat similar between host species at a site, but community differences exist between sites. Thus, helminth community structure in this area may be driven by host habitat or climate. With the exception of direct lifecycle nematodes, component communities differ between host wintering and breeding grounds. Our results provide baseline information with which to better investigate infra- and component community dynamics of helminths transmitted at high latitudes, and understand helminth infection of migratory waterfowl hosts throughout the annual cycle.

10:45 042.231 G **Developing a Lung Tissue Bacterial Co-culture Model Evaluating the Impact of Dust Exposure**, *Shari Galvin, Texas Southern University*
The Yersinia genus includes three human pathogens: *Yersinia enterocolitica* (YE), *Yersinia pseudotuberculosis* (YPT), and *Yersinia pestis* (YP). YE and YPT infect the gut and cause self-limiting gastroenteritis. In contrast, YP, the etiological agent of bubonic, septicemic, and pneumonic plague is responsible for causing three major human pandemics. YP is capable of killing infected patients within 3-7 days. Unless antibiotic treatment is started early, mortality rates can be as high as 66% -93%. Previously, our group determined that exposure to indoor and outdoor dust impacted opportunistic pathogens: *Escherichia coli*, *Enterococcus faecalis*, which are both gut flora, and *Psuedomonas aeruginosa*, found in gut and can cause pneumonic infection. While indoor dust exposure enhanced bacterial growth in certain media, both indoor and outdoor dust enhanced biofilm production of all three bacterial species, which could potentially alter their virulence potential. Dust, either indoor or outdoor, is considered to be an environmental contaminant and becomes toxic when present in excess amounts. Toxicity is attributed to composition of the dust contaminants. In furthering our previous studies, we sought to determine whether dust exposure could influence the proliferation of a bonafide pneumonic pathogen when cultured with lung tissue. In this study, a lung tissue infection model system was developed in which we determined the impact of dust on YP and its various isogenic mutant strains. YP co-cultured with A549 lung epithelial cells were exposed with various types of dust for a period of 6 hours. Bacterial loads were determined by plate counting.

11:00 042.232 G **Digitization to Realization: The utilization of Structure from Motion and ArcScene to Identify Taphonomic Processes and Digitally Preserve Burial CC-B14.**, *Samantha Mitchell, Texas Tech University; Ashley Booher, Texas Tech University; Brett A Houk, Texas Tech University*
Over the past decade, Structure from Motion (SfM) has increasingly been used as a means of digital preservation and for documenting archaeological excavations, including burials. However, few studies have tapped the potential of using SfM to document and analyze taphonomic processes affecting burials. This paper utilizes SfM models in conjunction with ArcGIS ArcScene, and 3D printing, to elucidate specific post-depositional events that may have affected Burial CC-B14 at the ancient Maya site of Chan Chich, Belize. This project successfully created a sharable ArcScene geodatabase that allowed for detailed spatial analysis of Burial 14. Also, 3D printing and SfM was used to digitally preserve human bones within the internment. We conclude that utilizing SfM modeling along with geospatial software can not only record burials with a high degree of detail, but can also contribute to analysis.

043. Science Education Oral Session III and Business Meeting
10:00 to 11:30 am
Lantana, 01
Science Education
Science Education Oral Session III and Business Meeting
Participants:

10:00 043.233 N **Denialism and the Disciplines: How improving interdisciplinary discourse on climate change can counter denialism**, *Patrick Lewis, Sam Houston State University; Ken Hendrickson, Sam Houston State University*

Recently, President Obama endured stiff, unreasoning criticism of his connection of climate change with unrest in the Middle East. The episode highlights an important gap in the effort to counter climate change denialism, in that many people could not or would not see a reasonable link. The authors think there isn't a dense enough or pervasive enough discourse on climate change. Instead, the disciplines are still in silos on the issue. That leaves open space for denialists and know-nothings to operate. We propose that it is critical to connect various and quite diverse fields of knowledge beyond the sciences via the grand narrative, or theme, of atmospheric carbon intensification. We argue that people should not be surprised or shocked when thinking about climate impinges on thinking in other areas policy. In our presentation, we propose a reading of human carbon-combustion impact through the diverse lenses of anthropology and history. For example, to define climate change in the public mind as anthropogenic, we can start by exploring when and what human decisions put us on the path to the present danger. We hope to alert science practitioners to particular issues in expanding climate awareness into such disciplines and to initiate an interdisciplinary dialogue with the object of enhancing public education on climate change.

10:15 043.234 N **Effective STEM Principal Profile**, *Denise Kern, Texas State University; Sandra West Moody, Texas State University*
While being an effective administrator is difficult, being an administrator who can make decisions that enhance STEM education is rare. This session will identify the characteristics that have been identified to impede effective learning by students and instruction by grades 5-8 science and math teachers. Our research has identified factors that these teachers identified were predictable such as providing adequate science materials and equipment. Other factors such as the ability to provide funds for next day instruction might not be predicted as important, but teachers reported that they deemed them valuable to their success. Numerous other factors reported by the teachers include some predictable while others factors were not.

10:30 043.235 N **Incorporating Educational Research Articles in Science Teaching Methods Course: Assessing Pre-Service Teachers' Perception in Elementary Science Teaching**, *Mamta Singh, Lamar University*
The purpose of the study was to investigate how pre-service teachers see benefit of reading educational research articles as one of the tools to improve their elementary science teaching. A total of forty-two pre-service teachers who were enrolled in a science teaching methods course before the student teaching semester participated in the study. For this study, students were required to read at least five journal articles base on elementary science and or teaching which were published within last ten years. After reading those assigned articles students were required to answers two research questions: 1. Did reading assignment helped pre-service teachers to become a better elementary science teacher? 2. How did reading assignment helped pre-service teachers to become a better elementary science teacher? The results suggested that utilization of these articles in the undergraduate science methods course was beneficial and pre-service teachers stated that it helped them to learn interesting ways of science teaching, making it fun and challenging at the same time.

10:45 043.236 N **Modifying Physical Layout of Materials to Reduce Student Frustration and Encourage Student-centered Learning in Biology Labs**, *Cathleen N. Early, Univ. of Mary Hardin-Baylor*
Teaching strategies that encourage student-centered learning are recognized as being the most effective. Many college instructors are revising their teaching style to be student-centered rather than the traditional teacher-centered pedagogy common in the courses they took as undergraduates. Activities in biology laboratory courses that require students to explore and compare various tissues, models, or organisms readily lend themselves to student-centered strategies. However, the physical layout of the materials students are to work with can be counter-productive to learning. Students become frustrated when too much time is spent trying to locate or determine what they are supposed to examine. To address this issue, I changed the way prepared slides are presented in lab. Boxed sets of slides are provided for each group of 4-5 students at their lab bench rather than placing all the slides in a central location for students to pick up a few at a time. The extra time invested to set this up the first time has resulted in students spending more time looking at slides and less time looking for them. I also spend less time resorting slides that were returned to the wrong tray. I will present tips on how to implement slide boxes and other changes to the physical layout of laboratory materials to enhance student-centered learning in biology labs.

045. Anthropology Oral Session and Business Meeting

1:00 to 2:00 pm
Bluebonnet House, 01
Anthropology
Anthropology Oral Session and Business Meeting
Participants:

1:00 045.237 N **Excavation results from the Black Vulture Rock Shelter (41BN207), a Late Toyah occupation on the Edwards Plateau.**, *Raymond Paul Mauldin, UT San Antonio; Leonard Kemp, Center for Archaeological Research-University of Texas at San Antonio; Cynthia Munoz, Center for Archaeological Research, UT San Antonio; Sarah Wigley, Center for Archaeological Research at UT San Antonio; Jason Perez, Center for Archaeological Research at UT San Antonio*
In 2008, the Southern Texas Archaeological Association (STAA) conducted testing at the Black Vulture Rock Shelter. The shelter is associated with active springs and is adjacent to the Medina River in Bandera County, Texas. Shovel testing and the excavation of a 2 x 2 meter area produced a cluster of primarily rib fragments thought to be bison (Bison bison), a single hearth, several hundred pieces of chipped stone debitage, and a handful of arrow points manufactured during the Toyah Interval (ca. AD 1250- 1650). Radiocarbon dates on two charcoal samples, one of which was associated with the hearth, returned dates of 320 +/- 40 and 290 +/- 40 Cal BP. No further work was conducted. In May of 2015, the Center for Archaeological Research (CAR) returned to the site and excavated additional units. Here we provide the first summary of the STAA and CAR work at Black Vulture. Calibrating the two charcoal dates suggest an occupation range at two sigmas of from AD 1483 to 1666 (93.5%) and from AD 1468 to 1649 (95.4%), with median dates of AD 1571 and AD 1562. Archaeological remains recovered to this point suggest a short-term occupation. The presence of a single hearth, a limited occupation area, and a low variety of artifact types suggests that a small number of individuals, possibly focused on a limited number of tasks, may have occupied the site at close of the prehistoric sequence.

1:15 045.238 N **Stepping Beyond the Wow Factor: A 3D Archaeological Investigation of the Black Vulture Site, Bandera County, Texas.**, *Leonard Kemp, Center for Archaeological Research-University of Texas at San Antonio; Cynthia Munoz, Center for Archaeological Research, UT San Antonio; Katherine Smyth, Center for Archaeological Research-University of Texas at San Antonio*
Over the past five years the development and use of 3D technologies in archaeology has moved from a highly specialized and expensive process to one that is relatively easy and inexpensive. The use of Structure from Motion (SfM) photogrammetry and 3D software allowing archaeologists to intuitively create models fosters new ways of analysis. As such this type of documentation should soon no longer elicit "wow," but become a standard methodological tool employed by archaeologists. In 2015, the Center for Archaeological Research conducted an archaeological investigation of the Black Vulture Shelter and began using SfM photogrammetry to document this excavation, later bringing 3D models into a GIS environment to quantify the data. Advantages to using this method included faster and more accurate recording of the site, as well as the capability to view and analyze the virtual site. In addition, 3D models are an excellent outreach tool which allow both the archaeological and general public to interact with cultural resources. Disadvantages included the creation of large and cumbersome data files and long data processing times. However, we believe that the advantages of using this method outweigh the disadvantages and as the method becomes more common the analytical component will improve..

046. Conservation Ecology Oral Session II and Business Meeting
1:00 to 3:00 pm
Academic Building, 111
Conservation Ecology
Conservation Ecology Oral Session II and Business Meeting
Participants:

1:00 046.239 N **Gulf of Mexico Species Interactions (GoMexSI) database: Beyond the fishes!**, *Theresa C Mitchell, Center for Coastal Studies at Texas A&M University; James David Simons, Texas A&M University-Corpus Christi; Jorrit Poelen, Data Analysis and Visualization Consultant*
Much attention has been devoted to measurement and cataloguing of biodiversity throughout the world and in the Gulf of Mexico over the past 30 to 50 years. However, systematic recording and cataloguing of species interactions, or biostructure, has received far less attention. Nevertheless, it is this biostructure that defines and governs the flow of energy through the ecosystem. The Gulf of

Mexico Species Interaction (GoMexSI) database and web application (gomexsi.tamucc.edu), is striving to rectify this situation. Response has been excellent with approximately 300 registered users to the webpage (i.e. those seeking to query the data). Collecting, extracting, and archiving data from published and un-published resources (797) and data contributors (28), we now have trophic interaction data for fishes from 121 sources, with a total of 80,380 interactions from 2,041 unique interactors. Presently we have identified an additional 269 references for diet data from nine taxa other than fishes including sea and shore birds, coastal and marine mammals, reptiles, arthropods, and others. A total of 400 free living species have been identified, with 142 from the arthropoda being the most speciose. In the process of locating these references, we are beginning to identify which taxa and species have been studied most frequently, and for which taxa further data collection is needed. Another 535 references with more than 700 species have been located representing parasite/host interactions. In the near future, we expect to start adding the information from these references into the database.

1:15 046.240 N **Identifying Nesting Habitat for Texas diamondback terrapin in the Nueces Estuary, TX**, *Aaron Scott Baxter, Center for Coastal Studies @ TAMUCC*
Diamondback terrapin occur from Cape Cod, MA to Corpus Christi, TX and populations are declining range-wide. One reason for these declines is the development/fragmentation of nesting habitat. Terrapins are philopatric and perennially return to the same nesting areas. The conservation of this species relies heavily on recruitment into populations as mature terrapins face many threats including boat strikes, drowning in crab traps, and vehicular mortality. In order to preserve nesting sites as functional habitat, they must first be identified. Nesting beaches for terrapin have historically been described as having sandy substrate with minimal vegetation. In many Texas estuaries, this type of habitat is simply not present. The focus of this study was to locate and characterize nesting habitats for diamondback terrapins within the Nueces Estuary, TX. A variety of methods were used including digital trail cameras, acoustic and radio telemetry, and walking surveys. These methods resulted in the identification of terrapin nesting sites. Both aborted nesting attempts and actual nests were discovered within the Nueces Estuary. Once nesting beaches were located, the habitat was characterized using parameters such as distance from water, elevation, vegetative cover, substrate type, and sediment grain size. This characterization will be applied to other Texas estuaries to assist in locating previously unknown nesting sites for this species, helping to ensure these areas remain accessible to nesting diamondback terrapin.

1:30 046.241 N **Unionid mussel survey and the presence of golden orb, Quadrula aurea, in the Lower Cibolo Creek, Texas**, *Shaun Michael Donovan, San Antonio River*
The Texas Parks and Wildlife Department (TPWD) currently lists 15 species of Unionid mussels as threatened, three of which are historically found in the San Antonio River basin, golden orb (*Quadrula aurea*), Texas pimpleback (*Quadrula petrina*) and Texas fatmucket (*Lampsilis bracteata*). In 2011, a 12-month finding by the U.S. Fish and Wildlife Service warranted listing five Texas Unionid species, including the three aforementioned, on the Endangered Species Act candidate species list. In response to these listings, the San Antonio River Authority initiated a holistic mussel survey in 2013 to identify mussel populations throughout the San Antonio River basin. The initial effort focused on the Lower Cibolo Creek, a 119 km spring fed creek that drains ~1,502 km2 southeast of San Antonio, TX. Previous studies suggested that *Q. aurea* was no longer found in the Lower Cibolo Creek and the overall Unionid density was very low. Quantitative and qualitative surveys were conducted and 81 Unionid individuals were found representing five species; yellow sandshell, *L. teres* (n=38), *Q. aurea* (n=32), pistolgrip, *Q. verrucosa* (n=7), paper pondshell, *Utterbackia imbecillis* (n=3) and Louisiana fatmucket, *L. hydiana* (n=1). Sites sampled were inclusive of all mesohabitats present and covered 6,900 m2, resulting in an overall species density of 0.012 individuals/m2. Sampling efforts are underway throughout the remainder of the San Antonio River Basin and will include all major tributaries as well as smaller creeks and streams in the watershed.

1:45 046.242 N **Carpal located scent-marking in raccoons** *Procyon lotor*, *Troy A Ladine, East Texas Baptist University*
Motion-sensor cameras reveal behaviors of animals not possible through other means. Five trail cameras were placed on the Environmental Studies Area of East Texas Baptist University (ESA) on 14 September 2014. Since,an additional seven cameras have been added. Pictures taken at two locations indicate the possibility of scent marking by raccoons (*Procyon lotor*). Marking appears to be conducted using the carpal region of the forearm. Sites marked were unique features in the area:

a snag 2 m height and 8 cm DBH, and a cluster of dead leaves caught on a branch 15 - 25 cm above the ground. On four subsequent visits, raccoons were observed smelling at the leaves. It is not known what the function of this behavior is in the species. Possibilities exist that they use this behavior in a sequentially territorial separation, recognition of group members, or mating behavior.

047. Graduate Student Competition II
1:00 to 2:30 pm
Packard Hall, East Room
Graduate Student Paper Competition
Graduate Student Competition II
Participants:

1:00 047.243 G **DisintegratoR: a new R package for evaluating phylogenetic trees while accounting for correlations between character states**, *William Bernard Gelnaw, University of Texas at Austin*
One of the assumptions of phylogenetic analysis is that all of the characters being assessed evolve independently of one another. However, morphological characters may be linked due to a shared developmental or epigenetic process, or because states are selected together because of shared functional or ecological pressures. The interdependence of characters is referred to as morphological integration and has been the basis for many arguments against using morphology to construct phylogenetic hypotheses. Morphological integration diminishes the reliability of phylogenetic analyses because it draws support for phylogenetic hypotheses from different characters out of proportion to the information that they actually carry. DisintegratoR is an R package that I have developed to, among other things, evaluate the likelihood of a phylogenetic tree given a Brownian motion model of evolution. What sets DisintegratoR apart from other programs is that it also uses the tree structure and the distribution of character states to create a model of correlations between characters, which it then uses to transform the original data to the expected set of states expected if there was no correlation between characters. The likelihood of the tree is then evaluated using the transformed data. Disintegrator is a step forward for the phylogenetic analysis of morphological data because it accounts for morphological integration in an objective way that removes opportunities for investigator bias.

1:15 047.244 G **Elevated humidity and bunching decrease desiccation rate and increase survival of air-exposed fragments of the aquatic invasive plant** *Hydrilla verticillata*, *Sasha Danielle Soto, Texas Tech University; Matthew Alexander Barnes, Texas Tech University*
Aquatic invasive plants can become entangled on trailered boats and other recreational equipment and hitchhike to new locations, thus increasing invaded distributions and potential for negative environmental and economic impacts. However, extended periods of air exposure during overland dispersal result in prolonged periods of stress and hinder the likelihood of plant survival and growth once they are returned to aquatic environments. Atmospheric conditions, such as humidity, temperature, or light intensity, may contribute to the rate of desiccation and the viability of hitchhiking plant fragments. Additionally, when fragments travel in bunches such as wrapped around a boat propeller, they may self-insulate and resist desiccation. Using the aquatic invasive weed *Hydrilla verticillata* as a case study, we observed desiccation response of coiled (simulating entanglement around a boat propeller) or flat fragments under low and high humidity conditions, and then returned them to a common aquatic environment to further monitor survival and growth following desiccation. Coiled fragments and fragments exposed to high-humidity conditions lost less mass than flat fragments and fragments exposed to low-humidity conditions over the same amount of time (ANOVA $p < 0.0001$). Furthermore, fragments that experienced relatively lower mass loss during air exposure exhibited increased survival upon return to a common aquatic environment ($p = 0.005$; AUC = 0.9351). Overall, these results suggest that consideration of vegetative bunching as well as humidity or precipitation can improve estimates of how far plant fragments may disperse, benefiting efforts to slow their spread.

1:30 047.245 G **Examining Ancient Maya Warfare: Diet and Mobility in the Colha Skull Pit, Belize**, *Kristin Hoffmeister, Texas A&M University; Lori E. Wright, Texas A&M University*
The ancient Maya of Central America have historically been characterized as a peaceful society. However, archaeological evidence from throughout the Maya world has increasingly demonstrated that these people were actively engaged in violent behavior and warfare. In northern Belize, excavations at the lithics production center of Colha yielded an unusual mortuary deposit that has provided insight into patterns of violence in the region. The Colha Skull Pit (Op. 2011) consists of

thirty individuals, represented only by cranial remains and cervical vertebrae. These remains include males, females, and subadults, many of which exhibit perimortem cutmarks. This unique mortuary deposit has been interpreted in a variety of ways, including human sacrifice, planned site abandonment, and the violent destruction of the ruling class. In order to better understand this mortuary deposit and its relationship to broader patterns of violence and warfare, we examine the origins and identities of these individuals directly using strontium (87Sr/86Sr), carbon (δ13C), and oxygen (δ18O) isotopic ratios of human tooth enamel. We evaluate variability in diet and mobility patterns during the lifetimes of the Skull Pit individuals in order to better understand the Skull Pit feature and the cultural behavior that produced it.

1:45 047.246 G **Habitat, Diet, and Life History Characteristics of the Saltmarsh Topminnow (*Fundulus jenkinsi*)**, *Josi Robertson, University of Houston-Clear Lake*
The Saltmarsh Topminnow, *Fundulus jenkinsi*, occurs sporadically within estuaries along the northern Gulf of Mexico and is listed as a species of concern by most of the Gulf coast states. The Saltmarsh Topminnow is under consideration for federal listing and given the limited knowledge of this species' population in Texas, it is imperative to understand their habitat preferences and life history requirements in order to better predict their overall abundance and population viability. 134 sites were sampled between February 2014 and March 2015. Water depth, water quality, and dominant vegetation were recorded at each site as well as fish species abundance (N), relative abundance (%), and diversity (H□) were calculated. Fish community assemblages were analyzed using PRIMER6 and showed a significant difference in fish assemblage structure and *F. jenkinsi* presence across seasons for both Galveston Bay (Global R=0.304, p=0.002) and Sabine Lake (Global R=0.388, p=0.001). *Fundulus jenkinsi* individuals were measured and length frequency histograms analyzed with the software package FiSATII to establish tentative relative age classes. 152 individuals were dissected to assess reproductive condition and diet composition. Gut content was extracted and prey abundance compared across season, lengths, and bays. Gonads were extracted and mean gonadosomatic index (GSI) calculated. Monthly mean GSI values were significantly different across months for both females ($F=31.58$, $p<0.001$) and males ($F=13.11$, $p<0.001$). Reproductive activity of females were further assessed by classifying ovarian phase. Ovary phases showed a significant positive relationship with standard length ($R^2=0.265$, $p<0.001$) and ovarian development showed signs of seasonal progression.

2:00 047.247 G **The stratigraphic position of fossil vertebrates from the Pojoaque Member of the Tesuque Formation (middle Miocene) near Española, New Mexico**, *Garrett Ross Williamson, Stephen F. Austin State University*
The stratigraphy of the Pojoaque Member of the Tesuque Formation near Española, NM is not well understood. This region, during the Middle Miocene, represented a dynamic alluvial fan-fluvial-lacustrine environment within the Española Basin while the Rio Grande Rift was active. Cavazza (1986) identified two paleodrainage systems (Lithosome A, basin-margin facies and B, basin-floor facies) by means of sandstone and conglomerate petrology, paleocurrent, and sedimentary facies analyses. This research demonstrates how using fossil location data can permit one to infer their stratigraphic position from detailed geologic maps with stratigraphic studies. Unfortunately, it was not common practice for early paleontologists to record specific geographic locations of fossils. Therefore, this study was restricted to relatively recently published paleontological data along with fossils discovered during this study to identify the stratigraphic positions of the fossil specimens. It has been well documented and confirmed by recent field work that fossils of the Pojoaque Member have almost exclusively been produced from Lithosome B deposits; more specifically, relatively thin (.5–3m) pale-green and maroon-red claystone to fine-grained siltstone beds. Many previous explorations recorded fossils singly from the Santa Cruz Red bed; in reality, there are multiple red horizons. These fossil-bearing beds reflect either different depositional environments or a difference in diagenetic conditions. Nine stratigraphic transects were measured across eleven sections in the Española Basin. Examining the stratigraphic distribution of these beds within correlated Lithosome B outcrops using stratigraphic sections measured during field studies helped better define the stratigraphic positions of vertebrate fossils of the Pojoaque Member.

048. Marine Science Oral Session II and Business Meeting
1:00 to 3:00 pm
Mockingbird House, 01
Marine Science
Marine Science Oral Session II and Business Meeting

Participants:

1:00 048.248 N **Effects of rapid salinity decrease on photosynthetic performance in the seagrasses, *Thalassia testudinum*, *Syringodium filiforme*, and *Halodule wrightii* using PAM fluorescence**, *Joseph Kowalski, The University of Texas Rio Grande Valley; Kirk Cammarata, Texas A&M University Corpus Christi; Hudson DeYoe, The University of Texas Rio Grande Valley*
Rapid decreases in estuarine salinity associated with increased storm frequency and intensity may impair photophysiological functioning in seagrasses. Pulse Amplitude-Modulated (PAM) fluorescence is a rapid indicator of photosynthetic efficiency. The seagrasses *Thalassia testudinum*, *Syringodium filiforme*, and *Halodule wrightii* were subjected to rapid drops in salinity from 35 to 15 to 0 over 10 to 20 minute increments in three separate experiments. Experiment 1 involved Thalassia alone with salinity decreased every 10 minutes under light and dark conditions. The combination of light and changing salinity revealed optimal photosynthetic performance at salinities between 17 and 20. Experiment 2 was with Halodule alone and subjected plants to decreasing salinities from 39 to 15 to 0 over a total of 60 minutes each per salinity treatment. Fv/Fm (efficiency) decreased significantly with decreased salinity. Experiment 3 utilized the same procedure as Experiment 2 (no 15 salinity treatment), but compared measurements of Photosystem II efficiency among all three species from salinities of 39 to 0. Photosynthetic efficiency in both Thalassia and Syringodium decreased substantially, while Halodule showed little change. Results provide a photophysiological basis for the ecological tolerance to hyposalinity for these species reported in the literature (*Syringodium* < *Thalassia* < *Halodule*).

1:15 048.249 N **Gulf of Mexico species interactions (GoMexSI) database: Big data, big ecology, big deal??**, *James David Simons, Texas A&M University-Corpus Christi; May Yuan, University of Texas-Dallas; Maru Vega-Cendejas, CINVESTAV; Jorrit Poelen, Freelance Software Engineer*
Much attention has been devoted to the measurement and cataloguing of biodiversity throughout the world and in the Gulf of Mexico over the past 30 to 50 years. However, the systematic recording and cataloguing of species interactions, or biostructure, has received far less attention. Nevertheless, it is this biostructure that defines and governs the flow of energy through the ecosystem. The Gulf of Mexico Species Interaction (GoMexSI) database and web application (gomexsi.tamucc.edu) is striving to rectify this situation in the Gulf of Mexico. Collecting, extracting, and archiving data from published and un-published resources and data contributors, we now have trophic interaction data for fishes from approximately 190 sources (24% of fish references), with a total of 80,398 interactions from 2,041 unique interactors. Currently focused on trophic interactions of fishes, we are assembling diet and habitat data in the Gulf of Mexico proper, and its estuaries from 800 references. We will soon be adding trophic data for other taxa to include sea and shore birds, marine mammals, sea turtles, crustaceans, and others from approximately 800 additional references. Beyond trophic interactions we will include parasitic, amensal, commensal, and mutualistic relationships. Response so far has been excellent with approximately 300 registered users to the webpage (i.e. those seeking to query the data). We are continually seeking data contributors to the project, but response has been tepid due to the lack of a robust data sharing culture in the ecological, environmental, and conservation sciences.

1:30 048.250 N **Influence of Freshwater Inflow on Aquatic Biota of the Lower Brazos River, Texas**, *George J Guillen, University of Houston Clear Lake; Jenny Oakley, University of Houston Clear Lake - EIH; Stephen Curtis, University of Houston Clear Lake - EIH*
The State of Texas is conducting validation studies to determine whether existing environmental flow standards adopted and implemented under the Senate Bill 3 process should be modified. Many of these standards were adopted using limited data and best available science. Existing freshwater inflow standards for the Brazos River estuary utilized instream flow standards for the Rosharon USGS gage. Unlike most Gulf coast estuaries the Brazos River discharges directly into the Gulf of Mexico instead of an enclosed bay. The nekton of the lower Brazos River and estuary has been rarely monitored during the last 50 years. The primary objectives of our study were to characterize and determine the influence of river discharge on physicochemistry and nekton in the Brazos River estuary. We conducted eight collections of nekton during November 2014 to May 2015 at nine sites extending from the mouth of the river to a point located 42 kilometers upstream. We also compared our results with past data and research results to characterize the response of nekton over a broad range of freshwater inflow. Based on statistical analysis of these data we detected distinct lateral and vertical gradients in salinity, dissolved oxygen, and nekton composition associated with freshwater discharge. We found that high and sustained freshwater discharges significantly altered the seasonal

nekton community composition of the lower river. Further research and monitoring are needed over a range of flow regimes to better characterize the response of water quality and estuarine biota to varying freshwater inflow.

1:45 048.251 N **Lessons learned from three years of seagrass monitoring in San Antonio Bay**, *Cynthia Hobson, Texas Parks and Wildlife Department*
Seagrasses are vascular aquatic macrophytes rooted in the sediments of shallow coastal waters, and serve as important habitat for fisheries and wildlife. In Texas, seagrass beds cover roughly 88,000 hectares of bay bottom, and are unevenly distributed, with more located in the lower coast, notably in the Laguna Madre. Globally, as resource managers have become more aware of ecosystem services provided by seagrasses, the need to monitor the extent and condition of seagrass beds has come to the forefront. In Texas there is currently no coordinated effort by government to regularly monitor seagrass bed extent or seagrass health. In 2012, Texas Parks and Wildlife Department (TPWD) conducted a pilot program designed to monitor changes in seagrass condition over large areas (coastwide and at bay scale) within the constraints of limited resources. As part of that study, 50 permanent monitoring stations were established in San Antonio Bay, using existing seagrass coverage maps and a random site selection process. Only sites that could be reached using small motor craft were established. Seagrass percent coverage by species and canopy height (leaf length) were first monitored in 2012, and then again in 2014 and 2015. All sampling took place during late summer or early fall to capture peak biomass before winter senescence. The author will discuss whether information collected from three years of monitoring is sufficient to provide the amount and kind of information that resource managers need about seagrass status in San Antonio Bay.

2:00 048.252 N **New trophic data for the Gulf of Mexico large marine ecosystem to support ecosystem assessment, fisheries modeling, and management**, *Tracy Fisher Weatherall, Texas A&M Corpus Christi; James David Simons, Texas A&M University-Corpus Christi*
As the fisheries world moves toward using an ecosystem based approach to management, the need for good monitoring data is of utmost importance. An important component of the manager's toolbox are fishery ecosystem models (e.g. Ecopath, Atlantis, OSMOSE), all of which are either directly or indirectly dependent on diet data of fishes. As part of a NOAA MARFIN grant, we are collecting demersal and pelagic fishes from around the northern and southern Gulf of Mexico, and performing gut content analysis. In addition to diet we are also analyzing fish tissue for stable isotopes of C and N. These data will be uploaded into the Gulf of Mexico species interaction (GoMexSI) database. The fish have been collected by trawl (NOAA groundfish survey), longline (NOAA longline survey), and hook and line (charter boats and Mexican fishermen). We will report on the status of catch and preliminary diet of selected species from the US waters in this paper. To date we have collected 1994 fish specimens. The highest numbers caught include *Lutjanus campechanus* (231), *Upeneus parvus* (116), *Lepophidium brevibarbe* (111), *Scomberomorus cavalla* (109), and *Prionotus longispinosus* (107). An additional 22 species have greater than 20 specimens. A total of 63 species have been collected. Rationale for the fish collected and locations of collection included a) lack of data for a species, b) very old data for a species, c) lack of data for a species in a particular location, or d) recommendations by management and ecosystem assessment scientists.

049. Systematics & Evolutionary Biology Oral Session III and Business Meeting
1:00 to 3:00 pm
Juniper House, 01
Systematics & Evolutionary Biology
Systematics & Evolutionary Biology Oral Session III and Business Meeting
Participants:

1:00 049.253 G **A new mosasaur from the Cretaceous Taylor Group of Texas: implications for the genus *Clidastes* and the evolution of Mosasaurinae**, *Joshua Ryan Lively, The University of Texas at Austin; Michael Polcyn, Southern Methodist University; Gorden Bell, Great Basin National Park*
We describe a new taxon of mosasaurine from the Campanian Taylor Group of Collin County, Texas and discuss its phylogenetic significance. Mosasaurs were a diverse clade of marine squamates that are known only from the Late Cretaceous. The Mosasaurinae was the most diverse clade of mosasaurs during the latest Cretaceous, including morphologically disparate taxa such as *Mosasaurus*, *Clidastes*, *Prognathodon*, and *Globidens*. The new taxon described herein is exemplified by TMM 43208-1, which includes a nearly complete skull, forelimb, ribs, cervical, trunk, and pygal vertebrae. The specimen exhibits a suite of character states that traditionally

diagnosed the genus *Clidastes*. However, phylogenetic analyses demonstrate that species assigned to *Clidastes*, including this new specimen, are paraphyletic with respect to the rest of Mosasaurinae, to the exclusion of *Dallasaurus turneri*. Numerous character states interpreted to be derived for Mosasaurinae are present in different individual species of *Clidastes*. Our phylogenetic results potentially provide support for two competing evolutionary hypotheses. One hypothesis is that convergence occurred between basal mosasaurines traditionally referred to *Clidastes* and more highly-nested members of Mosasaurinae. An alternative hypothesis is that variability in a basal mosasaurine clade (*Clidastes*) manifested as anatomical variation during the Coniacian – Campanian. Then, because of selective pressures on those variable characters, taxonomic diversity and disparity greatly increased during the latest Cretaceous, especially when compared to other mosasaur clades. Future work, including a detailed, specimen-level phylogeny of taxa assigned to *Clidastes*, will hopefully help elucidate the evolutionary history of the Mosasaurinae.

1:15 049.254 G **Genetic analysis of potential hybridization between the endangered** *Gambusia nobilis* **and invasive** *Gambusia geiseri* **in Texas**, *Victoria Rodriguez, shsu*
The introduction of invasive species is the second leading cause of species extinction across freshwater ecosystems, after habitat loss. Invasive species can reduce diversity of native taxa by direct predation, competition for limited resources and space, and through hybridization. Hybridization is particularly problematic when genetically distinct non-native and native taxa are closely related. In these cases, successful hybridization can compromise the genetic structure of the native species and drive native species extinction due to genetic introgression, outbreeding depression, or decreasing fecundity. The risk of extinction is greater when hybridization occurs between a vulnerable native species (such as endangered or rare species) and an invasive species. Rare species often lack the genetic variation necessary to survive when faced with ongoing hybridization, resulting in a potential extinction of the rare taxa. The federally endangered fish *Gambusia nobilis* is currently restricted to four locations in the Pecos River drainage. It currently faces threats from competition and habitat loss. Morphological evidence of hybridization between *G. nobilis* and the invasive congener *Gambusia geiseri* has been identified within San Solomon Springs at Balmorhea State Park in Toyahvale, Texas. I will present preliminary data for the morphological evidence of hybridization from samples collected at this location. I will also present complementary molecular data from one mitochondrial gene and five microsatellite loci to support the morphological data. Presenting both methods will give a greater insight to the potential hybridization issue currently facing the endangered *Gambusia nobilis*.

1:30 049.255 G **Patterns of genetic diversification in a widely distributed species of bat,** *Molossus molossus***, based on nuclear markers**, *Laramie Louise Lindsey, Texas Tech University; Robert D Bradley, Texas Tech University; Loren K Ammerman, Angelo State University*
The taxonomy and evolutionary relationships of the velvety free-tailed bat, *Molossus molossus*, from Central and South America long has been debated. Within this species, and for the entire genus *Molossus*, specimens have been difficult to identify and have presented several taxonomic challenges. The objective of this project was to characterize the genetic relationship among individuals representing subspecies of the widely distributed species, *M. molossus*, based on the nuclear markers beta fibrinogen (β-fib), dentin matrix acidic phosphoprotein (DMP1), and recombination activating gene 2 (RAG2). We tested the hypothesis that genetic patterns of diversification would reflect subspecies lineages. For preliminary results, β-fib intron 7 was amplified and sequenced for specimens throughout the geographic range of *M. molossus*. A Bayesian analysis was conducted with *M. rufus* as an outgroup and genetic divergences were estimated. Our results indicated that some currently recognized subspecies of *M. molossus* were consistent with the lineages recovered, and were consistent with lineages recovered in a mitochondrial gene tree (cytochrome b) from previous work. However, not all recognized subspecies of *M. molossus* were recovered by this analysis suggesting that several taxonomic revisions are needed. Overall there was low average genetic divergence across all specimens.

050. Geosciences Oral Session and Business Meeting
2:00 to 3:00 pm
Bluebonnet House, 01
Geosciences
Geosciences Oral Session and Business Meeting
Participants:

2:00 050.256 N **Boudins and other ductile structures in Packsaddle Schist at the Llano River bridge in Llano, TX**, *Chris A. Barker, Stephen F. Austin State University; Russell LaRell Nielson, Stephen F. Austin State University*

Precambrian Packsaddle Schist beneath the Llano River bridge at Hwy 71/16 in Llano, TX, was intruded by granitic dikes and sills and contains several features indicating ductile deformation. The country rock is mainly shallowly dipping ultramylonitic amphibolite schist with well-developed foliation. Long lineations are prominent on the foliation planes. Delta-winged leucocratic feldspathic porphyroclasts form sigmoidal shapes indicating mainly sinistral shear in the amphibolite. In the present orientation, this suggests tops moved northward with thrust fault movement. The amphibolite was intruded by multiple generations of granitic dikes and sills. Earlier intrusions are metamorphosed and sheared indicating syntectonic emplacement. Several of the sills were ductilly deformed into boudins by continued shearing of the host amphibolite and these are probably among the best and most easily accessible boudins in the Llano Uplift. Cross-cutting relationships and varying degrees of metamorphism of the intrusions allow determination of their relative ages. Some of the later felsic dikes are pegmatites with fine-grained chill margins. Faults with possible strike-slip movement are present. The rocks are also folded into open anticlines and synclines. This will be the final stop on the TAS geology field trip on Sunday (besides Cooper's).

2:15 050.257 N **Stromatolitic bioherms in the Upper Cambrian, Point Peak Member of the Wilberns Formation near Camp San Saba, Texas**, *Russell LaRell Nielson, Stephen F. Austin State University; Chris A. Barker, Stephen F. Austin State University*

Relatively large, oval stromatolitic bioherms have been exposed in the lower Point Peak Member of the Wilberns Formation, by the down cutting of the San Saba River at the picnic area on US Highway 377 north of Camp San Saba, Texas. The river has cut through the stromatolitic buildups, exposing the interior of a series of northeast-southwest trending stromatolitic bioherms. The northwest side of the bioherms shows a steeper margin where as the southeast side has a more gentle slope. These stromatolitic bioherms are 3 m in diameter and contain smaller circular heads 10 to 30 cm in diameter. Each smaller hemispheroidal head contains dome shaped laminations. Between the larger hemispherical buildups there are laminated beds of fossiliferous mudstone and wackestone that lack bioturbation, and contain fossil fragments between .125 and 2 mm in diameter. The lack of extensive bioturbation suggests oxygen poor conditions for the Point Peak Member of the Wilberns Formation during the Cambrian Period. The northeast-southwest trend, along with the steeper eroded northwest side of the bioherms and the fossiliferous mudstones and wackestones between the bioherms suggests that they acted as wave resistant structures, probably less than 1 m in height. The orientation of the build up would suggest that the waves approached from the northwest. Distribution, orientation and the internal structure of the stromatolitic bioherms suggest deposition in a low energy estuary or lagoon environment.

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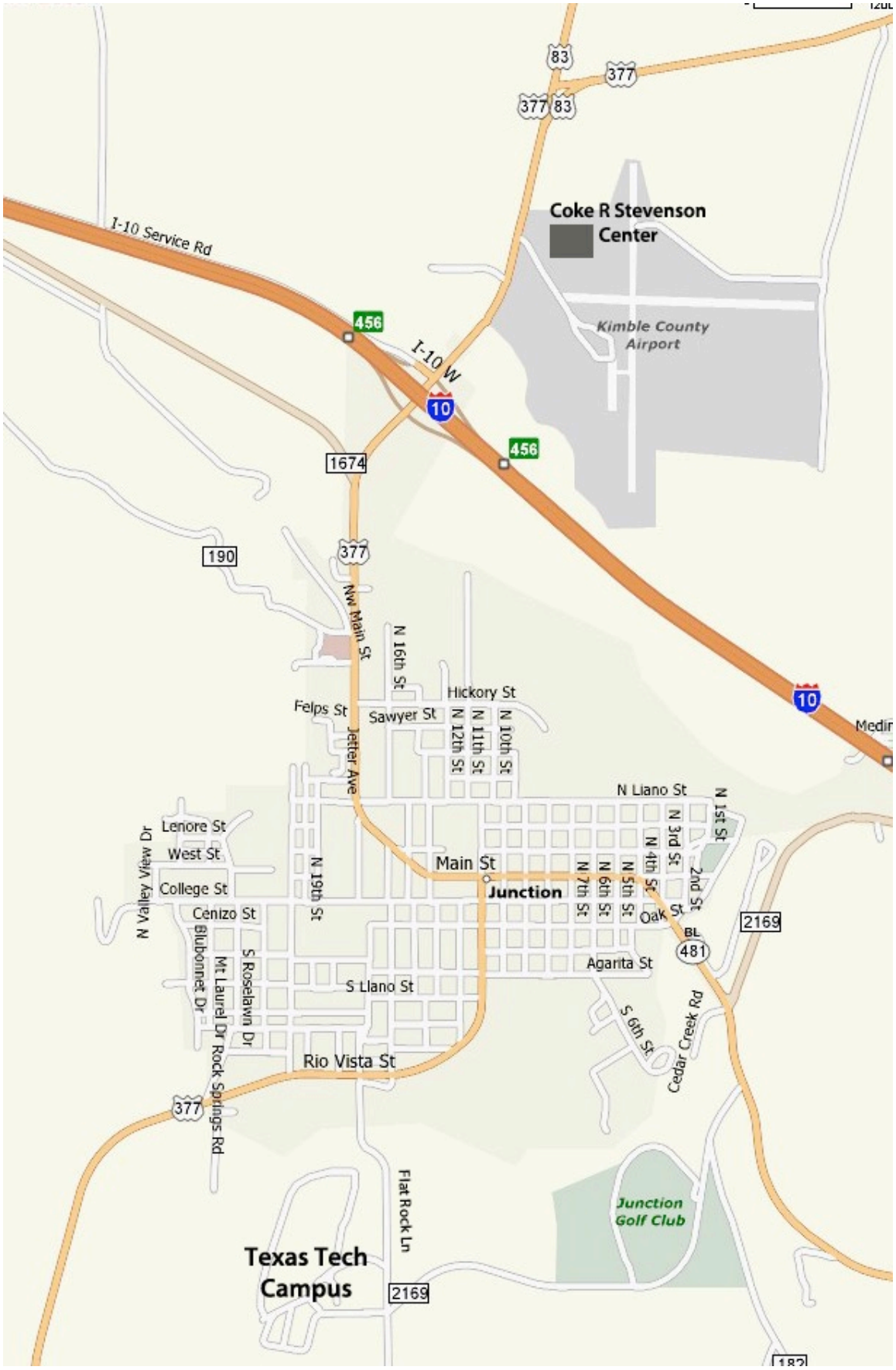
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