120th Annual Meeting of the Texas Academy of Science

March 3-5, 2017

University of Mary Hardin-Baylor
900 College Street
Belton, TX 76513

Official Program

THE TEXAS ACADEMY OF SCIENCE

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

Letter from the President of the Academy

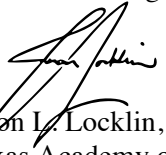
Welcome to the 120th annual meeting of the Texas Academy of Science at the University of Mary Hardin-Baylor! Annual meetings have long been a significant function of the Academy and play an important role in engaging our diverse membership body. With 16 active sections of the Academy, TAS is truly a multidisciplinary science organization with diverse interests. Our annual meetings provide an avenue for networking, sharing our research, and building relationships within and outside of our own disciplines. This is one characteristic of the Academy that makes TAS unique and a platform for interdisciplinary scientific research and education in Texas. This year's program includes 260 scientific presentations from students (70%) and professionals (30%) working in or around the State of Texas. Thank you for attending and making your contribution!

There are many individuals that make TAS and our annual meetings successful, and this year's meeting would not be possible without volunteers that serve the Academy in various critical capacities. This year's Program Chair, Dr. Neil Gray, local hosts, Dr. Karen Grant and Dr. Cathy Early, the planning committee, Drs. Andy Woodward, Joni Ylostalo, Kaleb Heinrich, Kathleen Wood, Christine Nix, and April Brown, and the TAS Coordinator of Information Technology, Dr. Chris Vitek, were all instrumental in putting this year's program together. Dr. Danette Vines, Immediate Past President and Elections Chair, headed the 2017 officer election and the TAS Constitution and Bylaw amendments election. Drs. Cathy Early, Karen Grant, Shannon Hill, and Don Harper coordinated the judging of presentations, posters, and research grant proposal submissions. And, of course, the 32 Section Chairs and Vice Chairs that form the program committee and provide the leadership to the pillars of the Academy – the TAS Sections. If you see them around this weekend, please tell them thanks!

On the ballot this year are recommended amendments to the TAS governing documents. These much needed recommendations have been a work-in-progress for many years and would not have made it to the ballot without the help of former TAS President, Cindy Hobson, former Non-Academic Director, John Burch, and outgoing Non-Academic Director, Dr. Mike Grusak.

I'm also pleased to finally announce that the *Texas Journal of Science* will be back on schedule this year and is now actively seeking submissions. This is great news for the Academy and I'd like to thank Drs. Andy Kasner, managing editor of TJS, Allan Nelson, manuscript editor of TJS, Ned Strenth, Kathryn Perez, and Mike Grusak for helping get the journal back on track. This has been a long process and your patience is much appreciated. You should be receiving volumes 67 (2015) and 68 (2016) in the coming weeks if you were a TAS member during those years.

Finally, please plan to experience every part of the 120th annual meeting over the next two days in Belton. We meet as a society only once each year to discuss and share our science, and our science is critical to advance our respective fields and to guide the legislative process as policy-makers look to us to make informed decisions. Our voice is needed more than ever in Austin and Washington, D.C. Thanks for being a part of this process.



Jason L. Locklin, Ph.D.
Texas Academy of Science President, 2016-2017

UNIVERSITY OF
MARY HARDIN-BAYLOR
EDUCATION FOR LIFE... EXPERIENCE OF A LIFETIME

March 4, 2017

On behalf of the administration, faculty, staff, and students, let me welcome you to the University of Mary Hardin-Baylor! We are honored to host the 120th Annual Meeting of the Texas Academy of Science on our campus, and proud of our historical ties with TAS.

After earning her Ph.D. in chemistry in 1931, Dr. Amy Le Vesconte devoted the next four decades to teaching chemistry to the students of Mary Hardin-Baylor and two other women's colleges. She was also instrumental in the formation of the Collegiate Academy of the Texas Academy of Science (TASCA) in the 1930s, and continued to edit and publish the TASCA journal through the 1950s. Today, the Natural Sciences division at UMHB continues to be a good fit with TAS and is in line with the TAS motto of "Promoting strong science and education in Texas." Although primarily a teaching institution, the university supports undergraduate research and continues to produce many junior high and high school science and math teachers each year. The university also recently announced the addition of a four-year Engineering program coming this fall.

In addition to the new Engineering program, we have recently added a Doctor of Nursing Practice degree, Doctor of Physical Therapy degree, and will soon also offer an Occupational Therapy program. The university is not only expanding our academic catalog, but also our campus topography. Over the last six years, we have added the Baugh Center for the Visual Arts, Isabelle Rutherford Meyer Nursing Education Center, Cummins Field House, Bawcom Student Union, and Crusader Stadium to our landscape. A new performing arts center will also be completed in time for the fall 2017 semester. Though our infrastructure and borders have grown and evolved, our commitment to Christian higher education remains the same. We are proud of our talented and dedicated faculty at UMHB, and confident in our ability to produce competent, successful men and women who are ready for the challenges of living and working in a rapidly changing world.

We are glad you have chosen to attend the 120th Annual Meeting of the Texas Academy of Science at the University of Mary Hardin-Baylor, and hope you enjoy your time with us. Best wishes for a productive and fulfilling meeting!

Sincerely,

Randy O'Rear

Randy O'Rear, Ed.D.
President

Office of the President • UMHB Box 8001
900 College Street • Belton, Texas 76513
(800) 727-UMHB • (254) 295-4500
umhb.edu

UNIVERSITY OF
MARY HARDIN-BAYLOR
EDUCATION FOR LIFE... EXPERIENCE OF A LIFETIME

A very warm welcome to the 120th Meeting of the Academy of Science from the faculty, staff and students of the University of Mary Hardin-Baylor. This meeting has been in planning for the last several years and has been made possible, in part, to recent, and continuing, growth of our university.

Although this is the first time for the annual meeting to come to UMHB, Mary Hardin-Baylor has had a relationship with the Texas Academy of science since at least 1938. Outside the Chemistry department office on the third floor of York Science Center is a dated November 1938 certifying the Science Club to being part of the Collegiate Division of TAS. In addition, a number of faculty members of the School of Natural Sciences regularly attend meetings. Three are currently active members of the TAS, three are TAS Fellows and one is a past board member.

The University of Mary Hardin-Baylor, originally the Female Department of Baylor University in Independence, TX was chartered February 1, 1845. In 1866, the move to Belton was made and the name changed to Baylor Female College. Finally, in 1978, this institution was named the University of Mary Hardin-Baylor. Judge Baylor, for whom both UMHB and Baylor University are named, lies buried in the grassy quad just north of the York Science-Wells Science Hall Buildings. For those of you with ties to 'Old Baylor', come by and pay your respects to the Judge.

Organizing the annual meeting is no small task and cannot be accomplished without the tireless efforts and hours of work by organizers and volunteers. I cannot begin to convey all my gratitude for all of their efforts. When you see them, please thank them too. Thanks too to the staff of Event Services and Sodexo Catering for their experience and for working so diligently to make sure that all of our guests have a wonderful stay here at UMHB. Many thanks also to the many faculty and students who volunteered to work at the meeting to help make events run smoothly. It is always a pleasure to work with members of the UMHB Community! Lastly, I would like to thank our administration, Dr. O'Rear, Dr. Oldham, Dr. Mynatt and Dr. DiFrancesca for all of their support and enthusiasm in hosting the 120th meeting.

Karen Grant, Local Host

Cathy Early, Co-Host

Andrew Woodward	Joni Ylostalo	Kaleb Heinrich
Kathy Wood	Christine Nix	April Brown

The Texas Academy of Science

120th Annual Meeting | University of Mary Hardin-Baylor

A special thanks to our 2017 Sponsors!

Larry Driver

Joseph Kowalski

Andrew Woodward

Since 1998, TAS has awarded $88,500 directly to support the research of nearly 100 students across all educational levels (B.S. or B.A., M.S. and Ph.D.). These efforts would be impossible without the generous donations of our meeting sponsors and other donors. We are grateful for the generous donations of this year's sponsors. Thank you!

The Texas Academy of Science

120th Annual Meeting | University of Mary Hardin-Baylor

Abbreviated Program Schedule

FRIDAY, MARCH 3		
8:00 am to 12:00 pm	**TAS Board of Directors Meeting**	Bawcom Student Union, Great Hall A
10:00 am to 6:00 pm	**Meeting Registration & Presenter Check-in**	NEC Lobby
10:00 am to 1:00 pm	**Poster Setup - Session I**	NEC Hallway
12:00 to 12:45 pm	**Section Chairs Pre-Session Lunch Meeting**	Bawcom Student Union, Great Hall C and D
1:00 to 2:30 pm	**Paper Sessions I**	Various Rooms
2:30 to 3:00 pm	**Coffee and Refreshments**	NEC Courtyard Area & YSC South Foyer
3:00 to 4:30 pm	**Paper Sessions II**	Various Rooms
4:30 to 6:00 pm	**Poster Session I**	NEC Hallway
6:00 to 6:30 pm	**Poster Session I - Take Down**	NEC Hallway

SATURDAY, MARCH 4		
7:00 am to 12:00 pm	**Meeting Registration and Presenter Check-in**	NEC Lobby
7:00 to 8:00 am	**Past Presidents' Breakfast**	Bawcom Student Union, Great Hall A
7:00 to 8:30 am	**Poster Session II - Setup**	NEC Hallway
8:00 to 9:00 am	**Graduate Student Competition I**	YSC 102 - Brindley
8:00 to 9:30 am	**Paper Sessions III**	Various Rooms
9:30 to 10:00 am	**Coffee and Refreshments**	NEC Courtyard Area
10:00 to 11:30 am	**Poster Session II**	NEC Hallway
11:30 am to 1:00 pm	**Lunch**	Bawcom Student Union, (Outside- King St. Side)

1:00 to 2:30 pm	**Graduate Student Competition II**	YSC 102 - Brindley
1:00 to 2:30 pm	**Paper Sessions IV**	Various Rooms
2:45 to 3:30 pm	**Section Chairs Post-Session Meeting**	NEC 125
3:00 to 4:00 pm	**Poster Session II - Take Down**	NEC Hallway
4:00 to 4:30 pm	**TAS Business Meeting**	NEC 105
4:45 to 6:15 pm	**Distinguished Texas Scientist & Outstanding Texas Educator Lectures**	NEC 105
6:30 to 7:15 pm	**Banquet Reception**	Bawcom Student Union, Great Hall
7:15 to 10:00 pm	**Awards Banquet**	Bawcom Student Union, Great Hall

SUNDAY, MARCH 5

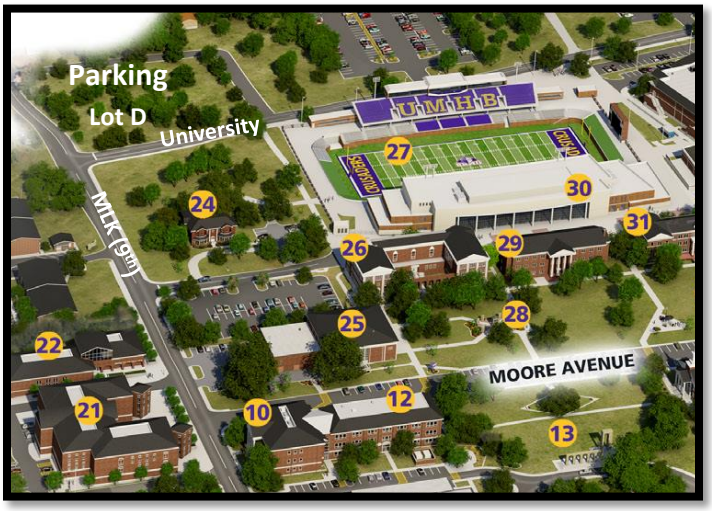
8:00 am to 1:00 pm	**Field Trip - Waco Mammoth National Monument (If you wish to attend please contact Dr. Chris Barker at cbarker@sfasu.edu)**	NEC Courtyard

Presenter Key for Poster and Paper Abstracts

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

Notes from the Local Host….

Parking



On Friday, there will be classes running on campus. **Parking** for TAS will be in the parking lot on the corner of Martin Luther King Jr Avenue and University Drive (across the road from the stadium and marked 'Parking Lot D' on site). This lot can hold more than 100 cars and can hold several buses (towards the rear of the parking lot). If you have handicap plates/placards, there are a number of handicap spots directly across from and around the Nursing Education Center. People with mobility issues, but no special licensing, are welcome to park closer as well. Campus Police should not be issuing parking tickets for use of Faculty/Staff areas but we do ask that you do observe parking rules of having your vehicles parked into the curb and parking between lines. The first rule is a safety measure to reduce fast exits out of parking areas and the second is to make sure only one parking spot per car. Due to our fast growth in student population and faculty/staff, parking spots are a premium on campus so please be considerate!!

On Saturday, you may park in any of the parking lots but be advised that we have some spots reserved for our award-winning speakers (west side of the York Science Building).

Campus Store

The Campus Store (Bawcom Student Union #30) will be open until 3:00 pm on Friday and from 10:00am – 1:00pm on Saturday. You can get snacks here, notebooks, pens, and if purple is your color, this is the place to go for clothing.

One suggestion has been made repeatedly as I've been planning and organizing this meeting – please communicate clearly what meeting participants can expect of food being served at the meeting. You've suggested, I've listened….

Friday, March 3rd

Board Meeting

The TAS Board will meet in the Great Hall A-B (3rd floor Bawcom Student Union, #30 on the map). Breakfast and lunch will be provided. Registration packets will be available here as well for board members.

Registration

Registration starts at 10:00 am in the lobby of the (Isabella Rutherford Meyer) Nursing Education Center (#21 on the map) and continues until 6:00 pm. On Saturday, registration will be open from 7:00 am until noon. While you are in the Nursing Education Center (NEC), please visit with our vendors. This is also the building where all poster sessions will be and many presentations will occur. The Business meeting, Distinguished Texas Scientist, and Outstanding Texas Educator presentations will also be held in this building.

Across the street from the NEC is the York-Wells Science Building (conjoined buildings #10 & #12 on the map) where the remaining presentations will be held. We will have volunteers at each entrance and on each floor to help direct you and to answer any questions that you may have – look for the TAS Volunteer badges.

Lunch

Section and Vice Chairs will meet in the Great Hall (3rd floor Bawcom Student Union, #30) at noon for a brief lunch meeting to receive judging packets and final instructions. Meeting participants are responsible for their own lunch plans either off campus or on campus. On campus there is a small Starbucks outlet, Chick-Fil-A, 1845 Grill, and Dining Hall. Off campus there are many restaurants north of campus on Main Street, several choices on 6th Ave as you travel back to the I-35 and quite a number in downtown Belton. There will be restaurant guides at registration.

Afternoon coffee break

Refreshments will be served on two locations – outside (weather permitting, in the 2nd floor foyer if raining) in the NEC Courtyard and in the foyer of York Science Center (outside YSC102 Brindley Auditorium). Beverages will be served at both locales: Starbucks coffee, tea (regular and herbal), water, and infused water. An assortment of cookies will be also served at the NEC location.

Friday evening

The decision was made to have participants eat dinner out in the Belton/Temple community so that you could enjoy a 'spirited' evening (UMHB is a dry campus). Lots of restaurants to choose from and a number have been listed in 'Recommended Restaurants near UMHB'.

Saturday, March 4th

The Past Presidents of TAS will meet in Great Hall A-B, 3rd floor Bawcom Student Union. You will be served our 'Crusader Breakfast' (eggs, breakfast meats, coffee cake, coffee, tea, and juice). This is only for those who have served as TAS Presidents. This is a typical breakfast menu for this event so if you think that this is something that you would like to attend at future meetings, I would encourage you to run for election.

For the rest of the academy, many of the hotels provide breakfast but there are lots of restaurants on the way to campus. Starbucks on campus will be open from 7:00 -10:00am. The dining hall will be open at 11:00 am for brunch.

Morning coffee break

Beverages (Starbucks coffee, teas, water and infused water) and cookies will be served in the NEC courtyard only (weather permitting, 2nd floor foyer otherwise).

Lunch

Lunch will be served outside the Bawcom Student Union (#30 on map). Premade and wrapped deli sandwiches (choice of turkey & cheddar, ham & Swiss, roast beef & provolone or roast veggies with provolone), kettle chips, fruit salad, brownies, bars, and cookies and beverages. Boxed lunches without the box. Eat *al fresco* or inside the Student Union. Please show your name badges to our volunteers!

Afternoon

There is no official break in the afternoon. Lots of presentations, Graduate Student Competition, TAS Board meeting and of course, our Awardees of the Distinguished Texas Scientist & Outstanding Texas Educator will be lecturing. Recipients of these awards are really top notch and are a must see!!

Banquet

Will be held in the Great Hall, 3rd floor Bawcom Student Union. Seating will begin at 6:30 pm. To accommodate as many people as possible, we will remain seated while serving staff serve dinner. Words of welcome around 7:00 pm and dissemination of awards will begin around 7:15 pm. Remember to win the award…you must be there (pictures will be taken, too, so you might want to gussy up a little).

Now for the important part, the menu. We will be served Chicken Cordon Bleu (chicken stuffed with ham and Swiss cheese) with roasted herb potatoes, green beans, salad, and a bun. Dessert will be cheesecake with choice of seasonal berries or chocolate sauce. Two approaches to choosing your seat; sit in front of your favorite cheesecake or sit anywhere and split desserts so each can enjoy a taste of both (that's what we do at Faculty/Staff banquets). Beverages will include coffee, tea, iced tea and water.

I hope that you enjoy your stay here at UMHB!

Karen Grant
The University of Mary Hardin-Baylor

The Texas Academy of Science

120th Annual Meeting | University of Mary Hardin-Baylor

Table of Contents

ACKNOWLEDGEMENTS FROM THE PROGRAMS CHAIR

Welcome to the 120th Annual Meeting of the Texas Academy of Science at the University of Mary Hardin-Baylor (UMHB) and Belton, TX! Many thanks to the wonderful hosts at the UMHB, including Dr. Karen Grant, Dr. Cathleen Early, and Dr. Andrew Woodward. The entire UMHB team has worked tirelessly to ensure that we have everything we need for a great meeting. As all TAs members know, our Section Chairs and Vice-Chairs are the true pillars of the Academy. They play an important role in the production of a strong program and I'd like to thank of them for their hard work and patience. The works dozens of hours behind the scenes reviewing and editing abstracts, helping plan the schedule, and communicating with authors. Thank you all for your tremendous dedication to TAS. I would also like to thank Dr. Jason Locklin, Dr. Keith Pannell, Dr. Danette Vines, Dr. Kathleen Wood, and the rest of the TAS board for their many contributions to this meeting. A special thanks to Drs. Cathy Early, Karen Grant, Shannon Hill, and Don Harper coordinated the judging of presentations, posters, and research grant proposal submissions. Last and certainly not least, I would like to thank Dr. Chris Vitek, our Coordinator of Information and Technology. Chris is one of the hardest working people I have ever met and his contributions to TAS are many. Thank you, Chris!

Neil Gray, 2017 Program Chair

About The Texas Academy of Science

History

First founded by teachers as the Academy of Science in Texas in 1880, the organization as we know it now emerged around 1929 and included a physicist, a botanist, a mathematician and two biologists as its founding members. Now, TAS publishes a peer-reviewed journal (The Texas Journal of Science since 1949), conducts an annual meeting that highlights research across 17 sections across the sciences, provides substantial funding opportunities for students (~$25,000 awarded annually) and facilitates expert testimony on policy issues related to STEM or science education. TAS membership approaches 600 individuals, with a large portion of the membership as students.

Mission

As part of its overall mission, the Texas Academy of Science promotes scientific research in Texas colleges and universities, encourages research as a part of student learning and enhances the professional development of its professional and student members. TAS possesses a complex, intriguing and long-standing educational mission.

Strategic Planning

The Texas Academy of Science (TAS) Board of Directors recently approved a vision for a 5-year Strategic Plan: “to increase the visibility and effectiveness of TAS in promoting strong science in Texas.” As part of that initiative, the Academy seeks to reach out to foundations and organizations that support and benefit the Texas science community. We believe that a number of opportunities exist for strategic partnerships that could bolster the impact of organizations that raise the profile of science in Texas. Our ultimate goal will be to make TAS the premier state academy in the United States; however, this cannot be accomplished without funding from both individuals and corporations. It should also be noted that 100% of the contributions given to TAS for student awards goes directly to the award.

About the University of Mary Hardin-Baylor

The University of Mary Hardin–Baylor (UMHB) is a Christian co-educational institution of higher learning located in Belton, Texas, United States. The university is fully accredited by the Southern Association of Colleges and Schools. UMHB was founded by the Republic of Texas in 1845 as "Baylor Female College," the female department of what is now Baylor University It has since become its own institution and grown to 3,898 students and awards degrees at the baccalaureate, master's, and doctoral levels. It is affiliated with the Baptist General Convention of Texas. UMHB has 119 undergraduate majors and 13 graduate degree programs, including several master's degrees and two doctoral programs in eight colleges: College of Business, College of Christian Studies, College of Education, College of Humanities and Sciences, Scott and White College of Nursing, College of Visual and Performing Arts, and the Graduate School.

Qualified students can participate in engaged learning through internships with businesses and industries. Study abroad programs are offered on three continents.

The University of Mary Hardin-Baylor traces its distinguished history to the days when Texas had yet to gain statehood and when Baptist missionary work was just beginning in the frontier Republic. As early as 1839, representatives of churches in Washington County issued an appeal to the Home Mission Board of New York to inaugurate a missionary movement in Texas. Missionaries Rev. James Huckins and Rev. William M. Tryon were sent, and soon after, Judge R.E.B. Baylor came to Texas as a teacher, lawyer, soldier and preacher. These leaders inspired the desire for Christian education in the area and, at a meeting of the Union Association in 1841, recommended forming an education society. War prevented action until 1843, when the Texas Baptist Education Society was organized Tryon and Baylor were appointed to prepare a charter to establish a Baptist university. On February 1, 1845, a charter was granted by the 9th Congress of the Republic of Texas, approved by President Anson Jones at Washington-on-the-Brazos, and the long awaited Baptist University became a reality.

University of Mary-Hardin Baylor

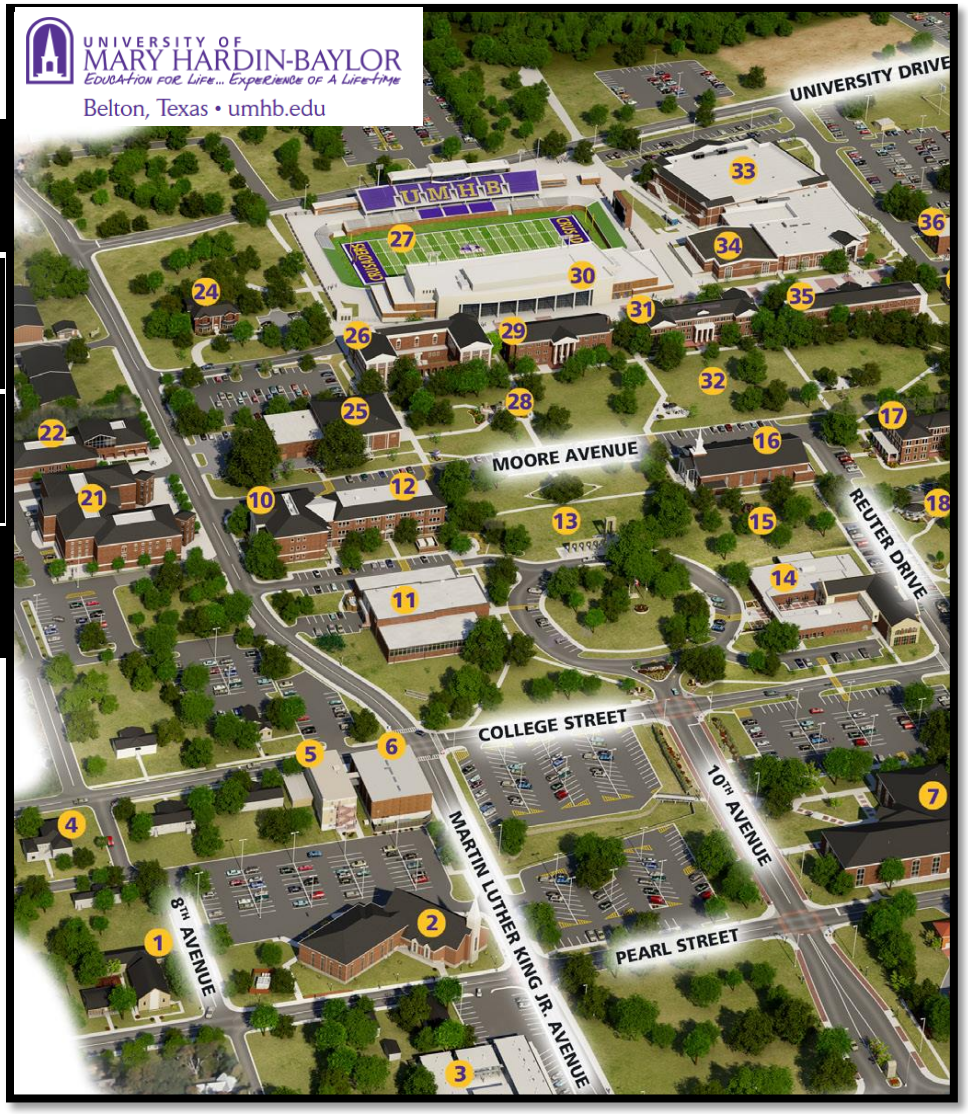
Maps and Directions

30. Bawcom Student Union (Great Hall)

10. York Science Center (YSC)

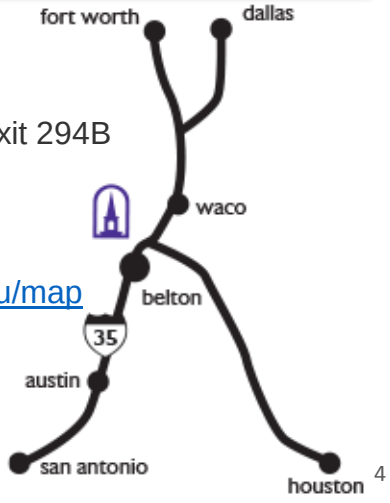
12. Wells Science Hall (WSH)

21. Meyer Nursing Education Center (NEC)



DIRECTIONS

- Take Interstate-35 to the 6th Avenue exit in Belton - Exit 294B
- Go west on 6th Avenue toward Belton
- Turn right on Main Street
- Turn left on 10th Avenue into campus
- Additional maps can be found at http://about.umhb.edu/map



Recommended Restaurants near UMHB

Sol de Jalisco

Modest strip-mall cafe focusing on typical Mexican dishes in a no-nonsense atmosphere.
2100 N Main St, Belton, TX 76513
Phone: (254) 933-8786

Jake's Chinese Buffet

Modest mainstay providing a selection of Chinese staples, with health-conscious options & catering.
520 E 6th Ave, Belton, TX 76513
(254) 939-9333

Schoepf's (BBQ)

Brisket, chicken, ribs & more cooked over mesquite coals & served in a sprawling, ranch-style space.
702 E Central Ave, Belton, TX 76513
(254) 939-1151

Jimmy John's (subs)

Counter-serve chain specializing in sub & club sandwiches, plus signature potato chips.
203 S Interstate Hwy 35, Belton, TX 76513
(254) 933-7772

Which Wich Superior Sandwiches

Modern, casual chain known for design-your-own sandwiches & varied bread options.
2881 N Main St, Belton, TX 76513
(254) 939-9424

Dead Fish Grill

Long-standing lakefront venue offering seafood & Southern comfort food with indoor & outdoor dining.
2207 Lake Rd, Belton, TX 76513
(254) 939-5771

BJ's Restaurant & Brewhouse

Family-friendly chain outpost that pairs familiar pub fare with an extensive list of house brews.
3550 S General Bruce Dr, Temple, TX 76504
(254) 778-3300

Cracker Barrel

Homey chain restaurant serving American comfort food, with an on-site general store.
3687 S General Bruce Dr, Temple, TX 76504
(254) 774-7457

Monterey's Little Mexico

Local chain presenting hearty Tex-Mex dishes, beer & cocktails in a laid-back, sit-down setting.
1712 SW HK Dodgen Loop, Temple, TX 76504
(254) 778-9212

Meg's Café

Locally sourced American eats with Texan flair, plus craft brews & cocktails served in relaxed digs.
1749 Everton Dr, Temple, TX 76504
(254) 771-3800

Poster Session Assignments and Schedule

Poster Session I

10:00 am-1:00 pm	Setup in NEC Hallway (Building 21 on the Campus Map)
4:30 pm-6:00 pm	Poster Session I Presentations and Judging
6:00 pm-6:30 pm	Take Down Posters

Poster Session I Participants – Poster Numbers 023.073 to 023.140

Poster Session I Sections Represented

- Anthropology
- Biomedical
- Engineering/Physics
- Environmental Science
- Geosciences
- Marine Science
- Mathematics/Computer Science
- Systematics & Evolutionary Biology
- Terrestrial Ecology and Management

Poster Session II

7:00 -8:30 am	Setup in NEC Hallway (Building 21 on the Campus Map)
10:00 -11:30 am	Poster Session II Presentations and Judging
3:00 -4:00 pm	Take Down Posters

Poster Session II Participants – Poster Numbers 036.174 to 036.241

Poster Session II Sections Represented

- Botany
- Cell & Molecular Biology
- Chemistry & Biochemistry
- Conservation Ecology
- Freshwater Science
- Science Education

Sunday Field Trip

A Mammoth Field Trip!

Join us for a TAS Student geology field trip to the ***Waco Mammoth National Monument***, one of the newest units of the U. S. Park System. The site has fossils of adult and juvenile mammoths, plus other animals. This glimpse into Pleistocene life is a great opportunity to see an important mammoth site. Special guest speaker: Don Esker, former director of the site and an expert on mammoths!

Time permitting, there may also be stops at the following locations:

- A prolific Cretaceous Comanche Peak Formation fossil collecting area
- High cliffs in Cameron Park to discuss the Balcones fault zone

The field trip starts on:
Sunday morning, March 5, 2017; departs at 8 am; breakfast not provided; location at Mary Hardin Baylor to be announced.

The field trip ends: In Waco about noon or 1 pm.

Participants will provide their own transportation from Belton to the Waco area. There will be a small fee for the Mammoth Park (probably less than $5). Enrollment may be limited.

If you wish to attend please send name(s), details and contact information to: Dr. Chris Barker (cbarker@sfasu.edu), 936-468-2340.

Field trip leaders: Dr. Barker and Dr. Larell Nielson from Stephen F. Austin State University.

Graduate Student Competition

Please join us for the annual Graduate Student Competition! There will be two sessions Saturday, March 4.

Graduate Student Competition I: *8:00 to 9:00 am in YSC 102 - Brindley*

8:00 032.161G *Through the eyes of a salamander*, **a transcriptome wide analysis of ocular development**, *Ruben Tovar, The University of Tulsa; Ron Bonett, The University of Tulsa*

8:15 032.162G **Analysis of skeletal part proportions of mammalian microvertebrates taken by barn owls (***Tyto alba***) in southern Africa**, *Timothy Lee Campbell, Department of Anthropology, Texas A&M University; Zachary W. Pierce, Department of Biological Sciences, Sam Houston State University; Frank Senegas, Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements, Université Pierre et Marie Curie; Patrick J. Lewis, Department of Biological Sciences, Sam Houston State University*

8:30 032.163G **Biopolymers as Treatment Agents for Crude Oil-Contaminated Seawater**, *Thelma Ameh, Tarleton State University; Rajani Srinivasan, Tarleton State University*

8:45 032.164G **Honey bee health in Texas: A comprehensive survey**, *Nicole J. Traub, Texas Invasive Species Institute, Sam Houston State University; Bridgette N Rose, Texas Invasive Species Institute, Sam Houston State University; Autumn J. Smith-Herron, Texas Invasive Species Institute, Sam Houston State University; Alexandra Herrera, Texas Invasive Species Institute, Sam Houston State University; Brian Chapman, Texas Invasive Species Institute, Sam Houston State University*

Graduate Student Competition I: *8:00 to 9:00 am in YSC 102 - Brindley*

1:00 041.252G **Macroevolutionary patterns in North American mosasaurs: a study system for understanding evolution in a greenhouse world**, *Joshua Ryan Lively, The University of Texas at Austin*

1:15 041.253G **Measuring the Effectiveness of Invasive Species Education Curricula on Student Knowledge of Invasive Species**, *Kathryn Parsley, Texas State University; Tina Marie Waliczek, Texas State University; Paula S Williamson, Texas State University; Florence M Oxley, Austin Community College*

1:30 041.254G **The relationship between blood hormone and lipid levels on the abundance of ectoparasites 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*

1:45 041.255G **Utilizing a Channel Geomorphic Unit sampling scheme to discover habitat associations for freshwater mussels**, *Andrew Glen, University of Texas at Tyler; Lance Williams, University of Texas at Tyler; Neil Ford, University of Texas at Tyler*

2:00 041.256G **A new hypothesis for burrowing as the main driver for reorganization of the circadian system in tetrapods**, *William Gelnaw, The University of Texas at Austin*

2016-2017 TAS Board of Directors and Contacts

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Jason L. Locklin
Department of Biology
Temple College
jason.locklin@templejc.edu

President Elect
Neil Gray
Department of Chemistry and Biochemistry
University of Texas at Tyler
ngray@uttyler.edu

Vice President
Keith H. Pannell
Department of Chemistry
University of Texas El Paso
kpannell@utep.edu

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Kathleen Wood
Department of Biology
Univ. of Mary Hardin-Baylor
kwood@umhb.edu

Coll. Acad. Counselor
Cathleen Early
Department of Biology
Univ. of Mary Hardin-Baylor
cearly@umhb.edu

Coll. Acad. Co-Counselor
Karen Grant
Department of Biology
Univ. of Mary Hardin-Baylor
kgrant@umhb.edu

Chair, Board of Dev.
Raelynn Deaton
St. Edward's University
paulad@stedwards.edu

2017 Student Representative
Kathryn Parsley
Dept. of Biology
Texas State University

2016 Student Representative
Ivy Jones
Dept. of Fisheries & Mariculture
Texas A&M University - CC
ivycolleenjones@gmail.com

Executive Secretary
Frank J. Dirrigl, Jr.
Department of Biology
Univ of Texas - RGV
frank.dirrigl@utrgv.edu

Corresponding Secretary
Marsha E. May
Texas Parks and Wildlife Dept.
Wildlife Diversity Program
Marsha.May@tpwd.texas.gov

2017 Local Host Coordinator
Karen Grant
Department of Biology
Univ. of Mary Hardin-Baylor
kgrant@umhb.edu

Coordinator of Information Technology
Christopher J. Vitek
Department of Biology
Univ. of Texas – RGV
christopher.vitek@utrgv.edu

Int'l Program Coordinator
Hugo A. Barrera-Saldaña
School of Medicine, Autonomous
University of Nuevo Leon
habarrera@gmail.com

Historian, TX Academy of Science
Raymond C. Mathews, Jr.
Lady Bird Johnson Wildflower Center
oceanrayaustin@gmail.com

Graduate Academy Counselor
Shannon Hill
Department of Biology
McLennan Community College
shill@mclennan.edu

Managing Editor of TJS
Andrew C. Kasner
Wayland Baptist University
kasnera@wbu.edu

AAAS Representative
Sandra Moody West
Department of Biology
Texas State University
sw04@txstate.edu

AAAS Representative
James Westgate
Lamar University
James.westgate@lamar.edu

2014 Academic Director
George Perry
College of Sciences
University of Texas at San Antonio
George.perry@utsa.edu

2015 Academic Director
Kathryn Perez
Biology Department
University of Texas - RGV
kathryn.perez@utrgv.edu

2016-2017 TAS Board of Directors and Contacts (cont.)

2016 Academic Director
Alexey Sukhinin
Department of Mathematics
Southern Methodist University
asukhinin@smu.edu

Immediate Past President
Danette R. Vines
Department of Chemistry
Schreiner University
CMB 6241, 2100 Memorial Blvd
DRVines@schreiner.edu

Manuscript Editor of TJS
Allan Nelson
Tarleton State University
nelson@tarleton.edu

Junior Academy Counselor
Vince Schielack
Department of Mathematics
Texas A&M University
vinces@math.tamu.edu

Jr. Academy Assoc Couns.
Nancy Magnussen
College of Science
Texas A&M University
nancy@science.tamu.edu

2014 Non-Academic Director
Michael A. Grusak
USDA-ARS Children's Nutrition
Research Center
mgrusak@bcm.edu

2015 Non-Academic Director
Felipe Chavez-Ramirez
Director, Conservation Program
Gulf Coast Bird Observatory
fchavez@gcbo.org

2016 Non-Academic Director
Margaret Russell
Program Manager, Nature Sites
Austin Parks and Rec. Dept
Margaret.Russell@austintexas.gov

2016-2017 Section Officers

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Stephen F. Austin State University
seldenjrz@sfasu.edu

Vice Chair: Tim Campbell
Texas A&M University
camp8943@tamu.edu

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University of Mary Hardin-Baylor
hdifrancesca@umhb.edu

Vice Chair: Angela Schladoer
Schreiner University
alschladoer@schreiner.edu

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University of Texas at Austin
mpoteet@jsg.utexas.edu

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University of Texas-Rio Grande Valley
Jihoon.kang@utrgv.edu

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Southwestern University
averi.segrest@gmail.com

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minton@uhcl.edu

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University of Incarnate Word
vgmartin@uiwtx.edu

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Wayland Baptist University
derderiand@wbu.edu

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Schreiner University
kdarvidsson@schreiner.edu

Vice Chair: John McClain
Temple College
john.mcclain@templejc.edu

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Saint Edwards University
billq@stedwards.edu

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Sul Ross University
mterry@sulross.edu

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Howard Payne University
cyounce@hputx.edu

Vice Chair: Stephanie Perez
Texas Lutheran University
snperez@tlu.edu

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Environmental Institute of Houston, UHCL
guillen@uhcl.edu

Vice Chair: Open

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Chair: Chris Distel
East Schreiner University
cadistel@schreiner.edu

Vice Chair: Nicole Traub
Sam Houston State University
traub.nikki@shsu.edu

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Stephen F. Austin State University
cbarker@sfasu.edu

Vice Chair: R. LaRell Nielson
Stephen F. Austin State University
rnielson@sfasu.edu

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Stephen F. Austin University
afrantzen@sfasu.edu

Vice Chair: Benny Arney
Sam Houston State University
chm_bea@shsu.edu

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Chair: Angela Brown
Sul Ross State University
abrown4@sulross.edu

Vice Chair: Prudence York-Hammons
Temple College
prudence.yorkhammons@templejc.edu

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Chair: Mamta Singh
Lamar University
mamta.singh@lamar.edu

Vice Chair: Michele J. Mann
University of Texas at Austin
mjmann@utexas.edu

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University of Texas-Austin
rpatrock@gmail.com

Vice Chair: Travis LaDuc
University of Texas-Austin
travieso@mail.utexas.edu

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Chair: Megan Keith
South Plains College
mkeith@southplainscollege.edu

Vice Chair: Joshua Lively
University of Texas at Austin
joushuarlively@utexas.edu

2017 Texas Distinguished Scientist

Bert W. O'Malley, M.D.

The O'Malley lab was first to discover in 1971 that hormones act by regulating messenger RNA production in their target cells. He substantiated nuclear receptors as 'transcription factors' and uncovered the structural mechanisms for activating these receptors. In 1995, O'Malley discovered the existence of 'coregulators', the coactivator and corepressor molecules that coordinate the regulation of all hormone-dependent gene transcription. Coactivators turned out to be the long-sought 'master regulators' of mammalian gene function. His work led to a molecular understanding of how hormonal antagonist drugs for cancers work and revealed that coactivators had major importance to reproductive, genetic, and metabolic diseases - and especially to cancers.

In recent years, the lab has turned to structural biological and computational analyses of the proteins that comprise an 'active transcriptional complex on DNA'. Using proteomic analyses (Mass Spec/RPPA/Computational Biology) in combination with cryo-EM and computational analyses (with Dr.Wau Chiu) O'Malley has determined the structure of an active estrogen receptor- coactivator (SRC-3 and p300) complex on DNA. This has 'never' been done before and opens up a major new investigative area in Structural Proteomics that has great relevance to cancer/metabolism/drug development and to the fields of Structural Biology and Computational Biology in general.

O'Malley has trained over 250 scientists and published over 650 papers and holds 23 patents in the fields of Gene Regulation, Molecular Endocrinology, Steroid Receptor and Coactivator Action, and Cell Proteomics and Metabolism. He is a pioneer in 'team science', directing one of the first NIH 'Center grants' for the past 45 years.

O'Malley is currently considered as the founding father of the field of Molecular Endocrinology and is a member of the National Academy of Sciences and the National Academy of Medicine, and has received 7 honorary doctorate degrees and over 60 honors and awards for his work, including the National Medal of Science from the White House.

2017 Outstanding Texas Educator

Kirk Evans

Mr. Evans has served his students and community as a science teacher for over 26 years. He currently serves as a 5th grade teacher at *Olson Elementary* (Allen ISD) in Allen, TX. He is also owner and President of *Eco Teaching Resources, LLC*.

His excellence in teaching inside and outside the classroom was recognized by his selection as a **2016 Finalist for Presidential Awards for Excellence in Math and Science Teaching**, a 2012 WFAA Project Green–Eco Educators K-5th Award Winner, a 2012 Keep Texas Beautiful- Sadie Ray Graff Educator Award Winner, and the Outstanding Environmental Achievement Award from the Texas Association for Environmental Education. Mr. Evans has won many other awards for his teaching excellence.

In her letter of support, Principal Reyes wrote, "As shown by his resume, to say Kirk is outstanding in his field would be an understatement. First and foremost, Kirk is an educator who consistently exceeds expectations. He strives to provide students with hands-on activities that help them experience the concepts they are learning at a much deeper level. He then enables the students to apply their knowledge not only to ensure their success on assessments, but also to see the bigger connection of the concept to their environment and to the world.

Kirk not only touches the hearts and minds of our students, but his knowledge also reaches our community in numerous ways. He is deeply involved in educating our citizens about our environment and how we can best care for and appreciate what is around us. He is committed to the belief that the more we are educated, the more we can positively affect our environment."

2017 Fellow of the Academy

Dr. Kathleen Wood

Kathleen was born and raised in the Texas Panhandle and attended Texas A&M University from 1973-77, graduating with a degree in microbiology. While studying graduate microbiology at UT Austin, she had an opportunity to go to Guam and the Philippines with Campus Crusade for Christ so she left and spent the next year working on her thesis in the evenings, graduating with a masters in 1981. In 1994, she and her husband returned to Texas and she began work on her PhD in Biomedical Studies at Baylor University. Her dissertation research at Baylor University used plant model systems to assess interviral recombination frequencies and antisense transgene topologies.

Just prior to graduation in 1999, she was hired by the University of Mary Hardin-Baylor Department of Biology to teach genetics and cell biology and became Department Chair in 2004. She has held a variety of committee positions at UMHB, including Promotion and Tenure chair, co-chair of the Health Professions Advisory Committee, and membership on the Strategic Planning and Campus Planning committees. Because of her promotion of and engagement in undergraduate research, she was named the York Professor of Biology in 2006. Her research interests are varied, often depending on what a current student is interested in. She served as TAS Collegiate Academy Counselor from 2012-2013 and Botany Section Chair from 2012-2014. She is currently on the Board of Directors of the TAS and has served as treasurer since 2013. Along with her active participation with TAS, she is a member of the American Society of Microbiology, the Beta Beta Beta Honor Society, National Science Teachers Association, the Society for College Science Teachers, and the Texas Association of Advisors for the Health Professions.

2017 Vice President

Dr. Alyx Frantzen

Dr. Frantzen is from Fredericksburg, with deep roots in the Hill Country. She attended Texas Lutheran College (now University) and received her BS in mathematics/chemistry. New Mexico State University was home for her graduate work, starting in mathematics and eventually finishing in physical chemistry. When she was starting her job search, she specifically looked for a position where teaching was the main focus and research was a tool used in teaching. She was lucky enough to find a position at Stephen F. Austin State University in 1998. She has been there ever since. She is currently an associate professor in the Department of Chemistry and Biochemistry. She participates in the Local East Texas Section of the ACS. She is also active in the STEM research center at SFASU. Every year she organizes and runs SMASH (Summer Mathematics and Science Highlights) Camp for incoming STEM majors.

She is a very active researcher. The majority of the students she works with are undergraduate students. She is a part of a small graduate program. She has worked with over 100 students in research projects. Many of the projects are set up to evaluate the inclination of the student to do research and evaluate their skills in the laboratory. She has taken many students to conferences over the years and encouraged all of them to present their work. Her students have presented locally at the SFASU Undergraduate Research Conference, regionally at the ACS/SWRM and TAS meetings, nationally at the ACS meetings and internationally at the CMS meetings. The work that she does in lab tends to be very interdisciplinary, pulling in geology, forestry, agriculture and environmental fields. She received the Teaching Excellence Award at SFASU; has been the Spotlight Speaker at the SFASU Bright Ideas conference; and received the Faculty Mentor Award at the SFASU Undergraduate Research Conference.

2017 Academic Director

Dr. Francisco Gonzalez-Lima

An honors graduate of Tulane University, New Orleans, Louisiana, Francisco Gonzalez-Lima received a B.S. in Biology in 1976 and a B.A. in Psychology in 1977. His Honors Thesis was supervised by Drs. Janis L. Dunlap, Arnold A. Gerall and Joan C. King. Dr. King's teachings, in particular, motivated him to study the brain. During his last summer at Tulane he worked in the neuroendocrinology laboratory of Dr. Andrew V. Schally, who later that year earned a Nobel Prize. The enriching research experiences at Tulane convinced him to pursue a research career. While being recruited to continue studies at Tulane, he met Dr. Sven O.E. Ebbesson, a former Tulane neuroanatomy professor, who recruited him in a visit to Puerto Rico where Dr. Ebbesson was the new director of the medical sciences graduate program.

In 1980 he received a Ph.D. in Anatomy and Neurobiology from the University of Puerto Rico School of Medicine, San Juan. Dr. Gonzalez-Lima was introduced to electrophysiology by Dr. Jose del Castillo, director of the Laboratory of Neurobiology, co-discoverer of quantum transmitter release (del Castillo and Katz--that led to a Nobel Prize to Katz), and a disciple of the Spanish school of Santiago Ramon y Cajal, founding father of modern neuroscience. Dr. Gonzalez-Lima's research philosophy from thereon has been inspired by their example. His doctoral dissertation utilized electrophysiological recording of single cells and electrical stimulation of the brain and was supervised by Drs. James J. Keene, Jose del Castillo, Earl Kicliter, Hilda Lopez and Walter L. Stiehl.

2017 Non-Academic Director

Paul Fleming

Paul is currently a fisheries research biologist with Texas Parks and Wildlife Department at Heart of the Hills Fisheries Science Center in Mountain Home Texas. He Joined TPWD's Inland Fisheries research team in spring 2008 and has since conducted research in various aspects of fish ecology, applied fisheries management, and threatened and endangered fishes. Some of his more notable research includes studying effects of severe drought on the federally endangered Devils River Minnow, fish population dynamics between impounded reservoirs and their tributary rivers, use of sonar to remotely sense Alligator Gar, and population and genetic dynamics of wild stocks of Guadalupe Bass.

Paul is a life-long Texas resident growing up in Parker County near Weatherford. He earned his Bachelor of Science degree from Texas A&M University – Corpus Christi in biology with a marine science emphasis and a minor in chemistry. He then went on to earn a Master of Science in Aquatic Biology from Texas State University in San Marcos Texas where his research focused on ecology of an exotic fish parasite and its vector. During his career, Paul has had integral roles in several professional biological societies. He has been a member of The American Fisheries Society (TCAFS), Texas Chapter of the American Fisheries Society (TCAFS), American Society of Ichthyologists and Herpetologists, and The Texas Academy of Science. He has over 10 years of service with TCAFS and severed on the Editorial Committee and Publicity and Exhibits Committee. In addition, he has been the official auctioneer for the chapter's annual fundraising event for the past six years.

Paul has been a member of the Texas Academy of Science for several years and gave his first professional presentation at the annual meeting in 2002. His respect for the Texas Academy of Science's mission has led to his desire to become a more proactive and contributing member to the society. He has served as the co-chair of the Freshwater Science Section for two consecutive years and as acting section chair for a year. He views being elected to the Board of Directors as an honor and privilege and looks forward to higher responsibility and continued contribution to the Academy's mission.

2017 Student Director

Kathryn Parsley

Ms. Kathryn (Kate) Parsley is a second-year Master's student in the Department of Biology at Texas State University. She received a B.S. in Biology with honors from Cameron University in 2015. Kate's academic interest is in discipline based education research. Her thesis focuses on developing college curricula to improve students' knowledge of invasive species.

Kate's paper presentation received the first place award in the graduate student competition at the 2015 Texas Academy of Science annual meeting. She also received the third place award for her poster presentation in the scholarship of teaching and learning competition at the 2016 National Association of Biology Teachers conference. While an undergraduate student, she was vice-president of the Psi Eta chapter of Beta Beta Beta Biological Honor Society, president of the local student chapter of the Botanical Society of America, and president of the Biology Club. She currently serves on the local host committee of the Southwestern Association of Naturalists.

Friday, March 3

001. TAS Board of Directors Meeting
8:00 am to 12:00 pm
Bawcom Student Union, Great Hall A
Texas Academy of Science Annual Meeting
TAS Board of Directors Meeting

002. Meeting Registration and Presenter Check-in
10:00 am to 6:00 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC Lobby
Texas Academy of Science Annual Meeting
Meeting Registration and Presenter Check-in

003. Poster Setup - Session I
10:00 am to 1:00 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC Hallway
Texas Academy of Science Annual Meeting
Poster Session I - Setup

004. Section Chairs Pre-Session Lunch Meeting
12:00 to 12:45 pm
Bawcom Student Union, Great Hall C and D
Texas Academy of Science Annual Meeting
Section Chairs Pre-Session Lunch Meeting

005. Anthropology Section Meeting
1:00 to 1:15 pm
York Science Center, YSC 117

Chair: **Robert Z. Selden**, *Stephen F. Austin State University*

1:00 005.001 **Anthropology Section Meeting**, *Robert Z. Selden, Stephen F. Austin State University; Timothy Lee Campbell, Department of Anthropology, Texas A&M University*

006. Biomedical Oral Session and Section Meeting
1:00 to 2:00 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 105

Chair: **Heidi DiFrancesca**, *University of Mary Hardin-Baylor*

1:00 006.002 U **Examining the effects of medium-chain triglycerides on neural circuit functions in a transgenic *caenorhabditis elegans* model of Alzheimer's disease**, *Jacob Boos, St. Edward's University; Fidelma O'Leary, St. Edwards University*

1:15 006.003 U **Examining the impact of insulin-degrading enzyme on the onset and progression of neurological and physiological deficits in Alzheimer's Disease**, *Sasha Michel Escamilla, St. Edwards University; Fidelma O'Leary, St. Edwards University*

1:30 006.004 U **The effect of a high fat diet on adiponectin in *Callospermophilus lateralis***, *Siena Rose Krueger, Austin College; Jessica Healy, Austin College*

1:45 006.005 **Biomedical Section Meeting**, *Heidi DiFrancesca, University of Mary Hardin-Baylor*

007. Chemistry & Biochemistry Oral Session I
1:00 to 2:15 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 125
Chair: **Alyx Frantzen**, *Stephen F. Austin State University*

1:00 007.006 G ***In vitro* sulfur donor reactivity of various cyanide antidote candidates**, *Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Chathuranga Chinthana Hewa Rahinduwage, Mr; Ilona Petrikovics, Prof.; Afshin Ebrahimpour, Dr.*

1:15 007.007 G **Benzodiazaboroles: synthesis, reversible formation, and structural properties**, *Janaka Prasad Abeysinghe, Sam Houston State University; Sanjaya Lokugama, Sam Houston State University; Dustin Gross, Sam Houston State University*

1:30 007.008 G **Boron trifluoride facilitated boronate ester exchange**, *Dulamini Indika Ekanayake, Sam Houston State University; Chathuri Jeewanthi Kombala, Sam Houston State University; Dustin Gross, Sam Houston State University*

1:45 007.009 G **Cladistic assessment of cyanotoxin accumulation in marine, freshwater, and terrestrial cyanobacterial isolates**, *I-Shuo Huang, Texas A&M University-Corpus Christi*

2:00 007.010 U **Comparative analysis of nitrate anion in coral reef waters at Roatan, Honduras**, *David Alberto Prieto Uzcategui, Midland College; Melissa Wood, University of Texas of the Permian Basin; Thomas Ready, Midland College*

008. Conservation Ecology Oral Session I
1:00 to 2:00 pm
Wells Science Hall, WSH 241
Chair: **Chris Distel**, *Schreiner University*

1:00 008.011 U **An analysis of coyote (*Canis latrans*) urine constituents which impact organismal behavior**, *Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin Simmons University*

1:15 008.012 G **Demographics, distribution, and genetic variation in the Texas diamondback terrapin (*Malaclemys terrapin littoralis*) within the Corpus Christi and Aransas Bay systems**, *Shantel Swierc, Center for Coastal Studies, Texas A&M University - Corpus Christi; Kim Withers, Center for Coastal Studies, Texas A&M University - Corpus Christi; Derek Hogan, Department of Life Sciences, Texas A&M University - Corpus Christi; Michael Forstner, Department of Biology, Texas State University*

1:30 008.013 G **Does elevated salinity induce a physiological response in Texas diamondback terrapin (*Malaclemys terrapin littoralis*)?,** *Lindsey C Ramirez, Center for Coastal Studies, Texas A&M University - Corpus Christi; Aaron Baxter, Center for Coastal Studies, Texas A&M University - Corpus Christi; Kim Withers, Center for Coastal Studies, Texas A&M University - Corpus Christi; Paul Zimba, Center for Coastal Studies, Texas A&M University - Corpus Christi*

1:45 008.014 N **Native Fish Conservation Areas in the Chihuahuan Desert of Texas**, *Gary Garrett, University of Texas; Timothy Birdsong, Texas Parks and Wildlife Department; Ben Labay, University of Texas at Austin; Megan Bean, Texas Parks and Wildlife Department*

009. Environmental Science Oral Session I
1:00 to 2:00 pm
Wells Science Hall, WSH 341

Chair: **Mary F Poteet**, *The University of Texas at Austin*

1:00 009.015 N **Biochar for agronomic and environmental applications in South Texas**, *Jihoon Kang, University of Texas Rio Grande Valley; Sergio Mireles, University of Texas Rio Grande Valley*

1:15 009.016 G **Effects of bacterial-algal consortia on biomass and lipid production**, *Adam M Chorazyczewski, Texas A&M Corpus Christi, Center for Coastal Studies; Xavier Mayali, Lawrence Livermore National Labratories; Paul Zimba, Center for Coastal Studies, Texas A&M University - Corpus Christi*

1:30 009.017 N **Examining ecosystem services in an urban environment**, *Seth Kramer, St. Edward's University; J. Amy Belaire, St. Edward's University*

1:45 009.018 U **Extreme Precipitation: Changes in Rain Frequency from 1895-2015 in Central Texas**, *Victoria Gore, Southwestern University*

010. Freshwater Science Oral Session I
1:00 to 2:15 pm
York Science Center, YSC 102 - Brindley

Chair: **Averi H Segrest**, *Southwestern University*

1:00 010.019 U **A potential role for male genitalia in sexual conflict**, *Joshua Francisco Rios, St. Edwards University; Sarah Joanne Morton, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

1:15 010.020 U **Applying Band-Aids: Challenges associated with molecular detection of *Angiostronglyus cantonensis* infection within Uruguayan and Brazilian apple snails**, *Carissa Alexandra Bishop, Southwestern University; Romi L Burks, Southwestern University*

1:30 010.021 G **Comparative Effects of High & Low Quality Allochthonous Input on Stream Food Webs**, *Cyrus Sadeghian, Sam Houston State University*

1:45 010.022 G **Conservation genetics of the endemic *Cyprinodon rubrofluviatilis*** and invasive ***Cyprinodon variegatus*** , *Kristina Ayers, Stephen F. Austin State University; Jennifer Gumm, Stephen F. Austin State University*

2:00 010.023 N **Discovery of the Mexican Blindcat, *Prietella phreatophila*, in the U.S. and an update on its range-wide conservation status**, *Dean A Hendrickson, University of Texas; Jack Johnson, National Parks Service; Peter Sprouse, Zara Environmental; Sarah Howard, National Parks Service; Gary Garrett, University of Texas; Jean Krejca, Zara Environmental; Adam Espelee Cohen, University of Texas; Danté Fenolio, San Antonio Zoo; Andrew G Gluesenkamp, San Antonio Zoo; José Antonio Dávila Paulín, Comisión Nacional de Áreas Naturales Protegidas; Laura Dugan, Texas Parks & Wildlife Department*

011. Geosciences Oral Session I
1:00 to 2:00 pm
York Science Center, YSC 110

Chair: **Chris A. Barker**, *Stephen F Austin State University, Geology Department*

1:00 011.024 N **A MECO rain forest/mangrove community from South Texas**, *James Westgate, Earth & Space Sciences, Lamar U.*

1:15 011.025 N **Continued human-enhanced coastal erosion near Rollover Pass, TX**, *Cissie Owen, Lamar University; Donald E. Owen, Lamar University*

1:30 011.026 G **Non-Invasive Investigation and Delineation of Karst Geohazards Using Electrical Resistivity within the Delaware Basin, Culberson County, Texas**, *Jonathan David Woodard, Stephen F. Austin State University*

1:45 011.027 N **Origin and Sedimentary Controls of Clastic Dikes in the Carrizo Sandstone (Eocene), Henderson, Texas**, *Russell LaRell Nielson, Stephen F Austin State University; Chris A. Barker, Stephen F Austin State University, Geology Department*

012. Mathematics & Computer Science Oral Session and Section Meeting
1:00 to 1:30 pm
Wells Science Hall, WSH 239

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

1:00 012.028 U **Creation of a Perfect Hockey Bracket: Using Matrices to Depict the Outcome of the Stanley Cup**, *Dominic Wade Carrillo, Sul Ross State University; Angela Michelle Brown, Sul Ross State University*

1:15 012.029 **Mathematics & Computer Science Section Meeting**, *Angela Michelle Brown, Sul Ross State University*

013. Science Education Oral Session I
1:00 to 2:30 pm
Wells Science Hall, WSH 131

Chairs: **Mamta Singh**, *Lamar University* & **Michele Johnson Mann**, *University of Texas at Austin*

1:00 013.030 G **An Inquiry Investigation of Endangered Species in the Edwards Aquifer**, *Stephanie Ann Garcia, UTSA PhD Student & TA; Martina McGhee, UTSA PhD Student & TA; Carrie Davis, UTSA Masters Student & Environmental Science Educator*

1:15 013.031 G **Examining the influence of principal participation on teacher success in STEM-focused professional development programs**, *SARA M HANSON, Texas State University; Sandra S. West, Texas State University*

1:30 013.032 U **Building minds one block at a time: Science education from within Minecraft: Education Edition**, *Kevin Chappell, The University of Mary Hardin-Baylor; Kaleb K. Heinrich, The University of Mary Hardin-Baylor*

1:45 013.033 N **Effect of Self-explaining on Scientific-Skill Development: Longitudinal Study via Latent Transition Analysis**, *Adrian Villalta-Cerdas, Sam Houston State University*

2:00 013.034 G **Efficiency and Efficacy of Flipped vs. Traditional laboratory courses**, *Gerardo Sanchez, University of Texas Rio Grande Valley*

2:15 013.035 N **Elementary Pre-Service Teachers & Inquiry Based Technology Integrated Lesson**, *Mamta Singh, Lamar University*

014. Coffee and Refreshments (Friday afternoon, NEC)
2:30 to 3:00 pm
Isabelle Rutherford Meyer Nursing Education Center NEC Courtyard Area

015. Coffee and Refreshments (Friday afternoon, YSC)
2:30 to 3:00 pm
York Science Center, YSC South Foyer

016. Cell & Molecular Biology Oral Session I
3:00 to 4:30 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 105

Chair: **Craig Younce**, *Howard Payne University*

3:00 016.036 G **Adult Retinal Pigmented Epithelial Cells exposed to simulated microgravity: A transformation from adherent cell type to multicellular spheroids**, *Vivek Mann, Texas Southern University , Houston ,Texas; Alamelu Sundaresan, Texas Southern University , Houston ,Texas*

3:15 016.037 U **BDL-induced biliary hyperplasia, hepatic injury and fibrosis regulated by paracrine action of mast cells: novel study using mast cell-deficient mice**, *Joanne Elise Thomson, UMHB; Laura Anne Hargrove, Baylor Scott & White Health/Texas A&M HSC/UMHB; Heather Francis, Texas A&M University/Baylor Scott & White Hospital*

3:30 016.038 U **Components of Inonotus *obliquus* cytotoxic to cultured 4T1 murine breast cancer cells**, *Jake Augustus Brozek, Wayland Baptist University; Sarah Christin Kelly, Wayland Baptist University; Vianney Trujillo, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam Joseph Reinhart, Wayland Baptist University*

3:45 016.039 G **Do Plasticizers Inhibit Toll Like Receptor Activity**, *Kallie Davis, Sam Houston State University*

4:00 016.040 U **Effect of Nutritional Stress on Fecundity and Maternal Provisioning of Oocytes in *Drosophila melanogaster***, *Kamryn N. Gerner-Mauro, St. Edward's University; Vivan A. Le, St. Edward's University; Lisa M. Goering, St. Edward's University*

4:15 016.041 U **RNA Aptamer Selection Against Glucose Oxidase for Detection of Neisserius Meningitides During Colonization of the Nasopharyngeal Cavity**, *Alexandra Ann Miller, University of Texas at Austin*

017. Chemistry & Biochemistry Oral Session II
3:00 to 4:15 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 125

Chair: **Alyx Frantzen**, *Stephen F. Austin State University*

3:00 017.042 G **Exploration of zirconium-based stain behavior, through an array of temperatures**, *Raul Alejandro Cuevas, University of Texas at El Paso; Russell Chianelli, University of Texas at El Paso; Vincent Burke, University of Texas at El Paso; Keith Pannell, U. T. El Paso*

3:15 017.043 U **Heats of Combustion of Natural and Artificial Sweeteners**, *Justin Christopher Hughes, Howard Payne University*

3:30 017.044 N **Inhibition of ergosterol biosynthesis and growth in *Trypanosoma brucei* by fluorinated sterols**, *David Leaver, Sul Ross State University; Presheet Patkar, Texas Tech University; Ujjal Singha, Meharry Medical College; Matthew Miller, Texas Tech University; Brad Haubrich, Texas Tech University; Minu Chaudhuri, Meharry Medical College; W. David Nes, Texas Tech University*

3:45 017.045 G **Modelling Blood Brain Barrier (BBB) penetration by in-vitro permeability study with the newly formulated cyanide (CN) antidote, dimethyl trisulfide (DMTS)**, *Chathuranga Chinthana Hewa Rahinduwage, Mr; Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Indika Kasun*

Warnakula, Mr; Afshin Ebrahimpour, Dr.; Ilona Petrikovics, Prof.

4:00 017.046 U **Synthesis of 6-fluorocholesterol and its potential use as a mechanism based inhibitor of parasitic nematodes.**, *Adrian Jaime Maldonado, Sul Ross State University; W. David Nes, Texas Tech University; Matthew Miller, Texas Tech University; Wenxu Zhou, Texas Tech University; David Leaver, Sul Ross State University*

018. Marine Science Oral Session I
3:00 to 4:15 pm
York Science Center, YSC 102 - Brindley

Chair: **George Guillen**, *Environmental Institute of Houston*

3:00 018.047 G **Beach Management Practices - Means & Methods of Protecting Galveston Island's Shoreline, Residents, Property, and Tourism Industry.**, *Virginia Greb, TAMUG; Rachel Johnson, TAMUG*

3:15 018.048 N **Biofilm Colonization of Seagrass Leaves: Responses to Biotic and Abiotic Factors**, *Kirk Cammarata, TX A&M Univ-Corpus Christi; Whitney Roberson, TX A&M University-Corpus Christi; Amie Cuvelier, TX A&M University-Corpus Christi; Meherube Mehrubeoglu, TX A&M University-Corpus Christi; Melissa Fisher, TX A&M University-Corpus Christi; Ariana Kavandi, TX A&M University-Corpus Christi; Shawn Hare, TX A&M University-Corpus Christi*

3:30 018.049 U **Identification of Sargassum Occurrences via Color Recognition of Satellite Images**, *Karthik Ramaswamy, Texas A&M University at Galveston; Sidney Marie Ramos, Texas A&M University at Galveston; Arturo Ignacio Guzman, Texas A&M Univesity*

3:45 018.050 U **Ortho-Phosphate Concentration in Coral Reef Waters**, *Melissa Wood, University of Texas of the Permian Basin; Thomas Ready, Midland College*

4:00 018.051 G **Parasitism and Fatty Liver Disease in *Pterois volitans* along the Gulf of Mexico, Atlantic Coast, and the Caribbean**, *Danielle Fails, Sam Houston State University*

4:15 018.052 U **Prevalence of white band disease, type I and II, on *Acropora cervicornis* of the Mesoamerican Reef in Utila, Honduras**, *John Phelps, McLennan Community College; Stephanie Lockwood, Texas Tech University at Waco; Traesha Robertson, College of Coastal Georgia; Donna Hamilton, University of North Texas-Dallas; Stephanie Randell, McLennan Community College*

019. Physics & Engineering Oral Session and Section Meeting
3:00 to 3:30 pm
Wells Science Hall, WSH 239

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

3:00 019.053 U **Laser Frequency Combs and the Search for Exoplanets**, *Bella Ferranti, Southwestern University*

3:15 019.054 **Physics & Engineering Section Meeting**, *Kim Arvidsson, Schreiner University*

020. Science Education Oral Session II
3:00 to 4:30 pm
Wells Science Hall, WSH 131

Chairs: **Mamta Singh**, *Lamar University* & **Michele Johnson Mann**, *University of Texas at Austin*

3:00 020.055 U **Elementary Pre-Service Teachers and Renewable Energy Education**, *Shebly Garbee, Lamar University; Mamta Singh, Lamar University*

3:15 020.056 N **Introducing Active Learning into the Biochemistry Classroom**, *Mary Kopecki-Fjetland, St. Edward's University*

3:30 020.057 G **Pre-Service Teacher's Knowledge**, *Anthony Petrosino, University of Texas at Austin; Michele Johnson Mann, University of Texas at Austin*

3:45 020.058 N **Principal Impact on STEM Teaching and Learning**, *Denise Kern, Texas State University*

4:00 020.059 N **Private-Academic Partnerships in Education**, *Derek L. Smith, Howard Payne University*

4:15 020.060 N **The Coming Science Teacher Professional Development Upheaval**, *Sandra S. West, Texas State University; Denise Kern, Texas State University*

021. Systematics & Evolutionary Biology Oral Session I
3:00 to 4:30 pm
Wells Science Hall, WSH 341

Chair: **Megan Keith**, *South Plains College*

3:00 021.061 G **A preliminary study of the relationships among the species of genus *Mengenilla* (Strepsiptera: Mengenillidae), insights on *M. chobauti***, *Dorothy Chipo Madamba, Sam Houston State University; Jerry L Cook, Sam Houston State University*

3:15 021.062 U **Do promiscuous females explore new territories to mate multiply despite higher levels of coercion?**, *Nicholas Ashley, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*

3:30 021.063 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; Raelynn Deaton Haynes, St. Edward's University*

3:45 021.064 U **How do dominance hierarchies differ between males of two species of live-bearing fish?**,

Kaitlyn E. Matthey, Student; Raelynn Deaton Haynes, St. Edward's University

4:00 021.065 U **How long does it take male mosquitofish to replenish sperm reserves?**, *Sarah Joanne Morton, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University; Joshua Francisco Rios, St. Edwards University; Skylor Ryan Matchett, St. Edward's University; Nicholas Ashley, St. Edward's University; Kaitlyn E. Matthey, Student*

4:15 021.066 G **Population Genetics of a Fungal Amphibian Pathogen in Texas**, *Thomas Marshall, Texas State University; Michael Forstner, Department of Biology, Texas State University*

022. Terrestrial Ecology and Management Oral Session I
3:00 to 4:30 pm
Wells Science Hall, WSH 241

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

3:00 022.067 N **Amphibians and Reptiles of C. E. Miller Ranch and the Sierra Vieja Range, Chihuahuan Desert, Texas, USA.**, *Drew Davis, University of South Dakota; Travis LaDuc, University of Texas at Austin*

3:15 022.068 G **A survey of insects and arachnids found in the nests of Carolina Wrens (*Thryothorus ludovicianus*) in urban and rural environments**, *Faith Byrd Kuchenbecker, Sam Houston State University; Diane LH Neudorf, Sam Houston State University*

3:30 022.069 G **Insect Pollinator Diversity and Other Associates of Saltcedar (*Tamarix* sp) along the Rio Grande in Presidio County, Texas**, *Alexandria Hassenflu, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

3:45 022.070 G **Mating behavior and parasitism of *Tamarixia radiata* , a biological control agent for *Diaphorina citri*** , *Heather Hernandez, University of Texas Rio Grande Valley; Daniel Flores, USDA APHIS PPQ S&T CPHST Mission Laboratory; Christopher Vitek, University of Texas Rio Grande Valley*

4:00 022.071 N **Resurgence of the tamarisk beetle on saltcedar and athel along the Río Grande, with notes on other biocontrols**, *Christopher M. Ritzi, Sul Ross State University; Alexandria Hassenflu, Sul Ross State University*

4:15 022.072 U **Using VHF Radio Telemetry to Determine Home Range and Habitat Use of Ladder-backed Woodpeckers (*Picoides scalaris*) in the Texas Panhandle.**, *Victoria Kristine Solis, Wayland Baptist University; Andrew Kasner, Wayland Baptist University*

023. Poster Session I
4:30 to 6:00 pm
Isabelle Rutherford Meyer Nursing Education Center NEC Hallway

Anthropology

Anthropology Posters

023.073 N **Dental Indicators of Diet among the Terminal Classic Maya at Colha, Belize: An Analysis of Dental Caries in the Skull Pit**, *Meagan D Moorman, Texas A&M University; Kristin Hoffmeister, Texas A&M University*

023.074 N **Meta-Analysis of Geometric Morphometrics in Anthropology**, *Robert Z. Selden, Stephen F. Austin State University; Kersten Bergstrom, Texas A&M University*

023.075 G **Migration in the southeastern Colonial Maya frontier: Oxygen and carbon isotopic evidence from the site of Tipu, Belize.**, *Willa Trask, Texas A&M University*

Biomedical

Biomedical Posters

023.076 U **An Assessment of the Impact of Slime layers Isolated from Probiotic Lactobacilli on the Metabolic Activity of Pathogenic Bacterial Biofilms**, *Priscilla Escareno, University of the Incarnate Word*

023.077 U **Bacteriostatic Effectiveness of Tea Tree Oil against E. coli in Popular Recipes for Home Remedies**, *Mackenzie Sautter, UMHB; Joni Henrik Ylostalo, University of Mary Hardin-Baylor*

023.078 U **Does nicotine consumption affect the growth of *Lactobacillus bulgaricus* in the human oral cavity?**, *Bianca Marie Rosas, St. Edward's University; Tiffany Chang, St. Edward's University; Robert Ramirez, St. Edward's University; Teresa Bilinski, St. Edward's University*

023.079 U **Expression and Prognostic Value of TMEM165 in Breast Cancer**, *Joshua Serrano, East Texas Baptist University Department of Biology; Blake P Johnson, Assistant Professor, East Texas Baptist University Department of Biology*

023.080 U **Healing or stealing: generic versus trade name antibiotic ointments**, *Taylor Alexandra Slack, University of Mary Hardin-Baylor; Joni Henrik Ylostalo, University of Mary Hardin-Baylor*

023.081 U **High-throughput application of Chemotherapeutic Agents to 22 established Multiple Myeloma cell lines**, *A. Keith Stewart, Mayo Clinic; Jonas Kruse, Baylor University*

023.082 U **Identification and Characterization of Novel Compound Inhibitors of** *Candida albicans* **Biofilm Formation**, *Alexandria I. Knecht, University of the Incarnate Word; Christopher G. Pierce,*

University of the Incarnate Word

023.083 U **Screening of NIH Clinical Collection Library for Compounds with** *Candida albicans* **Anti-Biofilm Activity**, *Christin R Thompson, University of the Incarnate Word; Christopher G. Pierce, University of the Incarnate Word*

023.084 U **The Biological Impact and Prognostic Potential of the GPI Transamidase Complex in Glioblastoma Multiforme**, *Victoria Davis, East Texas Baptist University Department of Biology; Blake P Johnson, Assistant Professor, East Texas Baptist University Department of Biology*

023.085 G **The association of Obesity and Lifestyle Factors among Children in rural and urban areas of the Trans-Pecos region**, *Kassandra Hernandez, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

Environmental Science

Environmental Science Posters

023.086 G **Assessment of shorebird populations In Galveston Bay using conventional and UAV techniques**, *Anna Claire Vallery, University of Houston - Clear Lake; George Guillen, Environmental Institute of Houston*

023.087 U **Effects of Initial Pesticide Exposure on Foraging Competition in the Southern Leopard Frog**, *Kaitlyn E. Matthey, Student; Raelynn Deaton Haynes, St. Edward's University*

023.088 U **Entomopathogenic Fungi: an Alternative to Pyrethroids and other Chemical Pesticides**, *Clarissa Mae de Leon, St.Edwards University; Fidelma O'Leary, St. Edwards University*

023.089 G **Feeding Behavior and Property Damages of** *Sus scrofa*, *Erin Elizabeth Ray, Hardin Simmons University; Steven Rosscoe, Hardin Simmons University; Wendi Wolfram, Hardin Simmons University*

023.090 U ***(Withdrawn)*** **Financial West Texas Wind Generation Study**, *Ryan Musick, 2016*

023.091 G **Impact of Landscape Changes on the Environmental and Water Quality Characteristics of Brays Bayou Watershed, TX**, *Sharmila Bhandari, Texas Southern University*

023.092 U **Novel determination of calcium species involved in solar energy storage**, *Denisse Velazquez, University of Houston Downtown; Aaron Torres, Scholars Academy-University of Houston Downtown; Mian Jiang, University of Houston - Downtown*

023.093 U **Physiological and Neurological effects of Pesticide Imidacloprid on** *C. elegans*, *Dayanna Garcia, St. Edwards*

023.094 G **Removal of contaminants from aqueous solutions by biochar produced from locally sourced biomass**, *Sergio Mireles, University of Texas Rio Grande Valley*

023.095 U **The Effects of Urban Heat Islands on the Number of Lightning Strikes Downwind from a City**, *Mary Celeste Kelley, University of the Incarnate Word*

Geosciences

Geosciences Posters

023.096 G **A sequence stratigraphic analysis of mixed carbonate-evaporitic deposition in the Harrisburg Member of the Permian aged Kaibab Formation**, *Cole Edward Hendrickson, Stephen F. Austin State University*

023.097 U **An Oligocene-Eocene Limestone in Big Bend Ranch State Park, Texas**, *Stephanie Nicole Elmore, Geology*

023.098 N **Camelids (a giant camel and two llamas) from the the late Pleistocene of South Texas**, *Jon Baskin, Texas A&M-Kingsville; Ronny Thomas, retired*

023.099 U **Comparison of Chert Geochemistry and Flint Knapping Workability**, *Joshua Cyrus Wynn, Wayland Baptist University; Tim R Walsh, Wayland Baptist University*

023.100 G **Geology of the Alto Relex Area, Big Bend National Park, Texas**, *Robert Lee Schoen, Stephen F. Austin State University; Chris A. Barker, Stephen F Austin State University, Geology Department*

023.101 N **Structural control of surficial and relict karst in the Owl Mountain Province, Fort Hood Military Installation, Texas**, *Mindy Faulkner, Stephen F Austin State University; Jacob A Meinerts, Stephen F Austin State University*

Marine Science

Marine Science Posters

023.102 H **A Comparison of Faunal Diversity in the Lower Laguna Madre and Arroyo Colorado, Texas.**, *Chelsey L. Faris, The International Baccalaureate Program at Lamar Academy; Taylor L. Cedillo, The International Baccalaureate Program at Lamar Academy; Gabriella L. Mata, The International Baccalaureate Program at Lamar Academy; Vallery L. Valle, The International Baccalaureate Program at Lamar Academy; Ricardo L. Sammons, The International Baccalaureate Program at Lamar Academy; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*

023.103 U **A Comparson of Dark Spot Syndrome Frequencyin the Bay Islands: Utila and Roatan, Honduras**, *Erin Castillo, Mclennan Community College*

023.104 U **Age and growth of the Smooth Butterfly Ray (*Gymnura micrura*)**, *Emily Richey, Texas A&M University Galveston Campus*

023.105 U **Cleaning Station Behavior of the *Elacatinus* spp. and Clients in the Mesoamerican Barrier Reef, Utila, Hondura**, *Kennedy Lynn Chudej, McLennan Community College*

023.106 U **Cleaning Station Behavior of the *Elacatinus* spp. and Clients in the Mesoamerican Barrier Reef, Utila, Honduras**, *Austin Ryan Biddy, McLennan Community College*

023.107 U **Effects of rapid salinity decreases on photosynthetic efficiency in *Halodule wrightii***., *Johnmarc M. Candelaria, University of Texas at Rio Grande Valley; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*

023.108 U **Frequencies and Substrate Association of Excavating Poriferans in Utila, Honduras.**, *Collin M Harvey, McLennan Community College*

023.109 U **Hydromedusae blooms and seasonal biodiversity changes in Galveston Bay**, *Catherine Risley, Texas A&M University at Galveston; Tess Heywood, Texas A&M University at Galveston*

023.110 G **Identification and Quantification of Seagrass Algal Epiphytes**, *Melissa Fisher, Texas A&M University-Corpus Christi; kirk cammarata, TX A&M Univ-Corpus Christi; Whitney Roberson, TX A&M University-Corpus Christi; Lucas Martinez, Texas A&M University-Corpus Christi; chelsea miller, Texas A&M University-Corpus Christi*

023.111 H **Net community primary productivity and respiration in Lower Laguna Madre and Arroyo Colorado, Texas.**, *Adilene L. Barrios, The International Baccalaureate Program at Lamar Academy; Alondra L. Medina, The International Baccalaureate Program at Lamar Academy; Bianca L. Garcia-Gonzalez, The International Baccalaureate Program at Lamar Academy; Kassandra L. Guerra, The International Baccalaureate Program at Lamar Academy; Ricardo Zamora, The International Baccalaureate Program at Lamar Academy; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*

023.112 G **Parasite richness and abundance in *Pterois volitans* along the Gulf of Mexico**, *Danielle Fails, Sam Houston State University*

Mathematics/Computer Science

Mathematics & Computer Science Posters

023.113 U **Balancing Selection Pressures, Multiple Objectives, and Modular Networks to Form Complex Agent Behavior**, *Alex Rollins, Southwestern University; Jacob Schrum, Southwestern University*

023.114 U **Evolving Tetris Players Using Raw Screen Inputs**, *Lauren Gillespie, Southwestern University*

Neuroscience

Neuroscience Posters

023.115 N **Analysis of Cu(II)-mediated dityrosine cross-linking of amyloid-beta in-vitro and in-vivo by MALDI MS**, *Andrea Renee Kelley, University of Texas at San Antonio; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO; Stephan Bach, University of Texas at San Antonio*

023.116 N **CX3CR1 and DAP12-TREM1&2 Signaling in MS-vs-AD: Biosimulations of proteomics differences and effects of a novel orally active CX3CR1 blocker (AZD8797)**, *Clyde F Phelix, The University of Texas at San Antonio; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO*

023.117 N **Characterization of amyloid-beta peptide aggregation induced by copper ions**, *Germán Plascencia Villa, THE UNIVERSITY OF TEXAS AT SAN ANTONIO; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO*

023.118 U **Characterization of spatial and temporal expression of the gene *c16orf54* in Zebrafish**, *Zachary Warren, The University of Texas at Tyler; Brent Bill, The University of Texas at Tyler*

023.119 G **Neonatal seizures lead to call-specific changes in the quantitative and spectrotemporal features of mouse ultrasonic vocalization behavior**, *Conner Reynolds, University of North Texas Health Science Center; Suzanne O Nolan, Baylor University; Jessica Huebschman, Baylor University; Joaquin Lugo, Baylor University; Samantha Lee Hodges, Baylor University*

023.120 U **Synaptic level alterations which underlie plasticity events during regeneration of *Lumbriculus variegatus***., *Miguel Madrigal, Univ. of the Incarnate Word; Katherine Michelle James, Univ. of the Incarnate Word; Veronica Giselle Martinez-Acosta, Univ. of the Incarnate Word*

Engineering/Physics

Physics & Engineering Posters

023.121 U **Developing a Robotic Farm Assistant**, *Madelyn Akers, Southwestern University; Diana Beltran, Southwestern University; Susana Beltran, Southwestern University; Jiawen Zhang, Southwestern University*

023.122 U **Exploring photometric methods for identifying emission-line B-type stars**, *Amy Glazier, Austin College; David Whelan, Austin College*

023.123 U **Testing a flared disk model against spectroscopic data for *Be* stars**, *Niki Stavrianopoulos,*

Austin College; Sophie Anderson, Austin College; Ryan Hood, Austin College; David Whelan, Austin College

023.124 U **Using 9-axis motion sensors to model and classify motions of the lower jaw**, *james roddy, Schreiner university*

Systematics & Evolutionary Biology

Systematics & Evolutionary Biology Posters

023.125 U **Cryptic yet curiously common: Population genetic structure and diversity of a cryptic *Pomacea* sp. and its better known congeneric** *P. canaliculata*, *Sofia Campos, Southwestern University; Cristhian M. Clavijo, Museo Nacional de Historia Natural, Montevideo, Uruguay; Fabrizio Scarabino, Centro Universitario Regional Este; Romi L Burks, Southwestern University; Kenneth Hayes, Howard University*

023.126 U **Development of the *IRBP* gene as a new nuclear marker for phylogeny reconstruction in** *Thomasomys* **(Rodentia: Cricetidae)**, *Jessica A James, Abilene Christian University; Paulina J Sanchez, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*

023.127 U **Evolution of mitochondrial gene order in gastropods**, *Glory Hughes, University of Houston Clear Lake; Michael Meriano, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake*

023.128 U **Phylogeny of rodent genus *Thomasomys* (Rodentia: Cricetidae) based on the nuclear gene recombination activating gene 1**, *John P Placide, Abilene Christian University; Hannah M Lantrip, Abilene Christian University; Marissa C Horne, Abilene Christian University; Cameron D Ludwig, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*

023.129 U **Using *ITS-2* as a DNA Barcode to elucidate *Hemerocallis* hybrid paternity and maternity: A Pilot Study**, *Joel David Rodgers, East Texas Baptist University; Catherine Cone, East Texas Baptist University*

Terrestrial Ecology and Management

Terrestrial Ecology and Management Posters

023.130 N **A comparison of flower visitors to Texas native and exotic ornamentals**, *Richard James Wilson Patrock, Texas A&M, Kingsville; John Reilley, PMC Manager, E. "Kika" de la Garza PMC, USDA; Maher Shelley, E. "Kika" de la Garza PMC, NRCS, USDA*

023.131 U **Analyzing environmental factors linked with bird diversity across an urban landscape**, *Jonatan Valentin Salinas, St. Edward's University; J. Amy Belaire, St. Edward's University*

023.132 U **Baseline Survey of Texas Horned Lizards in the Texas Panhandle**, *Sara van der Leek, Wayland Baptist University; Andrew Kasner, Wayland Baptist University*

023.133 U **Bees of Nacogdoches County Regional Airport**, *Ryan Joseph Pingenot, Stephen F. Austin State University; Daniel Bennett, Stephen F. Austin State University*

023.134 U **Characterization of the bacterial flora of the Sorcerer's Cave, deepest cave in Texas**, *Samantha N Studvick, Abilene Christian University; Allysa J Wilder, Abilene Christian University; Diana P Desai, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*

023.135 U **Comparing Potential Allelopathic Activities of Four Native South Texas Tree Species Against Three Invasive African Grasses**, *Amber Dixie Michalk, University of Texas Rio Grande Valley; Emily Zamora, University of Texas Rio Grande Valley; Cynthia Lilliana Cantu, University of Texas Rio Grande Valley; Andrew McDonald, University of Texas Rio Grande Valley*

023.136 U **Dispersion of black Walnut (*Juglans niger*) in relation to small mammal activity: preliminary findings**, *Rileigh Welch, East Texas Baptist University; Troy A Ladine, East Texas Baptist Univeristy*

023.137 U **Effects of Body Manipulation On Insect Succession and Postmortem Interval in the Transpecos Region of Texas**, *Yelixza Avila, Sul Ross State University - Biology; Christopher M. Ritzi, Sul Ross State University*

023.138 U **Food habits of raccoons (*Procyon lotor*) in an urban ecosystem**, *Benjamin Rhodes, East Texas Baptist Univeristy; Troy A Ladine, East Texas Baptist Univeristy*

023.139 U **Occurrences at one location of multiple individuals of a solitary species**, *Delaney Laznovsky, East Texas Baptist Univeristy; Itzel Morales, East Texas Baptist Univeristy; Troy A Ladine, East Texas Baptist Univeristy*

023.140 U **Preliminary Biodiversity Survey of Mammals in Taylor County Area**, *Elizabeth Donice Lopez, Hardin Simmons Umiversity; Michaela Gephart, Hardin Simmons University; Dejah Braxton, Hardin Simmons University; Wendi Wolfram, Hardin Simmons University*

024. Poster Session I - Take Down
6:00 to 6:30 pm
Isabelle Rutherford Meyer Nursing Education Center NEC Hallway

Saturday, March 4

025. Meeting Registration and Presenter Check-in
7:00 am to 12:00 pm
Isabelle Rutherford Meyer Nursing Education Center NEC Lobby

026. Past-Presidents' Breakfast
7:00 to 8:00 am
Bawcom Student Union, Great Hall A
Past Presidents' Breakfast (Past Presidents Only)

027. Poster Session II - Setup
7:00 to 8:30 am
Isabelle Rutherford Meyer Nursing Education Center NEC Hallway

028. Botany Oral Session and Section Meeting
8:00 to 9:00 am
Isabelle Rutherford Meyer Nursing Education Center NEC 105

Chair: **William Quinn**, *St. Edward's University*

8:00 028.141 U **DNA barcoding of plants in selected taxa of Euphorbiaceae in Central Texas**, *Madalynne Michelle Gatto, Texas Lutheran University; Savannah Hight, Texas Lutheran University; Tamara Kotin, Texas Lutheran University; Mark Gustafson, Texas Lutheran University; Alan Lievens, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*

8:15 028.142 U **Flavonoid Production in Two Genoytypes of Ozone-stressed *Glycine max* (L.) Merr.**, *Ashley Elizabeth Moreno, St. Edward's University*

8:30 028.143 N **Cretaceous and Paleocene fossil woods of eastern Terlingua Ranch, Brewster County, Texas**, *David E Lemke, Texas State University*

8:45 028.144 **Botany Section Meeting**, *William Quinn, St. Edward's University*

029. Chemistry & Biochemistry Oral Session III and Section Meeting
8:00 to 9:30 am
Isabelle Rutherford Meyer Nursing Education Center NEC 125

Chair: **Alyx Frantzen**, *Stephen F. Austin State University*

8:00 029.145 G **Synthesis, characterization, optical, and computational studies of BODIPY amide derivatives.**, *Laura Saucedo, University of Texas at El Paso; Yangjie Li, Beijing Normal University; Lainqian Tan, Beijing Normal University; Alejandro J Metta-Magaña, University of Texas at El Paso; Robinson I. Roacho, University of Texas at El Paso; keith Pannell, U. T. El Paso*

8:15 029.146 U **The role of RecA in tuberculosis drug resistance**, *Mason Ryan Taylor, Wayland Baptist University; Robert Moore, Wayland Baptist University*

8:30 029.147 U **The synthesis and characterization and of new anilino and thiophenoxy BODIPYs.**, *James Alexander Leventis, Newcastle University; Laura Saucedo, U. T. El Paso; Alejandro J Metta-Magaña, University of Texas at El Paso; keith Pannell, U. T. El Paso*

8:45 029.148 N **Theoretical Calculations of Dipole Moments of mono, meta, and ortho halobenzenes**, *Brian Barngrover, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*

9:00 029.149 U **Transesterification of ethyl acetate and furfuryl alcohol using base catalysis**, *Jenny Beldin, Stephen F. Austin State University; Russell J Franks, Stephen F. Austin State University*

9:15 029.150 **Chemistry & Biochemistry Section Meeting**, *Alyx Frantzen, Stephen F. Austin State University*

030. Conservation Ecology Oral Session II and Section Meeting
8:00 to 9:15 am
Wells Science Hall, WSH 241

Chair: **Chris Distel**, *Schreiner University*

8:00 030.151 U **Re-evaluating trap efficiency: cameras reveal species-specific captures per visit**, *Gregory Partridge, Schreiner University; Chris Distel, Schreiner University*

8:15 030.152 N **Red Wolf (*Canis rufus*) in east Texas: Rediscovery and activity patterns**, *Troy A Ladine, East Texas Baptist Univeristy*

8:30 030.153 U **Snail Slime in Real Time: qPCR Detection of Environmental DNA with Apple Snails**, *Madison Granier, Southwestern University; Matthew Barnes, Texas Tech University; Romi L Burks, Southwestern University*

8:45 030.154 U **Using citizen science to predict migration patterns: a case study with hummingbirds**, *Houston Glover, Schreiner University; Wesley Craig McCain, Schreiner University; Chris Distel, Schreiner University*

9:00 030.155 **Conservation Ecology Section Meeting**, *Chris Distel, Schreiner University*

031. Freshwater Science Oral Session II and Section Meeting
8:00 to 9:15 am
York Science Center, YSC 117

Chair: **Averi H Segrest**, *Southwestern University*

8:00 031.156 U **Effects of the Insecticide Imidacloprid on Competitive Feeding and Mating Behaviors in the Western Mosquitofish,** *Gambusia affinis*, *Skylor Ryan Matchett, St. Edward's University; Bailey Ann Pishner, St.Edward's University; Fidelma O'Leary, St. Edwards University; Raelynn Deaton Haynes, St. Edward's*

University

8:15 031.157 U **Effects of the Insecticide Imidacloprid on Female Life History and Fitness in the Western Mosquito Fish *Gamusia affinis***, *Bailey Ann Pishner, St.Edward's University; Skylor Ryan Matchett, St. Edward's University; Fidelma O'Leary, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

8:30 031.158 U **Habitat Selection and the Ideal Free Distribution in a Freshwater Crustacean**, *Devin John Herd, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

8:45 031.159 U **Vertical distribution and seasonal recruitment of zebra mussels in a central Texas reservoir**, *Devin Garcia, Temple College; Jason L Locklin, Temple College*

9:00 031.160 **Freshwater Science Section Meeting**, *Averi H Segrest, Southwestern University*

032. Graduate Student Competition I
8:00 to 9:00 am
York Science Center, YSC 102 - Brindley

Chair: **Shannon Hill**, *McLennan Community College*

8:00 032.161 G **Through the eyes of a salamander, a transcriptome wide analysis of ocular development**, *Ruben Tovar, The University of Tulsa; Ron Bonett, The University of Tulsa*

8:15 032.162 G **Analysis of skeletal part proportions of mammalian microvertebrates taken by barn owls (*Tyto alba*) in southern Africa**, *Timothy Lee Campbell, Department of Anthropology, Texas A&M University; Zachary W. Pierce, Department of Biological Sciences, Sam Houston State University; Frank Senegas, Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements, Université Pierre et Marie Curie; Patrick J. Lewis, Department of Biological Sciences, Sam Houston State University*

8:30 032.163 G **Biopolymers as Treatment Agents for Crude Oil-Contaminated Seawater**, *Thelma Ameh, Tarleton State University; Rajani Srinivasan, Tarleton State University*

8:45 032.164 G **Honey bee health in Texas: A comprehensive survey**, *Nicole J. Traub, Texas Invasive Species Institute, Sam Houston State University; Bridgette N Rose, Texas Invasive Species Institute, Sam Houston State University; Autumn J. Smith-Herron, Texas Invasive Species Institute, Sam Houston State University; Alexandra Herrera, Texas Invasive Species Institute, Sam Houston State University; Brian Chapman, Texas Invasive Species Institute, Sam Houston State University*

033. Neuroscience Oral Session and Section Meeting
8:00 to 9:00 am
Wells Science Hall, WSH 131

Chair: **Veronica Giselle Martinez-Acosta**, *Univ. of the Incarnate Word*

8:00 033.165 G **The Impact of Sub-Chronic Exposure to Ozone on the Electroretinogram: Rodent Scotopic Vision Alterations**, *Jordan Michele Wetz, University of the Incarnate Word*

8:15 033.166 U **The octopamine receptor Octβ1R is required for olfactory memory formation.**, *John Martin Gabriel Bermeo Sabandal, MARC Program*

8:30 033.167 G **Transcranial laser stimulation of the human prefrontal cortex improves decision-making**, *Celeste Lizeth Saucedo, University of Texas at Austin; Nathaniel J. Blanco, Ohio State University; Douglas Barrett, University of Texas at Austin; Francisco Gonzalez-Lima, University of Texas at Austin*

8:45 033.168 **Neuroscience Section Meeting**, *Veronica Giselle Martinez-Acosta, Univ. of the Incarnate Word*

034. Systematics & Evolutionary Biology Oral Session II and Section Meeing
8:00 to 9:15 am
Wells Science Hall, WSH 341

Chair: **Megan Keith**, *South Plains College*

8:00 034.169 U **Male sperm expenditure and behavioral shifts across varying social conditions in the western mosquitofish**, *Amber Raven, St. Edward's University; Donelle Robinson, City of Austin; Raelynn Deaton Haynes, St. Edward's University*

8:15 034.170 G **Succession of microbial communities within bone marrow over the course of human decomposition**, *Mary Nichole Ruble, Department of Biological Sciences, Sam Houston State University; Patrick J. Lewis, Department of Biological Sciences, Sam Houston State University; Aaron Lynne, Department of Biological Sciences, Sam Houston State University*

8:30 034.171 G **When adding data to a morphometric analysis is more hindrance than help**, *William Gelnaw, The University of Texas at Austin*

8:45 034.172 G **Range Expansion Of An Exotic Asian Snail (Melanoides Tuberculata) Into Central Texas Rivers, And The Parasitological Consequences Thereof**, *Stephen Harding, Texas State University and Bio-West, Inc.*

9:00 034.173 **Systematics & Evolutionary Biology Section Meeting**, *Megan Keith, South Plains College*

035. Coffee and Refreshments (Saturday morning, NEC)
9:30 to 10:00 am
Isabelle Rutherford Meyer Nursing Education Center
NEC Courtyard Area

036. Poster Session II
10:00 to 11:30 am
Isabelle Rutherford Meyer Nursing Education Center
NEC Hallway

Botany

Botany Posters

036.174 U **Bacterial characterization of the root microbiome**, *James Stewart, St. Edward's University*

036.175 G **Does parasitism in a mutualistic pollination system of water lilies increase plant fitness?**, *Ernesto Herrera, The University of Texas - Rio Grande Valley; Sarrah Rodriguez, The University of Texas - Rio Grande Valley; Raymundo Davalos, The University of Texas - Rio Grande Valley; Andrew McDonald, University of Texas Rio Grande Valley*

036.176 U **Effects of the fungal microbiome on phosphorus sensitivity in the common bean,** *Phaseolus vulgaris* **L.**, *Jacquelyn Turcinovic, St. Edward's University; Charles Hauser, St. Edward's University*

036.177 G **Floristic records and major range extensions for vascular plants from Erath County**, *Turner Cotton, Tarleton State University; Allan D Nelson, Tarleton State University*

036.178 G **Mulitivariate comparative analysis of eight Tamaulipan plant communities: structure and ecological characterisitics**, *Raziel Flores, University of Texas Rio Grande Valley (UTRGV)*

036.179 G **Prevalence of arbuscular mycorrhizal populations in salt impacted soils on Galveston Island**, *Angela Rittenberry, Stephen F. Austin State University; Jezreel Lopez, Stephen F. Austin State University; Josephine Taylor, Stephen F. Austin State University; Stephen Wagner, Stephen F. Austin State University; David Creech, Stephen F. Austin State University*

036.180 U **The effects of phosphorus deficiency in two genotypes of *Phaseolus vulgaris* L. (Fabaceae)**, *Kaitlyn Shay Cox, Student; William Quinn, St. Edward's University*

Cell and Molecular Biology

Cell & Molecular Biology Posters

036.181 N **A Preliminary Analysis of the Bacteria Harbored by Pillbugs**, *David E. Starkey, The University of the Incarnate Word*

036.182 U **Characterization of stem cell populations using EdU proliferation assay in a regenerating model system.**, *Christina N Mercado-Venegas, Univ. of the Incarnate Word; Veronica Giselle Martinez-Acosta, Univ. of the Incarnate Word*

036.183 U **Comparing the Effects of p53 Mutations in Mammary Carcinoma and Mutated Cancer-like Cell Lines**, *Victoria Campbell, Austin College; Madison Aliff, Austin College; Lance Barton, Austin College*

036.184 U **Effects of Hydroquinone on S17 Murine Stromal Cells**, *Geremy Lerma, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*

036.185 U **Examining genetic and phenotypic variation of *cis*-regulatory elements in *D. simulans* and** *D. melanogaster* **embryos**, *Amber Randolph, St. Edward's University; Lisa M. Goering, St. Edward's University*

036.186 U **Exploration of the effects of *bicoid* dosage on larval phenotypes in *Drosophila melanogster***, *Zaira Villa, St. Edwards University; Lisa M. Goering, St. Edward's University*

036.187 U **Geographic variation of *Wolbachia*-induced cytoplasmic incompatibility in the fly *Drosophila recens***, *Sydney Keane, East Texas Baptist University; Kelly Dyer, University of Georgia*

036.188 U **High fat diet increases serum estradiol in a hibernator, *Callospermophilus lateralis*,** *Ethan A Brem, Austin college; Alexandra Louise Hoffman, Austin college*

036.189 N **Knockout of the HDC/histamine axis and reduction of mast cell number/function rescues Mdr2-/- mice from PSC-related biliary proliferation and fibrosis**, *Laura Anne Hargrove, Baylor Scott & White Health/Texas A&M HSC/UMHB; Heather Francis, Texas A&M University/Baylor Scott & White Hospital*

036.190 U **PA28γ Expression Affects the Acquisition of Cancer Phenotypes**, *George Melchor Jr., Austin College; Kylie Peterson, Austin College; Hannah Butterfield, Austin College; Bethany Bundrant, Austin College; Lance Barton, Austin College*

036.191 U **Role of PA28γ in Development of Cancerous Hallmarks in Cancer Clone and Control Fibroblast Cell Lines**, *Alexandria Fusco, Austin College; Daniel Ahle, Austin College; Lance Barton, Austin College*

036.192 U **SPOP as an Emerging Key Player in Breast Cancer Progression**, *Everardo Ramirez, University of the Incarnate Word; Marieke Oldenbroek Burleson, University of the Incarnate Word*

036.193 U **Selection of suppressors of negative genetic interactions between genes involved in chromatin structure and gene expression in *Saccharomyces cerevisiae***, *Tim Kang, Abilene Christian University; Austin Parsons, Abilene Christian University; Julia Taylor, Abilene Christian University;*

Sarah Lee, Abilene Christian University

036.194 U **The Story of p53 and PA28gamma**, ***Simran Likhari****, Austin College; Brandon Dang, Austin College; Lance Barton, Austin College*

036.195 U **The role of epigenetic regulator** *wdr82* **in kidney formation and function**, *Eris Terra Tock, Southwestern University; Taylor Cravens, Southwestern University; Airon Wills, Southwestern University*

036.196 U **Using forward genetic screening to uncover genes important for autophagy in *Arabidopsis thaliana***, *Kevin Chappell, The University of Mary Hardin-Baylor; Pierce Young, Rice University; Andrew Woodward, The University of Mary Hardin-Baylor; Bonnie Bartel, Rice University*

Chemistry and Biochemistry

Chemistry & Biochemistry Posters

036.197 U **"Super Bulky" Guanidinates for the Synthesis of Low-Coordinate Metal Complexes**, *Brenda Ontiveros, University of Texas at El Paso*

036.198 U **A Comparison of Viscosity and Surface Tension Measurements of Biodegradable and Non-Biodegradable Skin Emollients with Application to Their Environment Impact**, *Savannah Leigh Robinson, University of Mary Hardin-Baylor*

036.199 U **A Synthesis Porphyrin-Ruthenium Polypyridyl complex for Splitting Water to Oxygen Gas**, *Aqeeb Ali, Stephen F. Austin State University; David Gonzalez, Stephen F. Austin State University*

036.200 U **Analysis of Metal Ions in Texas Hill Country Rivers using Inductively Coupled Plasma-Mass Spectroscopy**, *Adrian J Contreras, University of the Incarnate Word; Abraham A Williams, University of the Incarnate Word; Patricia P Gonzalez, San Antonio Water Supply; Alakananda Ray Chaudhuri, University of the Incarnate Word; Nicholas Leed, University of the Incarnate Word; Edward E Gonzalez, University of the Incarnate Word*

036.201 U **Antimicrobial and Antioxidant Properties of Extracts from *Nannochloropsis oculata***, *Gabriela A. Ortiz, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*

036.202 U **Axenation of Freshwater Microalgae Using Singlet Oxygen Generation**, *Kimberly Foster, University of the Incarnate Word; Daniel Sisco, University of the Incarnate Word; Justin Lamontagne, University of the Incarnate Word; James Martinez, University of the Incarnate Word; Maria Monroy, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*

036.203 G **Blood partitioning and elimination study with SDMEX, a new cyanide antidote**, *Indika K. Warnakula* and *Morgan Carpenter, Sam Houston State University; Emily Kefer, Sam Houston State University; Ivana Barrera, Sam Houston; Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Afshin Ebrahimpour; Ilona Petrikovics*

036.204 U **Characterization of the R136W point mutation in Hsp27 that leads to neurodegenerative disease.**, *Anna K Orta, University of Texas at El Paso*

036.205 U **Cloning and expression of *Pseudomonas aeruginosa* elastase in E. coli for examining inflammatory response of lung tissue**, *Christy Hjorth, University of Texas at Tyler; Ali Azghani, University of Texas at Tyler; Dustin Patterson, University of Texas at Tyler*

036.206 U **Comparison of cation exchange capacity determination methods**, *Alyx Frantzen, Stephen F. Austin State University; Lillie Zech, Stephen F. Austin State University*

036.207 U **Constructing Peptide-Based Molecular Building Blocks for the Controlled Assembly of Nanomaterials**, *Jessica Bird, The University of Texas at Tyler; Leif Laperriere, The University of Texas at Tyler; Howard Gray, UT Tyler; Dustin Patterson, University of Texas at Tyler; Sean Butler, The University of Texas at Tyler*

036.208 U **Discovering New Inhibitors against New Delhi Metallo β-lactamase (NDM-1) through Virtual Screening.**, *Sabi Shrestha, The University of Texas at Austin; Sonia Hernandez, University of Texas at Austin; Josh Beckham, University of Texas at Austin*

036.209 U **Discovering Novel Inhibitors for N-acetylneuraminic Acid Synthase in Neisseria meningitidis**, *My Quan, University of Texas at Austin*

036.210 U **Discovery of novel inhibitors for *Plasmodium falciparum* reductase enzyme through virtual screening**, *Nishtha Sharma, The University of Texas at Austin*

036.211 U **Effects of Nutrient Deprivation on Cell Fate Decisions in Mouse Embryonic Fibroblasts**, *Alexandra Marie Taylor, Southwestern University*

036.212 U **Enzyme Folding Improves Catalytic Activity of Enzyme Cargos in Virus-Like Particle Nanoreactors**, *Andrea Hernandez, University of Texas at Tyler; Dustin Patterson, University of Texas at Tyler*

036.213 U **Fabrication and comparison of Prussian Blue related hexacyanoferrates for battery application**, *Charles Punnathara, University of Houston- Downtown*

036.214 U **Finding Novel Inhibitors of 6-phosphogluconate-dehydrogenase of Leishmania major through Virtual Screening**, *Laura L Luo, University of Texas at Austin*

036.215 U **Gold(I)-Catalyzed Synthesis of 1H-**

Isochromenes, *Dakota Butler, Southwestern University; Parker Wilson, Southwestern University; Michael R Gesinski, Southwestern University*

036.216 U **Identification of Microbial Volatile Organic Compounds in Wild Basin Soil**, *Elizabeth Ademski, St. Edward's University; Mary Kopecki-Fjetland, St. Edward's University*

036.217 U **Investigation of possible inhibitors against multidrug-resistant New Delhi Metallo-Beta Lactamase (NDM-1)**, *Sonia Hernandez, University of Texas at Austin; Sabi Shrestha, The University of Texas at Austin; Josh Beckham, University of Texas at Austin; Walter L Fast, University of Texas at Austin*

036.218 U **Organic content of waters associated with healthy and diseased *Orbicella faveolata* at the southern edge of the Mesoamerican Barrier Reef system**, *Sophia Isela Salazar, University of Texas at El Paso; Wen-Yee Lee, University of Texas at El Paso; keith Pannell, U. T. El Paso*

036.219 U **Reaction of *Alizarin Red S Monohydrate* dye with *Alanine* and *Cysteine*, Absorption comparison with *Enriochrome Black T* Azo Dye**, *Aaron Torres, Scholars Academy-University of Houston Downtown; Denisse Velazquez, University of Houston Downtown; Charles Punnathara, no; Mian Jiang, University of Houston - Downtown*

036.220 U **Reactivity studies on [{(CO)3Cr}η6-C6H5]SiMe2H: The formation of bimetallic chromium-iron complex**, *Deidrah Carrillo, University of Texas at El Paso; Alex Bradford, Newcastle University; Alejandro J Metta-Magaña, University of Texas at El Paso; Hemant Sharma, University of Texas at El Paso; keith Pannell, U. T. El Paso*

036.221 U **Studies on Apoptotic Induction in Balb-3T3, K-Balb, and Jurkat T Leukemia Cell Lines**, *Morgan Nicole O'Neal, Southwestern University*

036.222 U **Synthesis and Characterization of Platinum/Ruthenium Nanoparticles for Methanol Fuel Cells**, *David McKinzey, UMHB; Linda gao, UMHB*

036.223 G **Synthesis and stability analysis of N-alkylbenzoxazaboroles**, *Rathnayaka Mudiyanselage Chathurika Rathnayaka, Sam Houston State University; Sobiya George, Sam Houston State University; Dustin Gross, Sam Houston State University*

036.224 U **Synthesis of Novel Anticarcinogenic Peptides**, *Ramish Nadeem, Southwestern University*

036.225 G **Synthesis of diazaborole-based macrocycles with ethylhexyl ester functional groups**, *Thao Nguyen, Sam Houston State University; Sanjaya Lokugama, Sam Houston State University; Dustin Gross, Sam Houston State University*

036.226 U **Titanium-Mediated Synthesis of Cyclobutane Derivatives**, *Jillian Marie Bradley, Southwestern University; Renee Walker, Southwestern University; Michael R Gesinski, Southwestern University*

Conservation Ecology

Conservation Ecology Posters

036.227 U **A Multi-year Analysis of Wing Loading in the Monarch Butterfly During the Fall Migration**, *Joshua Shayne Huckabee, Temple College; Jason L Locklin, Temple College; Clayton Sublett, Temple College*

036.228 U **Cataloging the Biodiversity of Waller Creek with a Publicly Accessible Repository**, *Jeff Brennan, University of Texas at Austin; He Bai, The University of Texas at Austin; Dean A Hendrickson, University of Texas; Adam Espelee Cohen, University of Texas; Mary F Poteet, The University of Texas at Austin*

036.229 U **Comparing traditional and novel genetic surveillance for white-nose syndrome across Louisiana bats**, *Dakota Ashley Limon, Texas Tech University; Carlos Garcia, Texas Tech University; Beau Gregory, LA Dept. of Wildlife and Fisheries; Richard Stevens, Texas Tech University; Matthew Barnes, Texas Tech University*

036.230 U **Effects of *Ligustrum* Removal on Herbaceous Plants in South Texas**, *Kody Ryan Windecker, Texas Lutheran University; Mark Gustafson, Texas Lutheran University*

036.231 U **Halophyte Biodiversity, its Linkage with Seagrass Biodiversity and the Impacts of Anthropogenic Activities along the Coast of Port Aransas, Texas**, *James Edsel Risinger, Student at Saint Edwards University; Gabriel Monticure, St. Edwards; David R. Johnson, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*

036.232 U **Tail Loss in Two Populations of the Georgetown Salamander (*Eurycea naufragia*)**, *Daniel Ramon Gonzalez, Southwestern University; Benjamin Allen Pierce, Southwestern University*

Freshwater Science

Freshwater Science Posters

036.233 U **(Withdrawn) Brazos River Database Biases Analysis: Comparing Various Data Sources to Describe Temporal and Spatial Fish Community Change**, *Christina Reidy Scanlon, University of Texas; Chelsea Jones, University of Texas at Austin*

036.234 U **Comparison of gut microbiomes between native and invasive viviparids (Gastropoda, Viviparidae)**, *Ernest North, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake*

036.235 U **Crushing resistance of freshwater snail**

shells along environmental gradients, *Kevin Hart, University of Houston Clear Lake; Riccardo Fiorillo, Georgia Gwinnett College; Christopher Brown, Georgia Gwinnett College; Russell Minton, University of Houston Clear Lake*

036.236 U **How does disturbance of aquatic ecosystems affect gene flow among damselfly populations in central Texas?**, *Wesley Craig McCain, Schreiner University; Mary K. Huerta, Schreiner University; Natalie Requenez, Schreiner University; Ryan Matthew Caesar, Schreiner University*

036.237 U **Recruitment, growth, and spatial distribution of zebra mussels in the flood pool of an infested central Texas reservoir**, *Ruopu Jiao, Temple College; Madeline Chaput, Temple College; Zachary Lopez, Temple College; Devin Garcia, Temple College; Jason L Locklin, Temple College*

036.238 N **Update on the Fishes of Texas Project**, *Adam Espelee Cohen, University of Texas; Dean A Hendrickson, University of Texas; Gary Garrett, University of Texas; Melissa Casarez, University of Texas; F Douglas Martin, University of Texas*

Science Education

Science Education Posters

036.239 U **Innovating molecular art: Communicating the true cost of science through repurposed materials**, *Carissa Alexandra Bishop, Southwestern University; Sofia Campos, Southwestern University; Shannon M. Walsh, Southwestern University; Hugo A. Cepeda, Southwestern University; Romi L Burks, Southwestern University*

036.240 N **Model Eliciting Activities: In-service teachers models of an incline plane**, *Cynthia Esperanza Lima, The University of Texas at San Antonio*

036.241 N **Standards-Based Science Institutes: Effective Professional Development that Meets Teacher and District Needs**, *Bonnie D McCormick, University of the Incarnate Word; Alakananda Ray Chaudhuri, University of the Incarnate Word; Richard Lewis, University of Texas at San Antonio*

037. Lunch
11:30 am to 1:00 pm
Bawcom Student Union, Bawcom Student Union (Outside-King St. Side)

038. Cell & Molecular Biology Oral Session II and Section Meeting
1:00 to 1:45 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 105

Chair: **Craig Younce**, *Howard Payne University*

1:00 038.242 G **Does BPS induce lipid synthesis and ER stress in HepG2 cells?**, *David Lollar, Sam Houston State University*

1:15 038.243 N **Translational Opportunities in Metabolic Engineering Plant Sterol Metabolome: Modifying Plant Sterol Profile to Control Insect Pests**, *Wenxu Zhou, Texas Tech University*

1:30 038.244 **Cell & Molecular Biology Section Meeting**, *Craig Younce, Howard Payne University*

039. Environmental Science Oral Session II and Section Meeting
1:00 to 1:45 pm
Wells Science Hall, WSH 341

Chair: **Mary F Poteet**, *The University of Texas at Austin*

1:00 039.245 G **Plant diversities in areas impacted by biological control of saltcedar (*Tamarix* spp.) in West Texas**, *Jaimie Michelle Lawhorn, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*

1:15 039.246 G **Seasonal Variations in Wet and Dry Deposition at a Single Site in Houston, Texas**, *Allen Ladd White, Texas Southern University*

1:30 039.247 **Environmental Science Section Meeting**, *Mary F Poteet, The University of Texas at Austin*

040. Geosciences Oral Session II and Section Meeting
1:00 to 2:00 pm
York Science Center, YSC 110

Chair: **Chris A. Barker**, *Stephen F Austin State University, Geology Department*

1:00 040.248 G **Sedimentology of the Riley Formation, Pontotoc, Texas**, *Jeff D Cullen, Stephen F Austin State University; Russell LaRell Nielson, Stephen F Austin State University*

1:15 040.249 N **Strike-slip motion transfer along a vertical-axis "corkscrew" structure; Ernst Canyon, Big Bend National Park, TX**, *Chris A. Barker, Stephen F Austin State University, Geology Department; Ryan R. Silberstrof, Stephen F. Austin State University*

1:30 040.250 N **Surface Morphology of Abode Undergoing Rain Degradation**, *Gerald Mulvey, University of the Incarnate Word*

1:45 040.251 **Geosciences Section Meeting**, *Chris A. Barker, Stephen F Austin State University, Geology Department*

041. Graduate Student Competition II
1:00 to 2:15 pm
York Science Center, YSC 102 - Brindley

Chair: **Shannon Hill**, *McLennan Community College*

1:00 041.252 G **Macroevolutionary patterns in North American mosasaurs: a study system for**

understanding evolution in a greenhouse world, *Joshua Ryan Lively, The University of Texas at Austin*

1:15 041.253 G **Measuring the Effectiveness of Invasive Species Education Curricula on Student Knowledge of Invasive Species**, *Kathryn Parsley, Texas State University; Tina Marie Waliczek, Texas State University; Paula S Williamson, Texas State University; Florence M Oxley, Austin Community College*

1:30 041.254 G **The relationship between blood hormone and lipid levels on the abundance of ectoparasites 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*

1:45 041.255 G **Utilizing a Channel Geomorphic Unit sampling scheme to discover habitat associations for freshwater mussels**, *Andrew Glen, University of Texas at Tyler; Lance Williams, University of Texas at Tyler; Neil Ford, University of Texas at Tyler*

2:00 041.256 G **A new hypothesis for burrowing as the main driver for reorganization of the circadian system in tetrapods**, *William Gelnaw, The University of Texas at Austin*

042. Marine Science Oral Session II and Section Meeting
1:00 to 2:15 pm
York Science Center, YSC 117

Chair: **George Guillen**, *Environmental Institute of Houston*

1:00 042.257 N **The Influence of Freshwater Inflow on the Occurrence of Atlantic Rangia and Water Celery within Galveston Bay**, *George Guillen, Environmental Institute of Houston; Jenny Oakley, Environmental Institute of Houston; Mandi Gordon, Environmental Institute of Houston; Cory Scanes, Environmental Institute of Houston; Norman Johns, National Wildlife Federation*

1:15 042.258 G **The reduction of dispersed oil toxicity through the synergistic application of hydrocarbon digesting microbial solutions**, *Michael Lewis, TAMU-CC, Center for Coastal Studies*

1:30 042.259 N **Why don't seagrasses grow in the Arroyo Colorado? Evidence from the water column and measurements of photosynthesis and respiration.**, *Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*

1:45 042.260 **Marine Science Section Meeting**, *George Guillen, Environmental Institute of Houston*

043. Science Education Oral Session III and Section Meeting
1:00 to 2:15 pm
Wells Science Hall, WSH 131

Chairs: **Mamta Singh**, *Lamar University* & **Michele Johnson Mann**, *University of Texas at Austin*

1:00 043.261 G **The Role of Museums in Addressing Student Misconceptions about Evolution**, *Sarah Harris, University of Texas at Austin*

1:15 043.262 N **The pchem projects: 10 years and going strong**, *Alyx Frantzen, Stephen F. Austin State University; Brian Barngrover, Stephen F. Austin State University*

1:30 043.263 G **Understanding Teacher Leadership in Math and Science Integrated Quality Professional Development Programs**, *Ruby Hernandez, Student; Sandra S. West, Texas State University*

1:45 043.264 N **Using the "5E learning cycle" and "interleaving" to improve student retention of basic and complex genetics concepts**, *Joni Henrik Ylostalo, University of Mary Hardin-Baylor*

2:00 043.265 **Science Education Business Meeting**, *Mamta Singh, Lamar University; Michele Johnson Mann, University of Texas at Austin*

044. Terrestrial Ecology and Management Oral Session II and Section Meeting
1:00 to 2:30 pm
Wells Science Hall, WSH 241

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

1:00 044.266 G **Chemosensory Signaling: Using Coyote Communication to Aid in the Deterrence of Livestock Predation**, *Hannah Stouffer, Hardin-Simmons University; Wendi Wolfram, Hardin Simmons University*

1:15 044.267 N **Use of landscape by endangered dama gazelles (*Nanger dama*) on Texas rangeland.**, *Susan Margaret Cooper, Texas A&M AgriLife Research; Elizabth Cary Mungall, Second Ark Foundation*

1:30 044.268 N **Impacts of herbivores on riparian zones of rural and urban streams: BMPs for their recovery and protection**, *Tom Arsuffi, TTU Llano River Field Station; Tyson Broad, TTU Llano River Field Station*

1:45 044.269 G **Trace Metals in Suburban Roadside Surface Soil**, *Matthew Fiala, Texas Southern University; Hyun-Min Hwang, Texas Southern University*

2:00 044.270 **Terrestrial Ecology and Management Section Meeting**, *Richard James Wilson Patrock, Texas A&M, Kingsville*

2:15 044.271 N **An algae mediated shell disease of yellow mud turtles; Implications for other species**, *James Learned Christiansen, University of Texas, Collections*

Section

045. Section Chairs Post-Session Meeting
2:45 to 3:30 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 125

046. Poster Session II - Take Down
3:00 to 4:00 pm
Isabelle Rutherford Meyer Nursing Education Center NEC Hallway

047. TAS Business Meeting (all TAS members)
4:00 to 4:30 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 105

048. Distinguished Texas Scientist & Outstanding Texas Educator Lectures
4:45 to 6:15 pm
Isabelle Rutherford Meyer Nursing Education Center NEC 105
Chair: *Dr. Keith Pannell*
4:45 to 5:30 pm - **Outstanding Texas Educator Lecture**
5:30 to 6:15 pm - **Distinguished Texas Scientist Lecture**

049. Banquet Reception
6:30 to 7:15 pm
Bawcom Student Union, Great Hall
Welcome and Seating

050. Awards Banquet
7:15 to 10:00 pm
Bawcom Student Union, Great Hall

Sunday, March 5

051. Field Trip - Waco Mammoth National Monument (If you wish to attend please contact Dr. Chris Barker at cbarker@sfasu.edu)
8:00 am to 1:00 pm
Off Campus - Waco Mammoth National Monument, Waco Mammoth National Monument
If you wish to attend please contact Dr. Chris Barker at cbarker@sfasu.edu).

Join us for a TAS Student geology field trip to the ***Waco Mammoth National Monument***, one of the newest units of the U. S. Park System. The site has fossils of adult and juvenile mammoths, plus other animals. This glimpse into Pleistocene life is a great opportunity to see an important mammoth site. Special guest speaker: Don Esker, former director of the site and an expert on mammoths!

Time permitting, there may also be stops at the following locations:

- A prolific Cretaceous Comanche Peak Formation fossil collecting area
- High cliffs in Cameron Park to discuss the Balcones fault zone

The field trip starts on:
Sunday Morning, March 5, 2017; departs at 8 am; breakfast not provided; location at Mary Hardin Baylor *NEC Courtyard*.
The field trip ends: In Waco about noon or 1 pm.

Participants will provide their own transportation from Belton to the Waco area. There will be a small fee for the Mammoth Park (probably less than $5). Enrollment may be limited.

If you wish to attend please send name(s), details and contact information to:
Dr. Chris Barker (cbarker@sfasu.edu), 936-468-2340.

Field trip leaders: Dr. Barker and Dr. Larell Nielson from Stephen F. Austin State University.

Friday, March 3

006. Biomedical Oral Session and Section Meeting
1:00 to 2:00 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC 105
Biomedical
Biomedical Oral Session and Section Meeting
Participants:

1:00 006.002 U **Examining the Effects of Medium-Chain Triglycerides on Neural Circuit Functions in a Transgenic Caenorhabditis elegans Model of Alzheimer's Disease**, *Jacob Boos, St. Edward's University; Fidelma O'Leary, St. Edwards University*
Cognitive function is the brain's ability to process information and form accurate perceptions. Maintaining optimal brain function and brain health best serves cognitive abilities, especially in the elderly and those with higher risks of being diagnosed with Alzheimer's Disease (AD). Previous studies suggest that consumption of medium-chain triglycerides (MCTs) is beneficial in aiding cognitive abilities in patients expressing early onset AD and mild cognitive disabilities. To further elucidate aspects of cognition that benefit from MCTs we used an AD model, a transgenic strain of Caenorhabditis elegans that expresses the Aβ42 peptide, a hallmark AD pathology, in all neurons. Both strains were age-synchronized and we examined chemosensory and motility functions. Each strain had three different treatment groups: 1) control, 2) coconut oil (CO), and 3) MCT oil. We tracked the impact of treatment at different life stages so chemosensory and motility assays were conducted for each treatment group on days 3, 5, 7, 9, 11, and 12. Results were compared using a 2-sample t-test and suggested consumption of MCTs through both supplements presented improvements in chemosensory and motility functions in AD C. elegans versus controls; mid-to-late life for controls benefitted the most. However, by day 11 AD C. elegans presented diminished motility and absent chemosensory responses in all treatment groups, suggesting the AD pathology had advance too far to benefit from dietary supplements. For N2 controls treatments showed benefits; interestingly only MCT oil was beneficial in later life, suggesting that MCTs may be a more effective supplement for the elderly brain.

1:15 006.003 U **Examining the Impact of Insulin-Degrading Enzyme on the Onset and Progression of Neurological and Physiological Deficits in Alzheimer's Disease**, *Sasha Michel Escamilla, St. Edwards University; Fidelma O'Leary, St. Edwards University*
Alzheimer's disease (AD) is a progressive neurodegenerative disease that causes cognitive and behavioral deficits. One of the main pathologies of AD is the formation of toxic plaques comprising the amyloid-beta peptide fragment. In previous research insulin-degrading enzyme (IDE) has been shown to break down amyloid plaque *in vitro*. To examine whether IDE treatment could also have an effect in vivo, a transgenic AD strain of *Caenorhabditis elegans* was utilized. Using chemotactic and lifespan assays, two strains of model organisms were used to test the neurological and physiological deficits in Alzheimer's disease. The N2 (wild type) and AD strain were treated with three different Insulin-degrading enzyme concentrations and compared to untreated groups. Compared to the untreated groups, all IDE treatments had improved the reversal speed of the model organism; however, amongst the treatments, Treatment A had decreased the population of the model organisms faster compared to the other treatments. Treatment B was most effective in the chemotactic assay, suggesting that the progression of neural plaques was slowed. Treatment B reached 50% of its population at a faster rate compared to the other treatments. This suggests that there may be a tradeoff between the quality of life and longevity. An AD patient may have to choose between having a better quality of life and a shorter lifespan versus a lesser quality of life while living longer than without treatment.

1:30 006.004 U **The effect of a high fat diet on adiponectin in** *Callospermophilus lateralis*, *Siena Rose Krueger, Austin College; Jessica Healy, Austin College*
Obesity is marked by metabolic dysregulation and significant fat storage. Type 2 diabetes, an inability to process blood sugar, is one pathology associated with obesity. Adiponectin – a peptide hormone produced in white adipose tissue – is very low in obese humans and mice. Adiponectin binds to a receptor AdipoR1 and signals for glucose uptake and fatty acid catabolism, but is found at low concentrations in obese and diabetic individuals. *Callospermophilus lateralis* is an obligate, fat-storing hibernator which becomes obese before winter, yet experiences no obesity-associated pathologies like diabetes. Fat-storing hibernators like *C. lateralis* progressively lose weight throughout the winter as they use fat stores for energy, and are utilized as models for studying obesity and weight loss. In 2013, eight *C. lateralis* individuals were put in two ad libitum diet groups – a control diet and a high fat diet – and pre-hibernation food intake and fat accumulation data were taken. Western blots were used to determine levels of adiponectin and AdipoR1 in various tissues for each diet group. There were no significant differences in body mass or percent fat mass between diet groups despite the high fat diet. Given this, adiponectin may play a role in clearing free fatty acids in blood and preventing fat tissue accumulation in the high fat diet group of *C. lateralis*. There were significantly higher levels of white adipose tissue adiponectin in the high fat group, which supports the idea that adiponectin could

prevent fat deposition in the high fat diet group.

007. Chemistry & Biochemistry Oral Session I
1:00 to 2:15 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC 125
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session I
Participants:

1:00 007.006 G *In vitro* **sulfur donor reactivity of various cyanide antidote candidates**, *Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Chathuranga Chinthana Hewa Rahinduwage, Mr; Ilona Petrikovics, Prof.; Afshin Ebrahimpour, Dr.*
Cyanide (CN) causes extensive cellular hypoxia by binding of the ferric iron of the cytochrome C-oxidase enzyme of the mitochondrial electron transport chain. It can be converted to the less toxic product of thiocyanate (SCN), which is excreted by the urine. This process is catalyzed by the sulfur transferase enzyme, Rhodanese (Rh) in the presence of a sulfur donor (SD). SD-type antidotes are investigated in vitro. The SCN formation from CN was analyzed with different SDs (SD1, SD2 and SD3) with and without Rh at physiological pH 7.4 and pH optimum for Rh 8.6. The SCN formation was measured within one minute spectrophotometrically at 460 nm after forming a red color complex of ferric thiocyanate. Without Rh, at pH 7.4 SD1 showed the highest SD efficacy (0.90 mM SCN/min; 50 mM SD1) followed by SD2 (0.14 mM SCN/min; 50 mM SD2) and SD3 (0.043 mM SCN/min; 250 mM SD3). In the presence of Rh (300 units/mL), SD1 showed the highest SD efficacy at pH 7.4 (0.95 mM SCN/min; 50 mM SD1), followed by SD2 (0.52 mM SCN/min; 50 mM SD2) and SD3 (0.07SCN mM/min; 250 mM SD3). In the presence of Rh (300 units/mL), at pH 8.6 SD1 showed the highest SD efficacy (1.00 mM SCN/min; 50 mM SD1), followed by SD2 (0.50 mM SCN/min; 50 mM SD2) and SD3 (0.06 mM SCN/min; 250 mM SD3). SD2 is the most, and SD1 and SD2 are the least Rh dependent SDs. The most efficient SD for CN intoxication is the SD1.

1:15 007.007 G **Benzodiazaboroles: synthesis, reversible formation, and structural properties**, *Janaka Prasad Abeysinghe, Sam Houston State University; Sanjaya Lokugama, Sam Houston State University; Dustin Gross, Sam Houston State University*
Diazaborole (DAB) is a heterocyclic aromatic compound that has high thermal stability, as well as, interesting optical and chemical properties. The structure and properties of DAB have been known for some time, however, their manipulation in dynamic covalent chemistry and utilization in complex molecular architectures has yet to be realized. The present study involves the influence of solvent on DAB formation and its dynamic covalent behavior under various conditions. XRD structural determination was carried to prove the structural identification of the products; moreover, computational calculations were used to compare experimental and theoretical results.

1:30 007.008 G **Boron trifluoride facilitated boronate ester exchange**, *Dulamini Indika Ekanayake, Sam Houston State University; Chathuri Jeewanthi Kombala, Sam Houston State University; Dustin Gross, Sam Houston State University*
The preeminent goal of this research is to advance the field of boron-oxygen based porous materials. Boronate ester based materials have received interest and found utility in many applications. The formation of these materials has been predominantly facilitated by their dynamic covalent character. In an effort to understand and improve this process, we are investigating the effect of boron trifluoride, a well-known Lewis acid catalyst, on synthesis and exchange of dioxaboroles. In the presence of boron trifluoride, we have observed an increase in reaction rate as well as beneficial side reactions that have driven the reaction equilibrium to unexpected products. The results of these efforts will be presented.

1:45 007.009 G **Cladistic assessment of cyanotoxin accumulation in marine, freshwater, and terrestrial cyanobacterial isolates**, *I-Shuo Huang, Texas A&M University-Corpus Christi*
This study identified the accumulation of 48 classes of cyanotoxins in terrestrial (73 strains), freshwater (60) and marine (16) cyanobacteria (totaling 149 strains from 58 genera in 8 orders) using ultra performance liquid chromatography/time-of-flight mass spectrometry. In total, 1733 occurrences of cyanotoxins were determined in the 149 strains studied. On average, 11.63 cyanobacterial toxins were accumulated per cyanobacterial isolate. Protease inhibitors were the most commonly identified cyanotoxin group (40.5% occurrence). Micropeptins, a group of potent chymotrypsin inhibitors, were the most frequent cyanotoxin detected (16.5%), then aeruginosin (protease inhibitors; 14.37%) and microcystin (hepatotoxins; 11.54%). Co-production of multiple cyanotoxins was determined in over 90% of the isolates. Over 25% of studied cyanobacterial genera produced more than 7 classes of cyanobacterial toxins. Overall, terrestrial and marine cyanobacteria produced as many bioactive compounds as freshwater cyanobacteria. Nitrogen-fixing terrestrial cyanobacteria (i.e. Anabaena) produced a high variety of cyanotoxins, indicating the potential for toxin exposure to animals foraging and to agriculture. This study represents the first systematic cyanobacterial toxin assessment and the diversity of toxin occurrence in different habitats, which is critical as the first step for the successful management of toxic cyanobacteria.

2:00 007.010 U **Comparative analysis of nitrate anion in coral reef waters at Roatan, Honduras**, *david Alberto*

Prieto Uzcategui, Midland College; Melissa Wood, University of Texas of the Permian Basin; Thomas Ready, Midland College
Nitrate concentrations were measured for water samples obtained along the Roatan, Honduras North shore coral reef obtained by the Midland College marine research team July 3rd – July 9th, 2016. Nitrate analyses were performed via a.) direct Ultra-Violet absorption, b.) visible absorption of brucine derivatized nitrate, visible absorption of diazotization derivatized nitrate, and d.) nitrate selective electrode. Results from Midland College lab analyses were compared to the independent analysis of duplicate samples sent to A&B Laboratories in Houston, Texas. In general, all of the nitrate analyses show that nitrate concentrations on the reef are 0.05 ppm or lower.

008. Conservation Ecology Oral Session I
1:00 to 2:00 pm
Wells Science Hall, WSH 241
Conservation Ecology
Conservation Ecology Oral Session I
Participants:

1:00 008.011 U **An analysis of coyote (*Canis latrans*) urine constituents which impact organismal behavior**, *Hannah Jones, Hardin-Simmons University; Wendi Wolfram, Hardin Simmons University*
Ethochemistry, the conjoining of ethology and chemistry, is an effective tool used in conservation efforts of endangered species and the understanding of behavioral patterns throughout the animal kingdom. Through efforts of ethochemistry, organic compound analysis of constituents within urine provides an understanding of the use of chemosensory signaling within coyotes (*Canis latrans*). Urine is used by multiple species as a means of communication to other organisms and includes information such as age, physical fitness, sex, reproductive status, and territorial boundaries. Multiple studies reveal recurring volatile organic compounds found between species and especially within the family Canidae. In this study, three of these recurring organic compounds were used on three separate ranch locations in Runnels County, Texas to identify which compounds would cause scent-marking behavior in wild coyotes. Scent-marking is often utilized in canid reproduction and according to the IUCN Red List of Threatened Species, hybridization between critically endangered red wolves and coyotes has become the primary threat to red wolf breeding programs as early as 1992. In identifying organic compounds between the two species that could impact scent-marking, and thus hybridization, our study can be used to reevaluate breeding programs in order to protect the continuation of red wolf population. By using the concept of ethochemistry, coyote urine containing chemical constituents could be used to develop more anti-hybridization tools.

1:15 008.012 G **Demographics, distribution, and genetic variation in the Texas diamondback terrapin (*Malaclemys terrapin littoralis*) within the Corpus Christi and Aransas Bay systems**, *Shantel Swierc, Center for Coastal Studies, Texas A&M University - Corpus Christi; Kim Withers, Center for Coastal Studies, Texas A&M University - Corpus Christi; Derek Hogan, Department of Life Sciences, Texas A&M University - Corpus Christi; Michael Forstner, Department of Biology, Texas State University*
The goals of this research are to determine the population genetics and population dynamics of the Texas diamondback terrapin (*Malaclemys terrapin littoralis*) within the Nueces/Corpus Christi Bay and Aransas Bay estuaries on the central Texas coast. The genetic data produced by this study can be integrated with previous DNA analyses on Nueces Bay populations and provide needed information for development of management strategies. It will also provide the first genetic data on populations located within Oso Bay (Nueces/Corpus Christi Bay estuary) and Aransas Bay. An understanding of the population genetics from these terrapins will help answer vital questions for conservation management in an underrepresented region from bays that are relatively isolated from one another. Terrapins were captured between April 2015 and December 2015. Sex was determined based on morphological characteristics and females were checked for gravidity. Photographs, standard measurements, body condition score, age estimates, physical abnormalities, scute notches and PIT tags were all performed and applied for each individual. Blood samples were drawn from all captured individuals to genetically compare individuals within, and across, these bay systems using microsatellite DNA analysis. Preliminary captures, sex ratios, and standard measurement data for individual males and females are currently being analyzed, providing insight on the demographics of Texas diamondback terrapins in the study sites. DNA analysis will be performed on an ABI 3730xl DNA Analyzer, utilizing a multiplex PCR strategy involving M13 fluorescent labeled forward primers and the same 12 SSR primers that multiple previous studies have used for this species.

1:30 008.013 G **Does elevated salinity induce a physiological response in Texas diamondback terrapin (*Malaclemys terrapin littoralis*)?**, *Lindsey C Ramirez, Center for Coastal Studies, Texas A&M University - Corpus Christi; Aaron Baxter, Center for Coastal Studies, Texas A&M University - Corpus Christi; Kim Withers, Center for Coastal Studies, Texas A&M University - Corpus Christi; Paul Zimba, Center for Coastal Studies, Texas A&M University - Corpus Christi*
This study evaluated the physiological effects of elevated salinity on blood chemistry in the Texas

diamondback terrapin (*Malaclemys terrapin littoralis*) within the Nueces and Mission-Aransas Estuaries. Terrapins (n = 105) were captured during April 2015 – November 2015 from Nueces Bay, Oso Bay, and Goose Island State Park. Water parameters were recorded for each sampling event. A blood sample was drawn from the subcarapacial sinus vein; initial blood glucose concentrations and morphometric data were recorded for each individual captured. First time captures were scute notched and PIT-tagged as part of an ongoing mark-recapture study. Plasma samples were analyzed using an electrolyte panel (Na+, Cl-, K+, and CO2). There were significant differences between the three bay systems for glucose ($F = 4.45$; $p = 0.0147$), potassium ($F = 22.57$; $p = <.0001$), and CO2 ($F = 4.06$; $p = 0.0209$). There were also significant differences in salinity ($F = 9.14$; $p = 0.0003$) between the three bay systems. Males and females within Oso Bay had significant differences in glucose ($F = 7.53$; $p = 0.0116$) and potassium ($F = 7.64$; $p = 0.0106$), while males and females within Nueces Bay had significant differences in CO2 ($F = 4.27$; $p = 0.0450$). Plasma samples are currently being analyzed using ELISA tests for stress hormone production. The results of this research provide the first physiological assessment of Texas diamondback terrapins under elevated salinity conditions utilizing hormones as indicators.

1:45 008.014 N **Native Fish Conservation Areas in the Chihuahuan Desert of Texas**, *Gary Garrett, University of Texas; Timothy Birdsong, Texas Parks and Wildlife Department; Ben Labay, University of Texas at Austin; Megan Bean, Texas Parks and Wildlife Department*
Texas Parks and Wildlife Department, in partnership with University of Texas Fishes of Texas Project and Siglo Group, has developed a statewide network of focal watersheds that represents a set of native fish "strongholds". In the Chihuahuan Desert region of Texas six Native Fish Conservation Areas in the Rio Grande, Pecos and Devils rivers were delineated and 39 focal fish species were identified as priorities for conservation. This was accomplished using a spatial prioritization analysis that identifies focal areas for conservation based on species distribution models for priority fish taxa. An Advisory Council of experts in the region has also been developed and they will be tasked with identifying priority conservation, restoration, monitoring and research actions for preservation of native fishes, their habitats and other aquatic resources in these watersheds. In addition, this collaboration will help to catalyze cooperation, collaboration and leveraging of technical and financial resources among local, state and federal natural resource management agencies, universities, NGOs and other local partners that contribute to conservation in the Chihuahuan NFCAs.

009. Environmental Science Oral Session I
1:00 to 2:00 pm
Wells Science Hall, WSH 341
Environmental Science
Environmental Science Oral Session I
Participants:

1:00 009.015 N **Biochar for agronomic and environmental applications in South Texas**, *Jihoon Kang, University of Texas Rio Grande Valley; Sergio Mireles, University of Texas Rio Grande Valley*
Biochar is a stabilized carbon-rich product with the potential for beneficial applications as soil amendment and/or environmental remediation across multiple disciplines in science and engineering. Biochar is created by heating biomass under conditions of limited or no oxygen (pyrolysis). Any organic wastes such as woody and grass materials, agricultural residues, manures, yard wastes, and municipal sludge could be biomass feedstock materials to produce biochar. By the charring the biomass, much of the carbon becomes "fixed" into a more stable form. When the resulting biochar is applied to soils, it effectively sequesters the carbon while improving soil structure and fertility. One of the biochar properties with key agronomic applications is pH that can affect nutrient availability and soil microbial communities. The pH of lower Rio Grande valley soils is alkaline. In soils with high pH, availability of micronutrients may decrease, and the activity of soil microbes may be reduced. We designed an experiment to examine the effect of pyrolysis temperature on biochar pH and its further effects on soil pH and nutritional status. Our preliminary data for biochar pH shows a positive relationship between biochar pH and pyrolysis temperature probably due to increasing ash content containing salts as well as decreasing organic acid functional groups with increasing pyrolysis temperature. Our presentation will present recent findings on the effect of biochars on soil pH and nutrient status affected by its ageing in the valley soils.

1:15 009.016 G **Effects of bacterial-algal consortia on biomass and lipid production**, *Adam M Chorazyczewski, Texas A&M Corpus Christi, Center for Coastal Studies; Xavier Mayali, Lawrence Livermore National Labratories; Paul Zimba, Center for Coastal Studies, Texas A&M University - Corpus Christi*
Bacterial-algal interactions impact growth rates and metabolite production in algal cultures through the alteration of the phycosphere. Recent studies have shown that quorum sensing (QS) molecules can be used to regulate behavior of bacteria and algae. These QS molecules could be used to increase growth rates or alter the production of byproducts in cultures of algae with the potential for higher yields in the production of biofuels. I have isolated axenic strains of

Phaeodactylum tricornutum and co-cultures of *Phaeodactylum* and associated bacterial cultures. I will assess the growth rates of the different co-cultures of *Phaeodactylum* and bacteria and the axenic samples to determine an accurate relationship between cell counts and a proxy measurement. Proxy measurements will include the absorbance of the samples at both 655 nm and 750 nm wavelengths and HPLC analysis of chlorophyll a abundance. Lipid and biomass differences in metabolite productions between the axenic samples and the co-cultures will be determined. Finally, I will identify unique bacterial-algal compounds that are serving as signals or QS compounds between bacteria and algae using time of flight analysis. My results will determine whether bacterial co-culture impact the lipid profiles of algae. I will then identify compounds that can be utilized to increase the production of biofuels through increased growth rates and lipid production in microalgae cultures.

1:30 009.017 N **Examining ecosystem services in an urban environment**, *Seth Kramer, St. Edward's University; J. Amy Belaire, St. Edward's University*
Human populations are increasingly urban, but they continue to depend on nature for their health and well-being. Urban landscapes depend on the rural ecosystems, but also benefit from internal urban ecosystems. The aim of this presentation is to examine the ecosystem services generated by ecosystems within urban areas. Ecosystem services are the benefits human populations obtain from nature. We evaluated two different urban ecosystems: an urban preserve and urban residential yards. These systems produce a range of ecosystem services. In our study, five main ecosystem services relevant to urban landscapes are addressed: carbon storage, carbon sequestration, pollution removal, avoided water runoff and energy savings. It is concluded that ecosystem services across all landscapes in an urban gradient have significant impact on quality-of-life in urban areas and that ecosystem service should be addressed in land-use planning, public policy, and individual decision making.

1:45 009.018 U **Extreme Precipitation: Changes in Rain Frequency from 1895-2015 in Central Texas**, *Victoria Gore, Southwestern University*
Analysis of precipitation data reveals trends in extreme rainfall events over the last century. The United States has seen an increase in yearly precipitation, especially regarding extreme daily precipitation events. We apply multiple methods to longitudinal data from eleven different locations within a 100 mile radius of downtown Austin. We find a precipitation threshold for each station for multiple time periods, apply a declustering process, and then fit a Generalized Pareto Distribution to the values above the threshold. The resulting period curves created for each site and time period provide an estimate of the upper extremes of the precipitation spectrum. Our models reveal the extent of change in the trend of extreme rainfall events near Austin, TX.

010. Freshwater Science Oral Session I
1:00 to 2:15 pm
York Science Center, YSC 102 - Brindley
Freshwater Science
Freshwater Science Oral Session I
Participants:

1:00 010.019 U **A potential role for male genitalia in sexual conflict**, *Joshua Francisco Rios, St. Edwards University; Sarah Joanne Morton, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Male genitalia are strikingly diverse in organisms with internal fertilization. Elaborated genital structures are usually involved in female stimulation, mediating cryptic female choice, or in increasing a male's fertilization success during sperm competition, which may result in sexual conflict. We studied the potential function of distal armaments in the copulatory organ of a livebearing fish (*Gambusia affinis*). Contrary to a previous hypothesis, the terminal structures are not required for sperm transfer, as males with curtailed copulatory organs still were able to sire offspring. This component of our experiment was conducted on two different occasions, using two different sets of virgin females. Results were repeatable and in both cases, the full intromittant organ was not necessary for transfer or sperm and fertilization of eggs. Using SEM, we also found that males inflict damage to tissue surrounding the female genital opening during copulations. Overall, we suggest that – along with the sexual activity of coercive males – injuries inflicted by genital structures during copulation may be a sign of sexual conflict in livebearing fishes, especially given that the genital structures are not necessary for sperm transfer.

1:15 010.020 U **Applying Band-Aids: Challenges associated with molecular detection of *Angiostronglyus cantonensis* infection within Uruguayan and Brazilian apple snails**, *Carissa Alexandra Bishop, Southwestern University; Romi L Burks, Southwestern University*
The rat lungworm disease comes from the parasitic nematode *Angiostrongylus cantonensis*, and humans become accidental hosts for *A. cantonensis* after consuming infected gastropods that serve as common intermediate hosts. Infection prevalence poses a threat to inhabitants of areas that may regularly consume raw or undercooked molluscs, including snails. Uruguay represents the southern limit for a group of apple snails (*Pomacea* spp.), which are known intermediate hosts for the parasite. In addition, certain regions of Brazil represent areas previously understudied in regards to

infection prevalence. We screened for the presence of *A. cantonensis* in apple snails by extracting total genomic DNA from foot tissue and conducting a species-specific PCR targeting the ITS-1 (internal transcribed spacer-1) gene. We sought to quantify infection prevalence by identifying infected individuals through visual comparison of gel electrophoresis bands against three positive controls. We have found no positives samples to date but we have only screened a subset of samples (~400 of 900). A number of challenges exist in defending negative screens, namely the difficultly in distinguish between primer dimer and 'false positives'. Targeted parasite DNA tends to be short (>200 bp) and move toward the bottom of gels. Other challenges include determining the detection threshold of primers because template DNA may have too little parasite DNA for detection, finding positively infected tissue for use as a control, and guarding against cross contamination in PCR. In this talk, we discuss strategies to overcome these challenges associated with verifying negative results.

1:30 010.021 G **Comparative Effects of High & Low Quality Allochthonous Input on Stream Food Webs**, *Cyrus Sadeghian, Sam Houston State University*
The study of conservation biology has primarily focused on the rapid decline of biodiversity over the past few centuries. Invasive species seem to be the most impactful on species at the community level. Native to eastern Asia, the Chinese tallow tree (*Triadica sebifera* or *Sapium sebifera*) has negatively affected local organisms since its large-scale introduction in the early 1900s for wax-based products and herbal medicine. Previous studies regarding tallow leaves in freshwater bodies of water have typically focused on ephemeral ponds where leached tannins are essentially recycled and the contents are maintained. We intend to focus on a stream ecosystem where the movement of water allows us to maximize leaching and truly test the quality of tallow leaves as a food source. We will expose flowing mesocosms to Chinese tallow leaves versus the leaves of a native tree: the American Sycamore tree (*Platanus occidentalis*). We would expect microbial respiration, fish growth, and invertebrate density to be hindered by the presence of a poor food quality. However, with the temporal variable associated with leaf decomposition, we would likely observe overall production to be more complex. The response variable data can be combined and scaled to represent total stream production compared to time. Sycamore leaves will decompose much slower than tallow leaves. Therefore, the response from the tallow treatments will likely be catalyzed and peak much faster than the sycamore treatments. We would then say tallow leaves are a pulse subsidy on stream ecosystems.

1:45 010.022 G **Conservation genetics of the endemic** *Cyprinodon rubrofluviatilis* **and invasive** *Cyprinodon variegatus* , *Kristina Ayers, Stephen F. Austin State University; Jennifer Gumm, Stephen F. Austin State University*
Hybridization is a natural process, however, human activities have contributed to an increase of hybrid species. In North America alone, 40% of fish species of conservation concern have been impacted by hybridization and introgression. Of eminent concern is the hybridization of native species with introduced or invasive species. Samples collected from the Brazos River from 2006 and 2012 display intermediate phenotypes between the invasive *Cyprinodon variegatus* and the native *Cyprinodon rubrofluviatilis*, suggesting that hybridization has occurred. The extent of hybridization and introgression between two species can not be determined by morphological characters as cryptic hybrids, individuals that phenotypically look like one species yet possess alleles unique to the second species, may be present. Genetic analysis using microsatellite markers of five parental and four hybrid populations provides the resolution needed to identify hybrid individuals and determine the impact of *C. variegatus* in the Brazos River. Preliminary data show that alleles unique to *C. variegatus* are present in both putative hybrids collected from the Brazos River in 2013 and samples collected from Salt Fork of the Brazos River in 2014-2015. However, samples collected from the Wichita River and Red Rivers do not possess these unique alleles. This suggests that *C. variegatus* and cryptic hybrids may have been present further upstream than originally documented. Additional sampling and genetic analysis is needed to understand the full impact *C. variegatus* has had on populations of *C. rubrofluviatilis* and if conservation efforts are needed to protect the loss of *C. rubrofluviatilis* genetic integrity.

2:00 010.023 N **Discovery of the Mexican Blindcat,** *Prietella phreatophila***, in the U.S. and an update on its range-wide conservation status**, *Dean A Hendrickson, University of Texas; Jack Johnson, National Parks Service; Peter Sprouse, Zara Environmental; Sarah Howard, National Parks Service; Gary Garrett, University of Texas; Jean Krejca, Zara Environmental; Adam Espelee Cohen, University of Texas; Danté Fenolio, San Antonio Zoo; Andrew G Gluesenkamp, San Antonio Zoo; José Antonio Dávila Paulín, Comisión Nacional de Áreas Naturales Protegidas; Laura Dugan, Texas Parks & Wildlife Department*
Mexican blindcat, *Prietella phreatophila*, was described in 1954 from a single locality in Northern Coahuila, México. Long listed as endangered by the Mexican federal government, it was listed by the U.S. Fish and Wildlife Service as a foreign endangered species in 1970, and the most recent (1996) update of its assessment for the IUCN Red List considers it endangered as well. Explorations in the late 1990s

discovered many new localities extending nearly to the international border, and a captive population established provided insights into the species' basic biology and behavior. In 2016 the species was discovered in a cave in the Amistad National Recreation Area (ANRA), just north of the Río Grande in Texas. The 1970 listing instantly gave the TX population full protection under the U.S. Endangered Species Act. The species' subterranean and mostly inaccessible habitat endows it with extremely low detectability and its actual range is likely broader than physical sampling of specimens has revealed. We review all prior and new knowledge of the species and its habitat to provide an updated international reassessment of its overall conservation status and threats, which most notably include aquifer depletion and contamination in both the Mexican and U.S. portions of its known range. A live captive population of two specimens collected in 1997 in Coahuila and one Texas specimen is now at the San Antonio Zoo, we are working with NPS to further explore ANRA caves and hope eventually to return to Coahuila to more fully update the species' conservation status.

011. Geosciences Oral Session I
1:00 to 2:00 pm
York Science Center, YSC 110
Geosciences
Geosciences Oral Session I
Participants:

1:00 011.024 N **A MECO rain forest/mangrove community from South Texas**, *James Westgate, Earth & Space Sciences, Lamar U.*
Evidence of Middle Eocene Climate Optimum (MECO) communities primarily has come from deep sea drill cores bearing marine microfossils. The MECO event occurred 40 million years ago, during the early Bartonian and lasted up to 600,000 years, beginning in paleomagnetic Chron 18r and peaking during Chron 18n. Planktonic forams from zone P13 and nanno-plankton from the upper half of NP16 are found in MECO sections of deep sea cores. Records of MECO-age continental communities are rare as they do not have forams and nannoplankton allowing correlation to deep sea deposits. The late middle Eocene Casa Blanca community (Texas Memorial Museum locality 42486) is an exception as the stratigraphic layer it came from lies 32 meters above the Turritella cortezi zone in the Laredo Formation. The T. cortezi zone allows biostratigraphic correlation between the middle portion of the Laredo Formation in Laredo, Texas and the Hurricane Lentil of the Cook Mountain Formation at Alabama Ferry on the Trinity River. Cook Mountain Formation planktonic forams come from zone P13 and its nannoplankton come from the upper half of zone NP16 indicating it and the Casa Blanca fossils were deposited during the MECO event. Paleomagnetic analysis of a 30 meter-long core drilled near the Lake Casa Blanca spillway indicates that the Casa Blanca community fossils were deposited during Chron 18n approximately eight meters above the reversal from Chron 18r. The Casa Blanca community indicates the local climate supported coastal mangroves living adjacent to a lowland tropical rain forest with a diverse vertebrate community.

1:15 011.025 N **Continued human-enhanced coastal erosion near Rollover Pass, TX**, *Cissie Owen, Lamar University; Donald E. Owen, Lamar University*
Rollover fish pass, an artificial cut made across the Bolivar Peninsula during 1955, has significantly enhanced normal coastal erosion due to relative sea-level rise. The pass serves as a funnel, diverting shoreface sand into East Bay behind the Peninsula. Sand enters with the flood tide, is deposited in a tidal delta in the calm water of East Bay, and little of it is returned to the Gulf of Mexico by the ebb tide. The beach west of Rollover Pass is more deprived of sand moving in the dominantly west-flowing longshore current. Geotubes were installed along ~5 miles of beach east and west of Rollover Pass during 2000-2001 for the stated purpose of "saving the beach" depleted by the Rollover Pass funnel. They quickly reduced beach width and steepened the offshore profile by wave erosion. They caused waves to break on them, rather than offshore, propelling fast-moving water directly to beach houses close behind them. This occurred during Hurricane Ike (2008), with a 20-foot storm surge, when all but one of ~200 structures were destroyed behind the geotubes. West of the geotubes, approximately 20 percent of beach houses survived Hurricane Ike because there were no geotubes to enhance destructive effects. Five months after Ike, they were removed and the State of Texas has recommended closure of Rollover Pass. The "fishing lobby" and inaction by the State of Texas has prevented this from happening since 2008. During 2016, highway 87 between High Island and Clam Lake is frequently closed by high water.

1:30 011.026 G **Non-Invasive Investigation and Delineation of Karst Geohazards Using Electrical Resistivity within the Delaware Basin, Culberson County, Texas**, *Jonathan David Woodard, Stephen F. Austin State University*
Differential dissolution of gypsum karst within the Delaware Basin poses a significant threat to infrastructure that society depends on, specifically along 34 miles of RM 652 in Culberson County. The study area is located on the northern margin of the Chihuahua Desert and includes outcrops of Castile and Rustler strata that host karst geohazards. A TR5 OhmMapper capacitively-coupled resistivity meter was used to acquire resistivity data for geohazard characterization. This study utilized a dipole-dipole array, and the depth of investigation was dependent on

the electrode spacing. An electrode spacing of 2.5 meters was used, with a transmitter offset of 2.5 meters. This geometric configuration allowed for recordings to be made as deep as 5 meters, while being acquired at approximately 2 miles per hour with a rate of 1 transmission per second. Resistivity data was processed using AGI's EarthImager 2D inversion software to produce a Smooth Model Inversion with a 10.0 smoothness factor after 8 iterations. Resistivity data collected from the OhmMapper successfully imaged significant anomalous patterns throughout the study area. Excavation sites were trenched and examined in order to correlate resistivity lab interpretations, with karst surface expressions. Results enabled delineation of suffusion induced features such as caves, vertical conduits in gypsum bedrock, extensive sink filled areas, lateral piping, and heavily leached zones. These features may potentially lead to catastrophic failure that could have a significant impact on the surrounding industries throughout this region. Geohazard features were common throughout the Castile Formation outcrop region, but minimal in the Rustler Formation.

1:45 011.027 N **Origin and Sedimentary Controls of Clastic Dikes in the Carrizo Sandstone (Eocene), Henderson, Texas**, *Russell LaRell Nielson, Stephen F Austin State University; Chris A. Barker, Stephen F Austin State University, Geology Department*
A number of small clastic dikes and other sedimentary structures are present in the Carrizo Sandstone (Eocene) along U.S. Highways 79 and 259 on the east side of Henderson, Texas. These dikes occur in a small area and have not been found at other locations in the Carrizo Sandstone around the Henderson area. The clastic dikes originate in quartz wacke and rise through lens-shaped bodies of quartz arenite. The dikes are 10–15 cm. in diameter and 2-3 m.in length. Deposition of the quartz wacke appears to have occurred in interdistributary bays. When the distributary channel migrated over the interdistributary bay, the load of the sand deposited in the distributary channel resulted in compaction and dewatering of the interdistributary sediments. We postulate that this dewatering and compaction led to the development of clastic dikes that came up through the distributary channel sediments. Clastic dikes are found only in the distributary channel facies and not in other sedimentary facies of the Carrizo Sandstone in this area. The location and development of these dikes appears to be controlled by the stratigraphic and facies relationships that developed in interdistributary and distributary channel areas. These distributary channels and interdistributary bays are part of the Rockdale delta system that was prograding from the west into east Texas during the Eocene Epoch.

012. Mathematics & Computer Science Oral Session and Section Meeting
1:00 to 1:30 pm
Wells Science Hall, WSH 239
Mathematics/Computer Science
Mathematics & Computer Science Oral Session and Section Meeting
Participants:

1:00 012.028 U **Creation of a Perfect Hockey Bracket: Using Matrices to Depict the Outcome of the Stanley Cup**, *Dominic Wade Carrillo, Sul Ross State University; Angela Michelle Brown, Sul Ross State University*
There is an understanding that someone can create a formula from a team's statistical data to generate a perfect bracket. This is done for many sports such as baseball, football, soccer, and basketball. The method of using a win-to-loss ratio can be unreliable because of many unknown variables. In this research we will reproduce what sports analysts have done and introduce it into the National Hockey League (NHL). By gathering data and entering it into a matrix to generate a ranking, we will theoretically be able to produce the perfect bracket of the Stanley Cup winners for 2016. We will utilize the Colley method to manipulate matrices to rank teams by reducing a matrix to the echelon form thus producing the ranks of each team. In this method we will create a point system in which the win-to-loss ratio and the number of times each team played each other coincides. To add different varying results, in an attempt to improve on the bracket, we will introduce point differentials by multiplying by or adding to the point system in the Colley method. From the data collected, we will deduce who is the future Stanley Cup Champion.

013. Science Education Oral Session I
1:00 to 2:30 pm
Wells Science Hall, WSH 131
Science Education
Science Education Oral Session I
Participants:

1:00 013.030 G **An Inquiry Investigation of Endangered Species in the Edwards Aquifer**, *Stephanie Ann Garcia, UTSA PhD Student & TA; Martina McGhee, UTSA PhD Student & TA; Carrie Davis, UTSA Masters Student & Environmental Science Educator*
With both natural and anthropogenic factors being considered, like human population growth, how do these affect our local aquifers? After also consulting experts within the field, we came to the conclusion that some endangered species in the Edwards Aquifer are federally protected because they serve as excellent indicator species for water quality (Edwards Aquifer Authority, 2016). We also came across research that said students would benefit from their own self-directed inquiry in order to awaken their sense of wonder, connect to their community, and engage in social justice concerning a local issue in a meaningful way (Lesh, et al., 2000; Dewey & Dewey, 1915; Chinn &

Malhotra, 2002; Calabrese-Barton, 2012; Gutstein, 2003). This inquiry investigation led to the development of a unit that can be adapted from kindergarten to 9th grade with the intent of students making critical connections from the research they gathered to their development of practical actions founded in social justice. An example of a student product is a written letter from the perspective of an endangered species pleading on behalf of the species for humans to take action. The implementation results reveal that students were able to connect the water quality to provide the various species with adequate living environment and how that same water quality then impacts humans. This inquiry investigation proved to have a meaningful impact on student learning by evidence of the ownership students began to take of their local aquifer and taking more responsibility of their human impact on the environment.

1:15 013.031 G **Examining the influence of principal participation on teacher success in STEM-focused professional development programs**, *SARA M HANSON, Texas State University; Sandra S. West, Texas State University*
Mix It Up is a Teacher Quality grant created to provide professional development for teachers and principals aimed at integrating math and science to improve STEM instruction in the 5th through 8th grades. I am interested in drawing meaningful conclusions about the impact of principals' participation with their teachers in the program versus teachers without their principal's support that focuses primarily on teacher success in the STEM classroom. Research in other fields has shown the benefits of principal participation and the positive effect that it has on students and teachers, and I hope to find a similar correlation with STEM-specific professional development programs. Analyzing compiled data from existing and upcoming classroom observations should provide a more holistic view of the efficacy of principal participation with regards to teacher success in the *Mix It Up* program.

1:30 013.032 U **Building minds one block at a time: Science education from within Minecraft: Education Edition**, *Kevin Chappell, The University of Mary Hardin-Baylor; Kaleb K. Heinrich, The University of Mary Hardin-Baylor*
In today's society technology permeates through all aspects of our daily lives, including education. A technology that has been increasing in popularity for both children and adults over the last decade is video games. Thus, scholars are exploring how best to teach the "gamer generation," because video games are a unique medium that allow the user to become fully immersed within generated worlds and experiences. One game that has recently taken the world by storm is Minecraft, which is a game that promotes creative freedom by providing the user with building materials and an open world for you to explore, discover, and build upon. This freedom allows users to create without any limitation. And with the recent release of Minecraft: Education Edition, we now have the necessary tools to bring this creative freedom to students. By utilizing the core concept of giving individuals the freedom to create and explore, we now have a platform to provide students with an immersive learning experience where they can walk inside the human body and explore many of its biological systems, or experience the consequences of deforestation and limited resources. The learning opportunities are infinite, with the only limitation being the imagination of the lesson designer. The participatory nature of digital media environments, such as Minecraft, have great potential to serve as learning tools and support science education.

1:45 013.033 N **Effect of Self-explaining on Scientific-Skill Development: Longitudinal Study via Latent Transition Analysis**, *Adrian Villalta-Cerdas, Sam Houston State University*
Research on the self-explaining effect has shown that careful design of activities can lead to authentic learning in the sciences. However, little direct evidence exists that self-explaining (as a learning strategy) provides a useful function in the way(s) students learn chemistry at college level. The work presented here comes to fill the void in knowledge on the field of self-explaining at college level by investigating the self-explaining effect in the undisturbed ecology of introductory chemistry courses. The study investigated the development of self-explaining as a skill utilizing six in-class activities designed to promote differential self-explaining behaviors. The activities consisted of chemistry problems that presented students with experimental data (i.e., chemical and physical properties) of compounds for them to contrast and explain in light of chemical theories and concepts. Data collection consisted of written explanations from +50 students at six data points along the timeline of the course. The written explanations (qualitative data) were coded using published coding schemes from similar studies, to later transform it into quantitative data. The transformed data was then analyzed via latent transition analysis to investigate the development of student's self-explain skill along the different data points. The study was replicated two times to investigate reproducibility of findings. The talk will present and discuss the complex data analysis and the major implications for chemical education research and practice.

2:00 013.034 G **Efficiency and Efficacy of Flipped vs. Traditional laboratory courses**, *Gerardo Sanchez, University of Texas Rio Grande Valley*
A flipped laboratory model involves significant preparation by the students on lecture material prior to

entry to the laboratory. As such, laboratory time is focused solely on active learning through experiments. The aim of this study is to observe the effects on student performance through the transition from a traditional laboratory format, to a flipped format. Data collection on two anatomy and physiology courses (2401 and 2402) spanned from the Fall 2012 semester, to Fall 2015. Labs were taught in the traditional format through Fall 2014. These labs involved lectures given by a teaching assistant, followed by an in lab quiz, and concluded by the week's activities. Spring 2015 marked the transition into the flipped format, where lectures and quizzes were now given online, with the in lab meetings focused purely on lab experiments. Histograms for both courses approached a more normal distribution once labs were flipped while lecture averages showed higher average scores. Chi square analyses returned a critical chi value of 71.94 and 681.32 for the 2401 and 2402 courses respectively. ANOVA tests on final exams, midterm exams, and quizzes showed F ratios of 26.06 / 215.08, 111.63 / 373.47 and 110.12 / 242.53, for 2401 and 2402 respectively. Regression analyses gave decreasing numbers after the flipped labs were introduced with an r^2 value of .485 for 2401, and .564 for 2402. Increased focus on active learning through flipped laboratory courses results in increased performance by the students overall.

2:15 013.035 N **Elementary Pre-Service Teachers & Inquiry Based Technology Integrated Lesson**, *Mamta Singh, Lamar University*
Introducing pre-service teachers to technology integrated lessons development and its implantation is the most effective way as it provides science content knowledge and technology skills for elementary science instruction. The present study assessed pre-service teachers' knowledge, attitude, and self-efficacy beliefs towards developing elementary science lesson plans with the integration of technology and evaluated pre-service teachers' science and technology integrated lesson plan using 5-E instructional model for elementary science instruction. A paired t-test result indicated a statistical significant difference ($p < 0.02$) in pre-post beliefs of pre-service teacher towards developing elementary science lesson plans with the integration of technology. Additionally, 90% of pre-service teachers developed technology integrated lesson using 5-E instructional model.

016. Cell & Molecular Biology Oral Session I
3:00 to 4:30 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC 105
Cell and Molecular Biology
Cell & Molecular Biology Oral Session I
Participants:

3:00 016.036 G **Adult Retinal Pigmented Epithelial Cells exposed to simulated microgravity: A transformation from adherent cell type to multicellular spheroids**, *Vivek Mann, Texas Southern University , Houston ,Texas; Alamelu Sundaresan, Texas Southern University , Houston ,Texas*
After a long-term spaceflight, humans in space suffer from adverse effects on various organs including the eyes. The risk of visual impairment/intracranial pressure (VIIP syndrome) is one of the leading health concerns for NASA.The purpose of this study was to investigate the effects of simulated microgravity using a Random Positioning Machine (RPM) on human adult retinal pigment epithelium (ARPE-19) cells. Cultured ARPE-19 cells were exposed to simulated microgravity for 5 and 10 days (d) following which a subset of ARPE-19 cells formed multicellular spheroids (MCS) whereas the majority of the cells remained adherent (AD). After 5d, alterations in the F-actin cytoskeleton and fibronectin were observed which reverted after 10d-exposure, suggesting a time-dependent adaptation to altered microgravity. Gene expression analysis of 12 genes involved in cell structure, shape, adhesion, migration, and angiogenesis suggested more changes in cells incubated in the RPM for 10d-samples compared to 5d. Eleven of these genes were down-regulated in AD and MCS 10d-RPM-samples compared to 1g-controls, whereas FLK1 was up-regulated in 5d- and 10d-RPM-MCS-samples. Similarly, TIMP1 was found to be up-regulated in both 5d-RPM-AD- and 5d-RPM-MCS-samples whereas the remaining genes were down-regulated in 5d-RPM-samples.Changes in the protein expression of Fibronectin, β-Tubulin, Laminin, vimentin and VEGF were assayed by western blot. Assessment of protein content suggested more changes in the 5d-RPM-samples compared to 10d. Our study revealed microgravity-provoked cytoskeletal alterations of ARPE-19, in addition to changes in cell growth and expression pattern of selected genes involved in cell structure, shape, adhesion, extracellular matrix, migration, and angiogenesis.

3:15 016.037 U **BDL-induced biliary hyperplasia, hepatic injury and fibrosis regulated by paracrine action of mast cells: novel study using mast cell-deficient mice**, *Joanne Elise Thomson, UMHB; Laura Anne Hargrove, Baylor Scott & White Health/Texas A&M HSC/UMHB; Heather Francis, Texas A&M University/Baylor Scott & White Hospital*
Bile duct ligation (BDL) induces cholestasis, which is marked by increased biliary proliferation and fibrosis. Mast cells (MCs) infiltrate the liver following damage and increase (i) histamine (HA), (ii) vascular endothelial growth factor (VEGF), (iii) intrahepatic bile duct mass (IBDM) and (iv) fibrosis. Inhibition of MC-derived HA decreases these parameters. Our aim was to evaluate the effects of BDL in MC deficient mice (KitW-sh). WT and KitW-sh mice were subjected to BDL. Separately, KitW-sh mice were injected with

cultured mast cells or 1XPBS. We collected serum, liver blocks and cholangiocytes. Liver damage was assessed by H&E and serum chemistry. IBDM was detected by CK-19 and proliferation by Ki-67 immunohistochemistry. Fibrosis was detected by Sirius Red/Fast Green staining, hydroxyproline content, and qPCR. Hepatic stellate cell (HSC) activation and TGF-β1 expression/secretion were evaluated. To evaluate vascular cells, Von Willebrand (vWF) and VEGF-C expression were measured. In vitro, HSCs were stimulated with cholangiocyte supernatants from all groups of mice and activation measured by qPCR. BDL-induced liver damage decreased in BDL KitW-sh mice. In BDL KitW-sh mice, IBDM, proliferation, HSC activation/fibrosis and TGF-β1 expression/secretion were decreased. vWF and VEGF-C expression decreased in BDL KitW-sh mice. In KitW-sh mice injected with MCs, IBDM, proliferation, fibrosis and vascular cell activation increased. Stimulation with cholangiocyte supernatants from BDL WT or KitW-sh mice injected with MCs increased HSC activation, which decreased with supernatants from BDL KitW-sh mice. Knockout of MCs decreases BDL-induced damage. Modulation of MCs may be important in developing therapeutics for cholangiopathies.

3:30 016.038 U **Components of Inonotus *obliquus* cytotoxic to cultured 4T1 murine breast cancer cells**, *Jake Augustus Brozek, Wayland Baptist University; Sarah Christin Kelly, Wayland Baptist University; Vianney Trujillo, Wayland Baptist University; Gary Owen Gray, Wayland Baptist University; Adam Joseph Reinhart, Wayland Baptist University*
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 Inonotus obliquus, or the Chaga mushroom, were prepared by refluxing powered Chaga in acetone (Soxhlet extraction, 1.5 hours). The extracts were distilled into ethanol, concentrated, and then fractioned via Sephadex LH20 chromatography (50% ethanol mobile phase; eluate monitored 280 nm). The resulting fractions were assayed for cytotoxicity to cultured 4T1 cells, and the fractions pooled based upon cytotoxicity. 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. Analysis of the physicochemical properties of the six collected peaks is ongoing. Crude extracts were also used to treat 4T1 cells in culture at concentrations of 100, 50, and 25 µg/ml in ethanol. From these protein was extracted and western blots were preformed and normalized to actin to determine expression of Caspases 3, 6, 8, 9, and twelve along with Cleaved forms of Caspases 3 and 8 and PARP. Levels of Caspase 3 and 8 as well as PARP were elevated in higher concentrations of Chaga extract.

3:45 016.039 G **Do Plasticizers Inhibit Toll Like Receptor Activity**, *Kallie Davis, Sam Houston State University*
Although the effects of industrial pollutants, such as plasticizers, on reproductive and metabolic physiology are well-known, their impact on other physiological systems has not been well studied. In particular, inflammation is a critical component of the innate immune response against a variety of pathogens, as well as playing an important role in the wound healing process. A pilot study suggests that exposure to the plasticizing agent dibutyl phthalate (DBP) impairs the inflammatory response downstream of toll-like receptor (TLR)4-mediated activity. In particular, a significant reduction in the release of the pro-inflammatory cytokine interleukin (IL)-6 from dermal fibroblasts was shown after an LPS challenge. We have now expanded our studies to include additional TLR-specific agonists in order to determine whether this effect is broadly applicable to the TLR-mediated inflammatory response in mammals. Understanding the effects of DBP on the inflammatory response is the first step toward revealing whether plasticizers lead to increased cell vulnerability to infections agents.

4:00 016.040 U **Effect of Nutritional Stress on Fecundity and Maternal Provisioning of Oocytes in *Drosophila melanogaster***, *Kamryn N. Gerner-Mauro, St. Edward's University; Vivan A. 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 and maternal provisioning was examined by quantifying the amount of *yolk protein (yp)* mRNA that was deposited into oocytes. Our predictions were that females raised on low protein food would lay fewer eggs and deposit less *yp* mRNA into oocytes than those raised on normal food, while females raised on high protein food would show an increase in fecundity and *yp* mRNA deposition. Preliminary results suggest that females raised on low protein food do lay fewer eggs per day. Quantitative PCR assays are still ongoing to determine the effect on *yp* mRNA production and deposition in oocytes. Development of both low and high protein diets affected time of development and adult yield. Further studies will examine whether nutritional protein stress affects early development of embryos laid to mothers raised on different diets and will test variation in levels of male-male aggression.

4:15 016.041 U **RNA Aptamer Selection Against Glucose Oxidase for Detection of Neisserius Meningitides During Colonization of the Nasopharyngeal Cavity**, *Alexandra Ann Miller, University of Texas at Austin*
Bacterial meningitis is considered almost uniformly fatal, and continues to have an unacceptably high morbidity rate. According to the World Health Organization, approximately 1.2 million cases of bacterial meningitis occur annually worldwide with 135,000 deaths (World Health Organization, 1998). The development of cost-effective and reliable diagnostic and therapeutic technologies will be essential in moderating the spread of the disease in less developed regions with little access to advanced health care. I have proposed an aptamer diagnostic tool that is portable, cost effective, and reliable. Aptamers are oligonucleotide sequences that have a high affinity for a target given selected conditions (Stoltenburg et al., 2007). In vitro bead-based aptamer selection will be utilized in order to find and enrich an aptamer for GOx from the N71 pool that will detect bacterial meningitis caused by N. meningitidis during the colonization of the nasopharyngeal cavity. This will be accomplished using an aptamer for Glucose Oxidase that conjoins with an aptamer that binds to NhhA. The aptamer complex will detect the presence and concentration of the bacteria by detecting the increase in electrical potential caused by production of hydrogen peroxide in a glucometer-like portable device. This approach will be portable and efficient in resource-limited regions. An RNA aptamer selection is underway, and 6 rounds of selection have been completed. Once an aptamer has been selected for GOx and a conjugate aptamer has been selected for NhhA, an affordable, portable, and simple diagnostic tool can be developed for bacterial meningitis.

017. Chemistry & Biochemistry Oral Session II
3:00 to 4:15 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC 125
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session II
Participants:

3:00 017.042 G **Exploration of zirconium-based stain behavior, through an array of temperatures**, *Raul Alejandro Cuevas, University of Texas at El Paso; Russell Chianelli, University of Texas at El Paso; Vincent Burke, University of Texas at El Paso; Keith Pannell, U. T. El Paso*
Zirconium-based stains provide a rich orange color when applied as a glaze for ceramics. Composed of a mixture between a stain and a flux, a glaze, serves to add both texture and color to a sculpture. This study was designed to follow four compounds at different concentrations of stain, from 15% to 30% at intervals of 5% and heated for 12 hours from 200 to 800 oC at increasing intervals of 200 oC. Each step was followed by XRD techniques to characterize the changes occurring. Lastly, an analysis of the orange-expressing test tiles was done and compared to the heated array. These studies will help develop a basis to understand the path taken by the stain at such high temperatures, and the reason for this stain to fail.

3:15 017.043 U **Heats of Combustion of Natural and Artificial Sweeteners**, *Justin Christopher Hughes, Howard Payne University*
Modern day dietetics offer several artificial sweeteners in leu of their natural counterparts, many claim to have near-zero caloric values. Data will be recorded from several Bomb Calorimeter trials involving both artificial and natural sweeteners. *Glucose*, Sucrose, Xylitol, Fructose, Asprtame, and Saccharin, will be included. Information will be compared between the two types and with the tabulated values.

3:30 017.044 N **Inhibition of ergosterol biosynthesis and growth in** *Trypanosoma brucei* **by fluorinated sterols**, *David Leaver, Sul Ross State University; Presheet Patkar, Texas Tech University; Ujjal Singha, Meharry Medical College; Matthew Miller, Texas Tech University; Brad Haubrich, Texas Tech University; Minu Chaudhuri, Meharry Medical College; W. David Nes, Texas Tech University*
Trypanosoma brucei, the causal agent for Human African Trypanosomiasis (HAT) also known as sleeping sickness, depends on ergosterol for growth. 26-Fluorolanosterol (26FL) is a mechanism-based inhibitor of *T. brucei* sterol C24-methyltransferase (24-SMT) and it was observed to exert potent inhibition of ergosterol biosynthesis and growth of procyclic and bloodstream forms of *T. brucei* while having no effect on cholesterol biosynthesis or growth of human epithelial kidney cells. 24-SMT is essential for sterol methylation and function of ergosterol in *T. brucei*, but is absent from the human host, thus providing an opportunity for selective inhibition. These results demonstrate that inhibition of ergosterol biosynthesis by a 26-fluorinated delta-24-sterol is a promising strategy for developing a new treatment for trypanosomiasis.

3:45 017.045 G **Modelling Blood Brain Barrier (BBB) penetration by in-vitro permeability study with the newly formulated cyanide (CN) antidote, dimethyl trisulfide (DMTS)**, *Chathuranga Chinthana Hewa Rahinduwage, Mr; Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Indika Kasun Warnakula, Mr; Afshin Ebrahimpour, Dr.; Ilona Petrikovics, Prof.*
CN inhibits the Cytochrome c Oxidase enzyme, which catalyzes the cell oxygen utilization causing lactic acidosis. As brain and heart are the main oxygen consumers, the CN effects are more prominent on these organs. To protect the brain, the CN antidote should be

able to cross the BBB effectively. DMTS is a naturally occurring compound, found mainly in garlic and onion. DMTS has a promising potential as an antidote for the CN intoxication due to its sulphur donor ability. This study focuses on the ability of newly formulated DMTS to cross the BBB model and effects of the surfactant Polysorbate 80 (P80) and the applied stirring on the DMTS permeability. Different incubation times between 10 and 60 minutes were applied to allow DMTS to distribute between the donor and acceptor parts of sandwiched plates. The donor phase contained 0.8 mg/ mL DMTS (pH of 7.4) with constant stirring. The artificial membrane was impregnated with a BBB-PAMPA (Parallel Artificial Membrane Permeability Assay) lipid cocktail. The DMTS concentrations in the donor and acceptor wells were determined by HPLC with UV detection. Results showed that the presence of the P80 in 0.5 mg/ml concentration didn't make any effect on the DMTS permeability. In addition, the number of stirrers only did make effect on the DMTS concentration in the acceptor phase, but not in the donor phase. In the literature it is recommended to have stirrer only in the donor phase to mimic the passive diffusion of BBB in the PAMPA model.

4:00 017.046 U **Synthesis of 6-fluorocholesterol and its potential use as a mechanism based inhibitor of parasitic nematodes.**, *Adrian Jaime Maldonado, Sul Ross State University; W. David Nes, Texas Tech University; Matthew Miller, Texas Tech University; Wenxu Zhou, Texas Tech University; David Leaver, Sul Ross State University*
Soil transmitted helminth (STH) Infections are commonly found worldwide with the World Health Organization (WHO) estimating that two billion people are infected which corresponds to approximately 24% of the world's population. Currently there is a limited armamentarium of anthelmintic drugs to treat these infections and the drugs now in use are becoming subject to drug resistance and environmental concerns. Helminths do not have the ability to biosynthesize their own sterols and they must obtain them from their host. Sterol A-ring methylase-1 (STRM-1) is a promising drug target as it has been shown that accessibility and modification of the fourth position in the sterol A-ring is required in order for these helminths to reproduce. STRM-1 is unique to helminths and is absent from the human host. Consequently there is great potential to develop selective therapeutics for these parasitic infections by inhibiting the function of STRM-1. The synthesis of 6-fluorocholesterol will be described in detail in addition to its potential use in the treatment of parasitic nematode infections.

018. Marine Science Oral Session I
3:00 to 4:15 pm
York Science Center, YSC 102 - Brindley
Marine Science

Marine Science Oral Session I
Participants:

3:00 018.047 G **Beach Management Practices - Means & Methods of Protecting Galveston Island's Shoreline, Residents, Property, and Tourism Industry.**, *Virginia Greb, TAMUG; Rachel Johnson, TAMUG*
The City of Galveston is located in the Gulf of Mexico on a barrier island 3.22 km wide and 51.50 km long. The island is home to approximately 50,180 residents (U.S. Census Bureau, 2015), and prone to natural disasters such as hurricanes and severe flooding due to storm surge. As a result of these natural occurrences, and a growing population, the city is suffering from significant shoreline erosion. Erosion of Galveston beaches cannot be prevented but the process can be slowed down through soft measures of shoreline protection. Slowing down the process of erosion can be accomplished by employing beneficial use of dredge material (BUDM) acquired from the United States Army Corps of Engineers (USACE). The USACE is responsible for dredging the ship channel every twelve to eighteen months; the fill is ninety-eight percent beach quality sand. Utilizing BUDM is a guaranteed source of sand if funding is available and least expensive method to help protect the shoreline, people, property and tourism industry of Galveston Island. The City has been working to mitigate shoreline erosion by initiating three phases of beach renourishment projects. This paper examines the methods implemented and discusses the difference between non-structural, hard coastal structures, or soft measures of shoreline protection. Texas General Land Office and Galveston Island Park Board of Trustees representatives are interviewed to discuss a cost-benefit-analysis of each project, funding sources, fill material and which method produces the best outcome for the environment and the future of beach renourishment projects.

3:15 018.048 N **Biofilm Colonization of Seagrass Leaves: Responses to Biotic and Abiotic Factors**, *Kirk Cammarata, TX A&M Univ-Corpus Christi; Whitney Roberson, TX A&M University-Corpus Christi; Amie Cuvelier, TX A&M University-Corpus Christi; Meherube Mehrubeoglu, TX A&M University-Corpus Christi; Melissa Fisher, TX A&M University-Corpus Christi; Ariana Kavandi, TX A&M University-Corpus Christi; Shawn Hare, TX A&M University-Corpus Christi*
Our goal is to characterize stressor-driven variation in the accumulation patterns of epiphyte biofilms on seagrasses, and impacts on seagrass function. Seagrass provision of critical estuarine food and habitat is challenged by anthropogenic stressors limiting light, enhancing eutrophication or altering hydrology. Seagrass interactions with environment are mediated by biofilms of epiphytic algae, fungi, bacteria and invertebrates. We quantify accumulation patterns of

algal epiphytes using visible, fluorescence and hyperspectral imaging, traditional biomass measures and metagenomics. Relationships among these community indicators were compared across different sites and through manipulative experiments altering water column nutrients (bottom-up) or epiphyte grazing (top-down) pressure. Fluorescence correlated with epiphyte biomass (r2 0.2 to 0.7) to varying degrees, interpreted as higher correlations observed for samples with similar algal communities, and lower correlations observed for samples with dissimilar algal communities. Fluorescence characteristics provided evidence of algal community change. Comparisons of 3 sites in Redfish Bay, TX yielded similar relationships of epiphyte levels estimated by biomass, fluorescence and hyperspectral imaging. Both nutrient-dosing of the water column and reduction of amphipod and shrimp grazers of epiphytes significantly increased epiphyte loading measured by biomass or fluorescence. DNA sequence-based technologies characterizing the bacterial (16S rRNA) and protist (18S rRNA) components of epiphyte biofilms revealed high assemblage diversity (up to 2000 OTUs per sample). Differences in taxonomic prevalence were observed between sampling sites, nutrient supplementation and seagrass host species. Future work will include calibration of image analysis, and gene expression studies of both the seagrasses and biofilms. Support: TGLO, TPWD, USDA, TAMU-CC, GCAT-SEEK

3:30 018.049 U **Identification of Sargassum Occurrences via Color Recognition of Satellite Images**, *Karthik Ramaswamy, Texas A&M University at Galveston; Sidney Marie Ramos, Texas A&M University at Galveston; Arturo Ignacio Guzman, Texas A&M Univesity*

Sargassum (*Sargassum natans* and *Sargassum fluitans*)is a free floating, yellow marine algae that originates in the Sargasso Sea. It has distinct, air-filled, grape-like structures which keep the algae afloat. While originating in the Sargasso Sea, sargassum appears throughout the Gulf of Mexico via the Coriolis effect and the Gulf Stream and blooms in great quantities near barrier islands. Previously, researches have used satellites such as the Landsat 07 and 08 to track and predict the movement of sargassum in the Gulf of Mexico. However, there was no method to quantify the amount of sargassum present. This project seeks to refine a computer program, using C++ language. that analyzes satellite images of sargassum in the Gulf and will quantify the amount present. The program disperses a satellite image into 50 x 50 pixel sections. The program then uses process of elimination; it omits areas that have RGB color values associated with other objects than sargassum. The resulting photo highlights sargassum patches. The program will be refined to scan the image for a gradient, which muddles the image. If the gradient exists, then it overlays the original image with a mirrored gradient to even the color display. The program will also be edited to predict the amount of sargassum in a certain patch based on its RGB saturation, once RGB value ranges are correlated to sargassum patch densities, measured in pounds per square foot.

3:45 018.050 U **Ortho-Phosphate Concentration in Coral Reef Waters**, *Melissa Wood, University of Texas of the Permian Basin; Thomas Ready, Midland College*

Coral reefs have been challenged by environmental changes over the past few decades. These challenges include hurricanes, El Nino events, and acidification of the ocean waters. Phosphorus is an essential element for sea life proliferation as it is incorporated in genetic material. (soluble PO4-3) Ortho-Phosphate is the predominant form of phosphorus in benthic waters and its concentration is directly related to the health of sea life including corals. The objectives of this research were two-fold: a.) to measure ortho-phosphate concentrations on the Roatan island coral reef; and b.) determine if there were any statistically significant difference in ortho-phosphate concentrations between the water immediately above healthy coral vs. diseased coral. The most prolific and reliable measure of ortho-phosphate concentration is the molybdic acid/potassium antimonyl tartrate/ascorbic acid protocol which binds to soluble phosphate producing an intense blue color which can be quantified via visible absorption spectroscopy. Water samples were obtained by the Midland College scuba diving team at 5 different locations along the Roatan, Honduras island coral reef. At each of these locations, samples were acquired in the water column directly above Orbicilla (formerly Montestrea) annularis corals for both healthy coral specimens and diseased coral specimens. Our results show that the ortho-phosphate concentrations in these waters were all less than 0.11 ppm. These results were corroborated by A&B Laboratories (Houston, Texas). Although we see slight differences in ortho-phosphate concentrations between healthy and diseased coral, these differences are close the detection limit of the experiment.

4:00 018.051 G **Parasitism and Fatty Liver Disease in *Pterois volitans* along the Gulf of Mexico, Atlantic Coast, and the Caribbean**, *Danielle Fails, Sam Houston State University*

Invasive species are known to be detrimental to both the economy as well as to environmental stability. One of the most successful invaders to date is the red lionfish, Pterois volitans, which first invaded the western hemisphere around 30 years ago. In this short amount of time, the lionfish has decimated native fish populations at a rate of roughly 7,500 lbs. per acre per year. Not only are these fish extremely efficient hunters, but they have no natural predators and seem to be fairly resistant to parasitism. To date, few species of

parasites have been found in lionfish and studies show that even when infected, lionfish display no negative host effects due to the presence of parasites. With such low susceptibility to parasitism, the lionfish have been able to establish populations along the length of the Gulf of Mexico as well as the Caribbean and northern parts of South America. Early results indicate a prevalence of 0% in lionfish collected from sites in Florida and Texas. Using these preliminary results compounded with liver histology work, a better understanding as to the mechanism that is contributing to the success of the invasive lionfish may be achieved. Collection of data along the Gulf of Mexico and Atlantic Coast has been completed and sample processing from the Caribbean is underway. The expansion of the project may open opportunities for parasitism research following geographic distribution, climate effects, and natural predator influences.

4:15 018.052 U **Prevalence of white band disease, type I and II, on *Acropora cervicornis* of the Mesoamerican Reef in Utila, Honduras**, *John Phelps, McLennan Community College; Stephanie Lockwood, Texas Tech University at Waco; Traesha Robertson, College of Coastal Georgia; Donna Hamilton, University of North Texas-Dallas; Stephanie Randell, McLennan Community College*
White Band Disease (WBD) has killed up to 95% of *Acropora cervicornis* since it was first observed in 1979. The loss of *Acropora* spp. has altered reef zonation and led to geomorphological changes to the Mesoamerican Reef and is predicted to lead to significant ecosystem degradation and loss of biodiversity throughout the Caribbean. This study assessed prevalence and percentage of diseased surface area of WBD, Type I and II, on Acropora cervicornis of the Mesoamerican Reef in Utila, Honduras. Higher prevalence of WBD on larger colonies at greater depths was expected. The study was conducted twice on alternating mooring sides at five dive sites of the subtropical island. Visual surveys were conducted in non-overlapping corridors from 15 m to 4 m with a quadrat and imaging software to calculate percent cover. All sites had WBD Type I, most had both I and II. Three-spot damselfish associations with *A. cervicornis* were marginally correlated with WBD prevalence. Contrary to expectations, *A. cervicornis* colonies were larger and had higher prevalence and percent cover of WBD at shallower depths. This may be due to the location of the larger colonies and higher prevalence of WBD off the most developed southern shore. Age and longer exposure to stressors may also contribute to prevalence and WBD percent cover. Further research on shallow water conditions of Utila and analysis of age of coral distributed across depth could build understanding of WBD dynamics.

019. Physics & Engineering Oral Session and Section Meeting
3:00 to 3:30 pm
Wells Science Hall, WSH 239
Engineering/Physics
Physics & Engineering Oral Session and Section Meeting
Participants:

3:00 019.053 U **Laser Frequency Combs and the Search for Exoplanets**, *Bella Ferranti, Southwestern University*
The laser frequency comb is an array of uniformly spaced optical frequencies that is analogous to a ruler for measuring the frequency or wavelength of light. As a precision measurement tool, it has revolutionized several calibration processes and aided in the development of optical atomic clocks, high-speed communication, waveform synthesis, and accurate metrology and spectroscopy measurements. Through the application of laser frequency combs in astronomical spectroscopy, the search for earthlike planets is becoming more feasible. Periodic Doppler shifts in the stellar spectrum of the parent star are the signature of an orbiting planet. However, for an earthlike planet orbiting a star like our sun, the Doppler shift is only 10 cm/s, or fractionally 3E-10, and its detection would be impossible without the aid of an "astrocomb". The astrocomb's ability to detect these minute frequency shifts is heavily dependent upon the stability of the comb itself. To ensure the overall reliability of one astrocomb in the making, I measured the frequency of a constant-wavelength laser which will ultimately serve as the astrocomb's reference and center wavelength. These measurements and their continuation, though seemingly minor, may ultimately help provide answers to some of our greatest questions regarding our planet's uniqueness and its place within the universe.

020. Science Education Oral Session II
3:00 to 4:30 pm
Wells Science Hall, WSH 131
Science Education
Science Education Oral Session II
Participants:

3:00 020.055 U **Elementary Pre-Service Teachers and Renewable Energy Education**, *Shebly Garbee, Lamar University; Mamta Singh, Lamar University*
The purpose of this study was to investigate knowledge and attitudes of elementary pre-service teachers towards renewable energy resources. Participants for this study were students enrolled in science methods for teachers course. Content knowledge pre-posttests and energy attitude survey were used to measure research objectives. As a result of this study, elementary pre-service teachers were educated on renewable energy resources as indicated by a difference in pre-posttests' result which was statically significant ($p < 0.05$). Additionally, the participants were able to develop

energy-related lesson plans that can be taught in elementary classroom.

3:15 020.056 N **Introducing Active Learning into the Biochemistry Classroom**, *Mary Kopecki-Fjetland, St. Edward's University*
A growing body of evidence indicates that students who actively engage with course material end up retaining it for much longer than they would have otherwise, and they are better able to apply their knowledge broadly. In active learning, unlike traditional lectures, students engage in some activity that forces them to reflect upon ideas and how they are using those ideas thus giving students the main responsibility for their own learning. An exponential growth of knowledge, development of new technology, and difficulty articulating knowledge areas in a field that was traditionally taught separately presents a unique challenge in teaching biochemistry in today's classroom. To overcome this challenge, active learning strategies such as a problem-based activity workbook and problem-based worksheets were progressively implemented into an upper division Biochemistry survey course with the goal of improving overall student critical thinking skills, student engagement, student motivation and collaboration between students for problem solving. Students were assessed using graded assignments and a pre and post exam targeting common misconceptions in biochemistry. Student survey results, post exam results, and in-class observations of student interactions indicate that these exercises enhanced student engagement during class time, increased collaboration in solving problems, and improved their ability to explain and correct their own misconceptions. Overall students enthusiastically recommended continued utilization of these active learning exercises in the course.

3:30 020.057 G **Pre-Service Teacher's Knowledge**, *Anthony Petrosino, University of Texas at Austin; Michele Johnson Mann, University of Texas at Austin*
This research evaluates the science content knowledge of 133 pre-service teachers with a high disciplinary content background and good pedagogy background (HDB), 121 pre-service teachers with a typical college disciplinary background and high pedagogy background (TDB) and a subpopulation of the university population of 100 students with typical college disciplinary background and no pedagogical background (TDPB). The participants took a survey of released science Praxis questions. A pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons and an effect size was determined. Earth science questions revealed statistically significant differences between the TDB(Mdn=24.00) and HDB(Mdn=25.00) (p=.017) but not between the TDPB(Mdn=25.00) or any TDPB group combination. Science processes questions revealed statistically significant differences between the groups TDB(Mdn=15) and HDB(Mdn=17) (p=.002) and between TDPB(Mdn=15) and HDB(Mdn=17) (p=.000) but not between the TDPB(Mdn=15) and HDB(Mdn=15). Life sciences questions revealed statistically significant differences in groups between the TDB(Mdn=22) and HDB(Mdn=26) (p=.000) and between TDPB(Mdn=24) and HDB(Mdn=26) (p=.000) but not between the TDPB(Mdn=24) and TDB(Mdn=22) and physical science questions revealed statistically significant differences in groups between the TDB(Mdn=33) and HDB (Mdn=35) (p=.000) and between TDPB(Mdn=30) and HDB(Mdn=35) (p=.000) but not between the TDPB(Mdn=30) and TDB(Mdn=33). Students from a program which emphasized high disciplinary knowledge scored best on content and pedagogy questions. Students with no STEM or education major scored as well and sometimes better than the group of students with typical disciplinary content and high pedagogical content knowledge and less than the high disciplinary knowledge students.

3:45 020.058 N **Principal Impact on STEM Teaching and Learning**, *Denise Kern, Texas State University*
Mix It Up is a Teacher Quality grant-funded professional development (PD) program for grades 5-8 math and science teacher teams and their principals designed to integrate math and science instruction incorporating best practices and inquiry based learning. When STEM principals participated in the PD with their math and science teachers, the principals had a better understanding of STEM instruction, the teachers felt more supported and had a more collaborative relationship with their principal. It was also observed that decisions made by principals enhanced or impeded high quality STEM instruction and student learning. Next research questions will include how the PD impacts principals who participate with their teachers, how the principal's role impacts STEM learning on their campus, how the principal's role impacts the campus climate, culture and discipline policies, and how the principal's role impacts student learning and student achievement. Teachers will be surveyed for their perceptions of their principal. Principals will complete a self assessment, and will be asked to grant access to their T-PESS self assessment.

4:00 020.059 N **Private-Academic Partnerships in Education**, *Derek L. Smith, Howard Payne University*
Independent, guided research projects are a staple of the scientific undergraduate experience; beneficial for the student currently and providing valuable experience to be referenced in future applications. While there is no limit to the grandiosity of objectives that aspiring young scientists may target, these projects may be superficially limited in their complexity due to lack of

funds--always a challenge in academic departments but, specifically, in small private schools. This presentation begins with the premise that existing relationships within an academician's sphere but intentionally outside of the academic environment may be capitalized upon simply because of existing personal rapport and credibility and availed to generate dedicated funds for student research projects. In this process students are required to develop a concise problem statement and budget proposal and pitch the project idea to these potential benefactors, invited by the instructor-mentor, as they would to an investor in a capital enterprise. Financial benefactors become beneficiaries in this exercise; as in this highly promoted event their enterprises are advanced and new targeted, charitable avenues are established. Students benefit from the rigor of preparing a summary business plan in advance of the short-term project, from the increased accountability and from the potential for a life-long mentoring relationship with an established professional. The advisor benefits from the added dimension to existing relationships and from the prospect of an enlarged network. Results from the initial foray into this model will be presented and future refinements discussed with peers in similar positions of academic and professional oversight.

4:15 020.060 N **The Coming Science Teacher Professional Development Upheaval**, *Sandra S. West, Texas State University; Denise Kern, Texas State University*
The Eisenhower PD program, Elementary and Secondary Education Act (ESEA)1984-1999 grew from $90 B to $251B. It was reauthorized as the Eisenhower Mathematics and Science Education program in 1994 to provide financial assistance to state and local education agencies and to institutions of higher education to support sustained and intensive high-quality professional development, and to ensure that all teachers will provide challenging learning experiences for their students in elementary and secondary schools. The program also focuses attention on meeting the educational needs of diverse student populations, including females, minorities, individuals with disabilities, individuals with limited English proficiency (LEP), and economically disadvantaged individuals, to give all students the opportunity to achieve to challenging state standards. Reauthorization also expanded the program, at state and local option, to include all core subjects (instead of only math and science). This funding ends at the 2017-2018 cycle. ESSA, Every Student Succeeds Act, rolls back much of the federal role in education policy and gives states much of that authority. A new block grant of $1.6 B consolidates many parts, including the Teacher Quality PD grants. Those Title 2 funds will be distributed by TEA, but no information has been forthcoming.

021. Systematics & Evolutionary Biology Oral Session I
3:00 to 4:30 pm
Wells Science Hall, WSH 341
Systematics & Evolutionary Biology
Systematics & Evolutionary Biology Oral Session I
Participants:

3:00 021.061 G **A preliminary study of the relationships among the species of genus** *Mengenilla* **(Strepsiptera: Mengenillidae), insights on** *M. chobauti*, *Dorothy Chipo Madamba, Sam Houston State University; Jerry L Cook, Sam Houston State University*
Genus *Mengenilla* has 20 described species but 11 accepted species names. Its sister group is genus *Eoxenos* and both genera together with genus *Congoxenos* are part of family Mengenillidae. An immediate sister group to the family Mengenillidae is the monotypic family Bahiaxenidae. The species *Mengenilla chobauti* (Hofeneder, 1910) was described as synonymous with *Tetrozocera santchii* (Pierce, 1918) by Kinzelbach despite the difference in thoracic morphology suggested by Pierce, particularly the scutellum and praescutum and is lumped with 9 other described taxa as synonyms of *Mengenilla chobauti*, citing the possibility that geographic isolation led to the noticeable slight morphological differences among the species. This study is the first to conduct a phylogenetic analysis at the species level to explore these relationships, focusing on adult male characteristics. Twenty-three taxa (including *Bahiaxenos* and *Eoxenos* as outgroups) were examined for 33 general, head, thorax and abdomen morphological characters. A phylogenetic analysis is conducted for the 23 described species of *Megenilla*, *Eoxenos* and *Bahiaxenos* to verify monophyly of *Mengenilla* and to authenticate Kinzelbach's argument on the status of *Mengenilla chobauti* and its synonyms. Authors including Pierce (1918) and Cook (2007) feel that *M. chobauti* synonyms are sufficiently morphologically diverse to be separate species. We expect to separate the lumped synonyms of *M. chobauti* and trace the nature of character evolution within the genus *Mengenilla*.

3:15 021.062 U **Do promiscuous females explore new territories to mate multiply despite higher levels of coercion?**, *Nicholas Ashley, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University*
Females with the ability to select and store sperm for fertilization have been identified as the main influence of offspring quality and quantity. Studies indicate that females optimize rather than maximize offspring; therefore, females desire a variety of male sperm to increase offspring fitness. In systems where females store sperm and are subject to high levels of male harassment (e.g. livebearing fishes), females may use tactics to increase genetic variation via mating with multiple males. Exploratory behaviors by females may be a good proxy to measure mechanisms by which

females enhance genetic variation of offspring, but decrease male harassment. We predicted that female guppies, *Poecilia reticulata*, are more likely to explore new environments in the presence of multiple males, and when males and females were allowed to make direct contact vs. no contact. We recorded two measures of female exploratory behavior—latency time for the female to emerge out of a provided shelter and distance traveled. Male densities ranged from one to three. We also measured male behaviors (mating and courtship) toward each female. We found no differences across treatments for either measure of female exploration. However, both sigmoidal and gonopodial displays by males were significantly greater in no contact treatments, indicating that male courtship behaviors are important when males cannot make physical contact with females. It is possible that the density threshold for harassment in guppies is greater than 3 males, and therefore, future studies should investigate female exploratory behaviors under differing conditions, including higher densities of males.

3:30 021.063 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; Raelynn Deaton Haynes, 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. This hypothesis predicts that individuals will respond less aggressively to neighbors than to non-neighbors. 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 *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. Preliminary results confirm that aggressive behaviors decrease over time, though only subordinate females display aggressive behaviors to novel females. This shows that, in part, this evolutionary principle is also applicable to this sex-role reversed system.

3:45 021.064 U **How do dominance hierarchies differ between males of two species of livebearing fishes?**, *Kaitlyn E. Matthey, Student; Raelynn Deaton Haynes, St. Edward's University*
Dominance hierarchies form in organisms that compete heavily for resources, territories, or mates, and less frequently when social dynamics change rapidly. Livebearing fishes of the genus *Gambusia* are shoaling organisms and males are aggressive, mating coercively with females. Studies have shown dominance hierarchies in the related guppy, but no studies to our knowledge have sought to understand whether purely coercive male species establish dominance hierarchies. Because mating and aggressive interactions are dynamic, we ask whether male mosquitofishes establish clear dominance hierarchies. Using two species, *Gambusia affinis* and *Gambusia geiseri*, we observed if a dominance hierarchy is clearly formed and delineated as well as how they were formed. Additionally, we compare and contrast how two closely related species are forming their dominance hierarchies. *Gambusia affinis* males do, in fact, establish dominance hierarches and do so quickly after first interaction based off of mating behaviors with the female. However, *Gambusia geiseri* are not as aggressive and coercive as *G. affinis*, so we predicted that their hierarchies would be formed on different behaviors, if at all. Thus, we compare our data from *G. affinis* with its congener *G. geiseri* to determine whether the less aggressive male congeners also establish clear hierarchies. To date, results suggest that both species form dominance hierarchies based on mating, rather than aggressive, behaviors. In addition,*G. affinis* form more delineated hierarchies than do male *G. geiseri*. These comparative data provide insights into the evolutionary significance of defined dominance hierarchies in socially dynamic organisms.

4:00 021.065 U **How long does it take male mosquitofish to replenish sperm reserves?**, *Sarah Joanne Morton, St. Edward's University; Raelynn Deaton Haynes, St. Edward's University; Joshua Francisco Rios, St. Edwards University; Skylor Ryan Matchett, St. Edward's University; Nicholas Ashley, St. Edward's University; Kaitlyn E. Matthey, Student*
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 mosquitofishes under varied rearing conditions (virgins never exposed to female vs. male 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 the male to a female and collected sperm at time 30 min, 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.

4:15 021.066 G **Population Genetics of a Fungal Amphibian Pathogen in Texas**, *Thomas Marshall, Texas State University; Michael Forstner, Department of Biology, Texas State University*
Chytridiomycosis, an emerging infectious disease caused by the fungal pathogen *Batrachochytrium dendrobatidis (Bd)*, is responsible for declines in amphibian populations worldwide. *Bd* was first described in the 1990s, and there is still much to learn about its regional diversity and origin. The Global Panzootic Lineage (*Bd*-GPL) has been responsible for devastating amphibian population declines and extinctions in Central and South America, Australia, and the western U.S., while a few localized endemic lineages have recently been discovered in regions that have not experienced major disease outbreaks. There are still several geographic gaps in our knowledge of *Bd* genetics, and relatively few studies have focused on regions in which *Bd* exhibits low virulence, creating a bias in our current knowledge of the pathogen's diversity. One such region that has not seen disease-associated declines is the state of Texas. Although this pathogen has been detected from amphibians in the state, strains had not been characterized genetically prior to this study. Here, we isolated, cultured, and genotyped strains of *Bd* in Texas. Our results indicate a diversity of *Bd* genotypes in the state, but all strains analyzed thus far belong to the invasive GPL. By turning our attention to regions such as Texas, we seek to gain a more complete evolutionary picture of *Bd*, and a better understanding of why chytridiomycosis outbreaks that impact amphibian populations tend to occur in certain areas and not others.

022. Terrestrial Ecology and Management Oral Session I
3:00 to 4:30 pm
Wells Science Hall, WSH 241
Terrestrial Ecology and Management

Terrestrial Ecology and Management Oral Session I
Participants:

3:00 022.067 N **Amphibians and Reptiles of C. E. Miller Ranch and the Sierra Vieja Range, Chihuahuan Desert, Texas, USA.**, *Drew Davis, University of South Dakota; Travis LaDuc, University of Texas at Austin*
An intensive, month-long vertebrate and vegetation survey conducted in 1948 on the C.E. Miller Ranch (Jeff Davis and Presidio counties, TX) was one of the first large-scale surveys conducted in the Trans-Pecos/Chihuahuan Desert. Several papers, based on large voucher collections, were produced from the survey, further elucidating the biodiversity and distributions of an underexplored region of the state, the Sierra Vieja Range. Following more than a decade of recent of herpetological work (2004-2013) on the 133 sq km C. E. Miller Ranch, we report occurrences of 50 species of amphibians and reptiles and comment on their distributions and abundance in various habitat associations of the region. Of these 50 species detected in recent surveys, six were not collected in 1948 and an additional three species documented in 1948 have yet to be detected in over a 13-year period of recent surveys. Land stewardship and conservation practices have likely contributed to the persistence of the majority of these species through time. Additionally, we comment on the perceived status of amphibians and reptiles from this region and potential species yet to be detection from this region.

3:15 022.068 G **A survey of insects and arachnids found in the nests of Carolina Wrens (***Thryothorus ludovicianus***) in urban and rural environments**, *Faith Byrd Kuchenbecker, Sam Houston State University; Diane LH Neudorf, Sam Houston State University*
As urban sprawl increases, the need for better understanding of anthropogenic effects on songbirds also increases. We evaluated how plant community and human dwellings impact arthropod communities found in the nests of a cavity-nesting songbird species, the Carolina Wren (*Thryothorus ludovicianus*). Avian nests are important habitats for arthropod species that live and reproduce in nesting material. Alteration of native plant communities, combined with urbanization may cause shifts in the community structure of nest-dwelling arthropods including parasitic mite and louse species that are known to decrease the fitness of nestlings. We compared nest-dwelling arthropod populations between and among nests collected in urban and rural environments. Nest boxes were placed in the yards of Huntsville, Texas residents, and at a field research station belonging to Sam Houston State University. Shortly after the nestlings fledged, nests were removed and placed in a sealed container so that all arthropods could be collected and identified. Species richness and abundances of arthropods in each nest were compared between the urban and rural study areas. Plant cover

and native and non-native plant predominance was assessed to determine if plant community structure in areas near a nest related to a measurable difference in the arthropod community. Preliminary results suggest species richness was greater in the rural habitat.

3:30 022.069 G **Insect Pollinator Diversity and Other Associates of Saltcedar (*Tamarix* sp) along the Rio Grande in Presidio County, Texas**, *Alexandria Hassenflu, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*
Tamarix sp. was 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. As part of this study, a combination of pan trapping and observational techniques, supplemented with sweep netting and hand capturing techniques, was used to assess the pollinators associated with salt cedar. A total of six trees at five different sites were compared to an equal number of native trees at the same sites along the Rio Grande. Each tree had three differently colored pan traps placed at its base for 24 hours, and was observed for pollinator activity for 15 minutes at the time of pan trap placement. Sampling began in April biweekly during the ends of the project and weekly during the summer months. and concluded in November 2016. Insects collected were returned to the Jim V Richerson Invertebrate Collection for sorting, pinning, and identification. Although the specimens are still under examination, a breakdown of the families of insects and their abundances associated with saltcedar will be compared against those associated with native vegetation.

3:45 022.070 G **Mating behavior and parasitism of *Tamarixia radiata* , a biological control agent for *Diaphorina citri* , Heather Hernandez, University of Texas Rio Grande Valley; Daniel Flores, USDA APHIS PPQ S&T CPHST Mission Laboratory; Christopher Vitek, University of Texas Rio Grande Valley**
The Asian citrus psyllid (ACP), *Diaphorina citric*, is an efficient vector of the bacterium *Candidatus liberibacter asiaticus*, associated with the deadly citrus disease Huanglongbing (HLB), or citrus greening disease. HLB spreads rapidly and is expanding its geographical range, threatening citrus industries in new areas. A Pakistani strain of *Tamarixia radiata* is successfully being used as a biological control agent for *D. citri* in the Rio Grande Valley, Texas. The USDA-APHIS Mission Laboratory is mass rearing the parasitoid and shipping large numbers to be released in urban environments for the biological control of ACP. Optimal biological control of ACP requires the ability to develop and enhance rearing methodologies in order to effectively and efficiently mass produce *T. radiata* release. In this study, we examined the mating behavior of *T. radiata* males and the impact of parasitism based on *D. citri* densities. Male *T. radiata* were significantly longer than females which was revealed to have a positive correlation with mating success. Parasitism rate showed to increase up to an average of 88.8% as densities of *D. citri* were increased. These results will help improve mass rearing strategies and success to aid in the biological control program in citrus producing regions.

4:00 022.071 N **Resurgence of the tamarisk beetle on saltcedar and athel along the Río Grande, with notes on other biocontrols**, *Christopher M. Ritzi, Sul Ross State University; Alexandria Hassenflu, 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 been light or absent in the past two years, significant defoliation events were observed in 2016 due to subtropical beetle activity. Also of note was the continued presence and spread of the splendid tamarisk weevil, as well as documented defoliation by tamarisk scale in the same region.

4:15 022.072 U **Using VHF Radio Telemetry to Determine Home Range and Habitat Use of Ladder-backed Woodpeckers (*Picoides scalaris*) in the Texas Panhandle.**, *Victoria Kristine Solis, Wayland Baptist University; Andrew Kasner, Wayland Baptist University*
Ladder-backed Woodpeckers (*Picoides scalaris*) were tracked using VHF radio telemetry in Blanco Canyon, near Floydada, TX to determine home range and core territory sizes of individuals, habitat associations, and tree species use for males and females. A total of 7 (4 females and 3 males) woodpeckers were tracked throughout the summer months from May-Aug 2016,

resulting in 138 point locations (about 20 point locations per woodpecker). Average home range size for all 7 birds was 78,226.65 m2 (33,669.46 - 126,124.72 m2). Average home range for females was 89,497.39 m2, and average home range for males was 63,198.99 m2. Home range sizes were not significantly different for males and females (T=1.22, P=0.289, df=4). Average core territory size for all birds was 1,106.59 m2 (459.31 - 2442.32 m2). Average core territory for males was 1302.88 m2, and average core territory for females was 830.57 m2. Core territory sizes were not significantly different for males and females (T=-0.76, P=0.528, df=2). Plant species richness was higher at male point locations (average total richness=3.93) than female point locations (average total richness=3.05) (T=-2.83, P=0.008, df=32). Male woodpeckers were located more often in areas with more mesophytic plant species near the riparian corridor, and females were present in xeric areas adjacent to the riparian corridor. Tree use by males and females reflected these associations, with females using mesquite (*Prosopis glandulosa*) and hackberry (*Celtis occidentalis*) more often, and males using elm (*Ulmus* sp.) and other mesophytic trees more often.

023. Poster Session I
4:30 to 6:00 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC Hallway
Anthropology
Anthropology Posters
Participants:

023.073 N **Dental Indicators of Diet among the Terminal Classic Maya at Colha, Belize: An Analysis of Dental Caries in the Skull Pit**, *Meagan D Moorman, Texas A&M University; Kristin Hoffmeister, Texas A&M University*
The ancient Maya of Central America were a complex society known for their monumental architecture, elaborate writing system, and material culture. The archaeological site of Colha, Belize has generated insight into the complex social processes that occurred among the Maya during the Terminal Classic. In particular, the Colha Skull Pit feature suggests that the Terminal Classic was characterized by violence and warfare. The Skull Pit consists of the cranial remains and vertebrae of thirty individuals that range in age from subadult to old adult and include both males and females. Many of these individuals also exhibit perimortem cut marks on several aspects of the skull. The identities of these people are uncertain, and possible interpretations vary. These individuals could be a vanquished elite group killed by foreign invaders, human sacrifices, or an elite group toppled by their own people. One way to investigate the people in the Skull Pit is through their dental remains. Specifically, caries ("cavities") are pathologies in teeth that form from a diet high in sugar and carbohydrates. In the present study, we scored caries on all available dentition from the Terminal Classic period at Colha. We compared the caries prevalence between the Skull Pit individuals and those buried in contemporaneous Terminal Classic deposits in order to examine dietary differences between these groups that further reveal the identities of the Skull Pit individuals. Determining the circumstances surrounding this strange deposit will allow more insight into the Maya during the Terminal Classic period.

023.074 N **Meta-Analysis of Geometric Morphometrics in Anthropology**, *Robert Z. Selden, Stephen F. Austin State University; Kersten Bergstrom, Texas A&M University*
Through the use of publications and their cited references harvested from Scopus, we generated an interactive directed bipartite citation network for geometric morphometric applications in anthropology using Gephi 0.9.1. The network was subsequently filtered to include only those nodes with a degree of two or higher. InDegree and OutDegree were used to identify and illustrate publications and references central to each of the communities identified in the study. Using the citation network as an epistemological tool, practitioners can identify schools of thought or practice, references with the highest overall authority, references central to each school of thought or practice, and the within-field publications that are cited most. Practitioners may then view and actively explore the progression of those publications, and the references that they cited, in graphical form.

023.075 G **Migration in the southeastern Colonial Maya frontier: Oxygen and carbon isotopic evidence from the site of Tipu, Belize.**, *Willa Trask, Texas A&M University*
This project identifies the geographic origin of a subset of 588 Maya buried at Tipu (N=198), an early Colonial Period visita mission cemetery. Situated at a geographic and cultural frontier, Tipu experienced a dynamic history of fluctuating political alliances and was instrumental in early Colonial frontier politics and trade. Ethnohistoric records indicate that this remote community functioned as a refuge for a large southern exodus of indigenous Maya escaping oppression, forced labor, and other hardships encountered in northern Yucatan regions more firmly under Spanish control. To test whether the frontier community of Tipu functioned as a haven for refugee Yucatec Maya, stable oxygen ($\delta^{18}O$) and carbon ($\delta^{13}C$) isotope values are obtained from 179 individuals recovered from early Colonial Period contexts at Tipu, in order to estimate geographic location of birth and assess broad dietary patterns in birth place. Additionally, $\delta^{18}O$ and $\delta^{13}C$ values from nineteen Postclassic individuals are utilized to

understand and contextualize regional population movements immediately prior to the arrival of the Spanish. A statistically significant difference in the distribution of δ18O values is found between the Postclassic and Colonial time periods ($p<0.05$). δ18O values obtained from Colonial period burials indicate a majority of individuals originated in the northern and southern Maya lowlands, including Spanish occupied regions. Interestingly, 5% of the Colonial period population has extremely enriched δ18O values, consistent with individuals raised near evaporative lakes in the Itza Maya occupied Petén region. This confirms Tipu's role as a dynamic frontier during the early Colonial period.

Biomedical

Biomedical Posters

Participants:

023.076 U *An Assessment of the Impact of Slime layers Isolated from Probiotic Lactobacilli on the Metabolic Activity of Pathogenic Bacterial Biofilms.*, *Priscilla Escareno, University of the Incarnate Word*
Maintenance of the normal microbial flora constitutes one of the first lines of immunity against colonization of opportunistic pathogens. Lactobacillus is considered a beneficial probiotic due to its ability to maintain low pH environment, bacteriocin production, and in some species, strong adherence to intestinal and vaginal cells. Lactobacilli slime (S-layer), a loosely organized cell wall structure, also plays a role in adherence to these cells. This study investigated the effect of S-layer extracts isolated from selected species of lactobacilli on biofilm development of Pseudomonas aeruginosa, Cronobacter muytjensii and Stenotrophomonas maltophilia. P. aeruginosa is commonly in skin flora while S. maltophilia is in humid areas. C. muytjensii, while unfamiliar, is found to be infectious to infants. It is hypothesized that lactobacilli S-layers will have a differential effect by interfering with pathogenic biofilm development in a species-specific manner. S-layers from Lactobacillus crispatus, Lactobacillus acidophilus, Lactobacillus coleohominis and Lactobacillus iners were extracted using guanidium hydrochloride, dialyzed, and subsequently lyophilized to prevent proteolytic degradation. Extracts were reconstituted in saline and protein concentration was assessed. Analysis and comparison of S-layer proteins present in each lactobacilli species yielded no proteins which were unique to any of the species. Biofilm assays, measuring metabolic activity, as assessed by the reduction of tetrazolium salt (XTT), were conducted by co-incubation of each lactobacilli S-layer extract at varying concentrations with individual pathogenic biofilms at various time points. Early results suggest that lactobacilli S-layers may be stimulatory to the development of pathogenic biofilms. Future studies may yield the mechanism of this interaction.

023.077 U **Bacteriostatic Effectiveness of Tea Tree Oil against E. coli in Popular Recipes for Home Remedies**, *Mackenzie Sautter, UMHB; Joni Henrik Ylostalo, University of Mary Hardin-Baylor*
Tea tree oil (TTO) is a popular oil with many uses. One such use is as a bacteriocidal/bacteriostatic agent and it is recommended by many popular websites to clean various home items. These recipes vary significantly and the brand of TTO is rarely specified. This experiment was designed to test different brands of TTO to see if there are any differences in bacteriostatic effect. Four different "recipes" of TTO were also tested with concentrations ranging from 0.06 - 2.1%. While most recipes specified adding vinegar, only water and TTO were used to test only the effectiveness of the oil with the assumption of 0.05 mL/drop. Using turbidity tests on Escherichia coli, initial results using one brand of TTO show that at these varying concentrations the TTO was not able to significantly inhibit the bacteria. The brands were also tested against each other at a concentration of 1.0%. There was a significant difference in bacteriostatic effect which will be investigated more along with the GC/MS data from each brand. Further testing will be performed on gram positive bacteria and using the other brands of TTO at the concentrations given by the recipes.

023.078 U **Does nicotine consumption affect the growth of** *Lactobacillus bulgaricus* **in the human oral cavity?**, *Bianca Marie Rosas, St. Edward's University; Tiffany Chang, St. Edward's University; Robert Ramirez, St. Edward's University; Teresa Bilinski, St. Edward's University*
Over recent decades, probiotics have been studied intensively as more findings suggest they fight or neutralize non-beneficial bacteria in the gastrointestinal tract. While this plethora of research lends more insight into the possible efficacy of probiotics in digestion regulation, the effects they have in the human oral cavity are only recently being investigated. Furthermore, nicotine has been found to aid the biofilm formation of bacteria such as *Streptococcus gordonii* and allows other oral bacteria to colonize and create dental plaque that lead to gingivitis and periodontal disease. Due to the limited amount of research on the effects of nicotine on probiotics, the purpose of this study is to determine whether nicotine has an affect on the growth of an oral probiotic like *Lactobacillus bulgaricus*. We isolated *L. bulgaricus* and *S. salivarius* from pure cultures and grew them together in an MRS tube. We then grew the bacterial samples on MRS plates with nicotine disks and recorded the zones of inhibition (ZOI) of nicotine. Nicotine concentrations of 40μL, 50μL, and 60 μL displayed average ZOI of 2.067 cm, 2.233 cm and 2.317 cm, respectively. These results show that nicotine inhibits the growth of *L. bulgaricus*. This research indicates that the efficacy of probiotics is hindered in the presence of nicotine, which may suggest

that probiotic use is less effective in smokers when compared to non-smokers.

023.079 U **Expression and Prognostic Value of TMEM165 in Breast Cancer**, *Joshua Serrano, East Texas Baptist University Department of Biology; Blake P Johnson, Assistant Professor, East Texas Baptist University Department of Biology*
The TMEM165 gene encodes for a Golgi-localized protein belonging to the well-conserved, though, uncharacterized family of membrane proteins referred to as the Uncharacterized Protein Family 0016 (UPF0016). Interestingly, abnormal TMEM165 gene expression is frequently observed across a variety of human cancer types. Furthermore, previous glycoproteomic studies identified TMEM165 as a breast cancer-specific protein in patient-derived tumor tissue, serum and breast cancer cell lines. The gene expression patterns and functional role of TMEM165 in breast cancer, however, have not been investigated. The goal of this study is to assess TMEM165 gene expression levels across the four major molecular breast cancer subtypes: luminal A, luminal B, triple-negative/basal-like and HER2-type. To accomplish this, our studies will evaluate TMEM165 gene expression in primary breast tumors versus normal adjacent tissue by means of bioinformatics analysis of The Cancer Genome Atlas (TCGA) RNA-seq database using the cBioportal online tool as well as microarray data mined from the Gene Expression Omnibus (GEO). In addition, the biological relationship between abnormal TMEM165 gene expression and prognosis will be examined via meta-analysis of survival outcomes as determined by integrative genomic analysis of the TCGA and GEO databases using the Kaplan-Meier Plotter online tool. Together, these studies will provide insight into the biological impact and prognostic potential of altered TMEM165 expression in breast cancer, particularly with regard to triple-negative/basal-like tumors which confer a poorer prognosis and lack a clinically relevant therapeutic target.

023.080 U **Healing or stealing: generic versus trade name antibiotic ointments**, *Taylor Alexandra Slack, University of Mary Hardin-Baylor; Joni Henrik Ylostalo, University of Mary Hardin-Baylor*
Generic medications tend to be more affordable than trade name medications, and it is assumed that as long as the active ingredients are the same both types of medications should have the same efficacy. Antibiotic ointments are commonly used in households on children and adults to prevent bacterial infection in minor cuts, scrapes, and burns on the skin. In the experiments carried out here we tested the hypothesis that generic and trade name antibiotic ointments would be equally effective. To compare the effectiveness of the ointments on the growth of a common Gram-positive skin microbe, *Staphylococcus epidermidis*, Kirby-Bauer disk-diffusion test was used. Blank disks were soaked in Neosporin, Wal-Mart, and H-E-B brand triple antibiotic ointments followed by aseptic placing of the saturated disks onto Mueller-Hinton agar plates containing freshly smeared *S. epidermidis*. After an adequate growth period, the zone of inhibition was measured using a millimeter ruler. Based on the zone of inhibition measurements, all the ointments tested inhibited the growth of *S. epidermidis* with no significant differences in the efficacy between the different ointments. In conclusion, our results suggest that it is of no difference whether you use trade name or genetic antibiotic ointment. Further tests are needed to determine whether the effect of the different ointments is bactericidal or bacteriostatic and if the ointments have varying degrees of bactericidal or bacteriostatic effect. Further experiments are also needed to determine if the results are similar with other common species of the human normal microbiota, e.g. *Escherichia coli*.

023.081 U **High-throughput application of Chemotherapeutic Agents to 22 established Multiple Myeloma cell lines**, *A. Keith Stewart, Mayo Clinic; Jonas Kruse, Baylor University*
Numerous chemotherapeutic agents (CTAs) are available for use in patients with cancer, yet these may have variable efficacies depending on unique host and cancer cell line characteristics. Current methods utilize protocols to determine CTA efficacy individually, which is both time-consuming and monetarily expensive. In order to optimize the efficiency of this process, our lab utilized a high-throughput, automated protocol to determine the efficacies of an entire library of 79 FDA-approved CTAs, in triplicate, simultaneously. For this experiment we first acquired established Multiple Myeloma (MM) cell line cultures (n=22). We then utilized a source assay plate containing the agent library that was serially diluted in media using the high-throughput robot across 7 assay plates from 10.0 mM to 0.01nM concentrations. For each cell line, the serially diluted CTA plates were added to 7 assay plates containing MM cells, one plate for each dose concentration. The MM cell assays were then incubated for 24 hours with the CTAs. CellTiter-Glo chemiluminescent reagent was then added to determine the remaining cell viability after incubation. Finally, Spotfire data visualization software was used to compile relative CTA efficacies and generate accurate dose-response curves. Overall, the protocol developed by our laboratory represents a method for reducing the time and monetary cost of determining CTA efficacy in myeloma.

023.082 U **Identification and Characterization of Novel Compound Inhibitors of** *Candida albicans* **Biofilm Formation**, *Alexandria I. Knecht, University of the Incarnate Word; Christopher G. Pierce,*

University of the Incarnate Word
Candia species represent the main cause of opportunistic fungal infections worldwide, and *C. albicans* is the most common etiological agent of candidiasis. Candidiasis represents the third to fourth most frequent nosocomial infection in hospitals in the United States. These infections are typically associated with unacceptably high morbidity and mortality rates up to 50 percent, mainly due to the limited arsenal of antifungal drugs. For the three major classes of antifungal drugs, polyenes, azoles, and echinocandins, resistant strains of *C. albicans* are routinely reported. Furthermore, *C. albicans* ability to form biofilms, complex microbial communities, heightens this issue of resistance as biofilms are intrinsically less susceptible to these commonly used antimicrobials as well as host immune responses. Considering the role of biofilm formation in *C. albicans* infections, it represents a valuable target for the development of anti-virulence treatment strategies. One advantage of targeting such virulence factors is it may inflict weaker selective pressure for the development of resistance. In this study, we performed a cell-based phenotypic screen of 320 compounds that have been in Phase I-III clinical trials. Briefly, the compounds were screen to identify inhibitors of *C. albicans* biofilm formation and fully mature pre-formed *C. albicans* biofilms. Following the initial screening of the compounds, eight compounds inhibited *C. albicans* biofilm formation and of these compounds one also inhibited pre-formed biofilms. Compounds that display anti-biofilm activity represent a promising subset of small molecules for the development of anti-virulence treatment strategies targeting *C. albicans* biofilm formation.

023.083 U **Screening of NIH Clinical Collection Library for Compounds with** *Candida albicans* **Anti-Biofilm Activity**, *Christin R Thompson, University of the Incarnate Word; Christopher G. Pierce, University of the Incarnate Word*
Candida albicans, while a common inhabitant of the human microbiota, represents an increasing health threat to immune and medically compromised individuals. As an opportunistic pathogen, *C. albicans* is capable of causing disease ranging from superficial to life-threatening systemic candidiasis. Furthermore, the seriousness of *Candida* infections is heightened due to the lack of antifungal drugs available, particularly against the biofilm mode of growth. *C. albicans* biofilms are clinically relevant as they are more resistant to antifungal drugs. Currently there are only three major classes of antifungal drugs proven to be effective against *C. albicans* infections, polyenes, azoles, and echinocandins. In addition to *C. albicans* ability to develop drug resistance, the toxicity of these antifungals to human cells represents a major problem. In effort to address the urgent need of developing new treatment strategies targeting the resistant *C. albicans* biofilms, we screened a subset of small molecule from the NIH Clinical Collection compound library to discover novel inhibitors of *C. albicans* biofilms using a 96-well microtiter plate model of biofilm formation. From a subset of 387 compounds, we found four compounds that inhibit *C. albicans* biofilm formation. Of these compounds, one inhibits preformed biofilms which are generally more resistant to treatment. Future studies are aimed to further characterize the inhibitory effects of these compounds using dose-response curves and screen the compounds for potential additive or synergistic effects with clinically used antifungals. The compounds identified in this study represent potentially novel antifungal agents, which are urgently needed, to treat *C. albicans* biofilm infections.

023.084 U **The Biological Impact and Prognostic Potential of the GPI Transamidase Complex in Glioblastoma Multiforme**, *Victoria Davis, East Texas Baptist University Department of Biology; Blake P Johnson, Assistant Professor, East Texas Baptist University Department of Biology*
Glioblastoma multiforme (GBM) is the most common and deadly form of primary brain tumor in humans. Characteristically, GBM are infiltrative tumors exhibiting enhanced cell motility and cell-to-cell communication capabilities. As such, GBM often recurs regardless of treatment, thus highlighting the need for novel therapies and early-stage biomarkers in this disease. Emerging reports in cancer glycobiology indicate that alterations in protein glycosylation represent attractive candidates as novel biomarkers and therapeutic targets across a variety of human cancers. Specifically, abnormal glypiation, or the formation of glycophosphatidylinositol (GPI) anchors, has commonly been cited in cancer progression and therapeutic resistance as glypiated proteins are frequently secreted from cells where they aid in cellular interactions with the tumor microenvironment. Cancer-associated alterations in glypiation stem principally from increased expression of key glypiation biosynthesis enzymes, namely the multi-subunit GPI transamidase (GPIT) complex, whose increased expression and resulting GPI biosynthesis contribute to cancer development and progression. Interestingly, previous findings indicate that elevated levels of GPI-anchored proteins are present in GBM. The gene expression patterns and biological impact of altered GPIT subunit levels, however, remain unknown. Using The Cancer Genome Atlas (TCGA) microarray database, this study assessed GPIT subunit levels in primary GBM tumors versus normal brain tissue. Based on these findings, our studies subsequently examined the biological relationship between abnormal GPIT subunit expression and prognosis via meta-analysis of the TCGA database using the Kaplan-Meier online tool. Collectively, these studies have expanded our understanding of the biological impact and prognostic

relevance of GPI biosynthesis in GBM.

023.085 G **The association of Obesity and Lifestyle Factors among Children in rural and urban areas of the Trans-Pecos region**, *Kassandra Hernandez, Sul Ross State University; Christopher M. Ritzi, Sul Ross State University*
Childhood obesity and poor eating habits are the struggles many children are facing across the nation. Obesity in children has been seen to have increased nearly three times in the past 50 years, and about 1 in 3 children in the U. S. are classified as being overweight or obese. The question is raised, is there any correlation between body mass index (BMI) and percent body fat to geographic settings? Thus the objective of this study is to attempt to determine if there is any evidence or information on whether a child's geographical settings associated with culture, lifestyle, and demographics affect their body composition determined by BMI and body fat percentage in the area of Texas west of the Pecos river the Trans-Pecos region. This study will use the children's body mass index, percent body fat, and a nutritional survey for measurements, as well as conduct a follow up study on 9th grade students who were tested on the same measures when they were in 5th grade in 2013. The cities selected for this study will be determined by choosing a selection of rural and urban cities in the Trans-Pecos region by using the United States Census Bureau. There have been few studies about the associations of child obesity and related health issues with urban and rural environments. This study could be of importance to school districts if the findings recognize that geographical settings can be a major influence on student health.

Environmental Science
Environmental Science Posters
Participants:

023.086 G **Assessment of shorebird populations In Galveston Bay using conventional and UAV techniques**, *Anna Claire Vallery, University of Houston - Clear Lake; George Guillen, Environmental Institute of Houston*
Almost 75% of U.S. bird species utilize Texas coastal wetlands as either a permanent or seasonal habitat (TCELCP, 2010). Intertidal habitat including mudflats, marshes and oyster reefs are utilized by many of these species for foraging. These intertidal habitats are at risk due to coastal development, predicted changes in sea level, and coastal storms associated with climate change. It is predicted that a majority of these habitats will be lost due to these factors within the Galveston Bay system within the next 50 years. In order to understand how these factors may affect intertidal habitat and associated bird species, and to develop effective management methods to mitigate impacts, it is first necessary to gain a better understanding of current population sizes and densities of these species in coastal areas. Gathering this information for Galveston Bay is difficult due to the size and complexity of this estuary and logistics of surveying intertidal habitat and bird populations using traditional methods. New techniques that utilize Unmanned Aerial Vehicle (UAV) technology, however, have the potential to make conducting large-scale surveys of intertidal areas possible both safely and with less expense and effort than previous attempts using ground surveys only and/or manned aerial surveys. Our objectives include testing whether UAV technology can be used to gather information on foraging shorebird numbers and distribution of these shorebirds on various intertidal habitats, including oyster reefs. The interaction of tides, substrate and meteorological conditions have been and will be explored at various locations in the Galveston Bay system.

023.087 U **Effects of Initial Pesticide Exposure on Foraging Competition in the Southern Leopard Frog**, *Kaitlyn E. Matthey, Student; Raelynn Deaton Haynes, St. Edward's University*
This experiment is intended to determine the behavioral effects of pesticide exposure on the Southern Leopard Frog (*Rana sphenocephala*) at different life stages. Previous studies have been conducted revealing the toxic effects of the pesticide Imidacloprid, a known neural blocker on insects. Because Imidacloprid is found in freshwater streams at various concentrations, we conducted experiments to better understand its effects on aquatic organisms. We hypothesized that higher concentrations of Imidacloprid would negatively affect cognitive decision making in tadpoles, measured as competitive foraging. We placed tadpoles into four pesticide treatments matching stream concentrations of control, low, medium, and high. First, we measured the time it took the tadpole to notice the food. Second, we recorded latency time to feed, or the amount of time it took to find food hidden under an obstruction in a competitive environment (groups of twenty). We found no differences across treatments for latency time, but tadpoles in the high concentration took significantly longer to notice food than those in the control concentration. Therefore, the results partially supported our hypothesis showing that in high enough concentrations Imidacloprid may act as a neurological interrupter to insensitive aquatic vertebrates. Future studies include a larger sample size of adult frogs at a variety of life stages.

023.088 U **Entomopathogenic Fungi: an Alternative to Pyrethroids and other Chemical Pesticides**, *Clarissa Mae de Leon, St.Edwards University; Fidelma O'Leary, St. Edwards University*
The use of chemical pesticides in the United States has increased by approximately 50% in the past 6 years. Chemical pesticides may degrade in sunlight (e.g. Imidacloprid) however, once in the soil they persist for

months and have unintended effects on non-target organisms. Aquatic environments are similarly impacted due to increased pesticide levels in runoff. Use of entomopathogenic fungi, natural pesticides, can reduce the quantity of synthetic pesticides in use. As fungi can also take up unusual molecules as an energy source, they can reduce the level of pesticide and pesticide metabolites already in the environment. We examined the impact of entomopathogenic fungus, using the soil-dwelling nematode *Caenorhabditis elegans*, a detrivore, as a model non-target organism. Following a 24hr exposure to *Beauveria bassiana*, we assessed *C. elegans* for chemotaxis, motility, and fecundity, which are needed for individual and species success, every other day. The data indicate a 25% decrease in mortality, with no physical nor neurological deficits, compared to controls. In contrast, a typical target organism *Reticulitermes flavipes*, a subterranean termite, under the same conditions showed a 50% increase in mortality. This study suggests that *Beauveria bassiana* can be safely used in agricultural settings as it impacted targets, without detriment to non-target organisms.

023.089 G **Feeding Behavior and Property Damages of** *Sus scrofa*, *Erin Elizabeth Ray, Hardin Simmons University; Steven Rosscoe, Hardin Simmons University; Wendi Wolfram, Hardin Simmons University*
Feral Hogs have been the bane of agricultural developers, ranchers and land owners, to the point of having no legal limitations to their depredation. Multiple studies have been conducted to estimate the cost of property damage by feral hogs, and to better understand feral hog diet and activity patterns. Understanding these behaviors and what drives the extent of property damage can provide improved insight into the adaptability of feral hogs. Research suggests, that through more focused studies and analysis using modern technological advances, improved control methods can be derived to deal with the destructive presence of these feral hogs. This study utilizes the advances in modern technology through analysis of drone photography and the identification of seed content in scat collection to identify resource preference in a grassland initiative property currently being restored to native grasses. Assessment of the data collected will help aid in the development of methods to increase the monitoring of feral hogs and to provide additional tools for improved management.

023.090 U **Financial West Texas Wind Generation Study**, *Ryan Musick, 2016 (Withdrawn)*
General wind speeds are thought to increases with height however wind turbine generation profiles show the opposite. Having accurate and predictable wind generation curves is critical to the continued success and advancement of renewable wind energy, and by systematically categorizing the atmospheric conditions and its propagation through a 3-day prior-to and 1 day after analysis of 10 financially extreme days, an identification of variables correlating to the wind generation from West Texas were revealed. Multiple data methods are used throughout the research, including surface and upper air analysis. While financially beneficial days were impacted greatly by weather system propagation in cyclo-genetic regions, most detrimental days were a cause of mechanical shutdowns due to icing and extreme market conditions inherent to the current day-ahead and real-time market system.

023.091 G **Impact of Landscape Changes on the Environmental and Water Quality Characteristics of Brays Bayou Watershed, TX**, *Sharmila Bhandari, Texas Southern University*
Rapid increases in impervious surfaces due to urbanization often intensify the frequency of flooding which in turn increases environmental pollutants. Brays Bayou Watershed (BBW) is heavily urbanized and densely populated watershed located mostly in Harris County, TX. This study used a three-pronged approach of chemical and microbial analysis, remote sensing, and Geographic Information Systems (GIS). The objectives of the study are 1) To identify and analyze the indicators of environmental and human health impacts for urban watersheds, 2) To determine nutrient, heavy metal and bacterial contamination and 3) To analyze and interpret the spatial and temporal changes in BBW. Water and sediment samples were collected and analyzed for Al, As, Ca, Cd, Cu, Fe, Hg, K, Mg, Na, Pb and Zn concentrations. Bacterial analysis was also performed to enumerate the fecal coliform bacteria in water samples. Three decades (1980-2010) of Landsat Thematic Mapper TM satellite images along with spatiotemporal historical GIS data were processed and analyzed for the land use and land cover changes. Our remote sensing analysis revealed that the BBW lost about 28.35% (9463acres) vegetation during the period of 1984 to 2010. The loss in vegetative areas resulted in increased impervious surface areas. Increasing trends for Al, Cu, Fe, Pb and Zn were observed towards the downstream of BBW, however, opposite trends were observed for *Escherichia coli* concentrations. Our findings provide a foundation for future flood alleviation planning for city and county personnel that can help to minimize the economic, mental, and physical burdens associated with such events.

023.092 U **Novel determination of calcium species involved in solar energy storage**, *Denisse Velazquez, University of Houston Downtown; Aaron Torres, Scholars Academy-University of Houston Downtown; Mian Jiang, University of Houston - Downtown*
Solar thermal power is a renewable technology

currently in active development. Continuous, non-stop generation, regardless of weather condition, is an important area of research exploration. Solar power plants can provide a solution for power storage. Calcium and its compounds are used in these plants as additives to improve energy storage efficiency, and they need constant monitoring and regeneration. In this study, we developed novel methods to both qualitatively and quantitatively determine calcium content in the plant fluid. Samples of the calcium species have been tested for the solar thermal energy storage tank. We used classical titration as well as cutting-edge spectrophotometry for the calcium assay. The optimal conditions for spectrophotometry depend on the choice of the dye. Various red-ox dyes were examined for their color-changing sharpness, stability, pH range, and interferences, and the Alizarin Red S dye was optimal. This work was supported by MSEIP-Re-Energize Project, NRC, UHD-MiniGrant, and Welch Foundation (BJ-0027).

023.093 U **Physiological and Neurological effects of Pesticide Imidacloprid on** *C. elegans*, *Dayanna Garcia, St. Edwards*
This study examined the premise that imidacloprid (imid) negatively affects physiological and neurological functions of non-target organisms such as *C. elegans*. Wild-type *C. elegans* (N2) were exposed to imid via their food source (*E. coli* OP50), and assays for lifespan, motility and chemo-taxis were performed. Two imidacloprid concentrations, aside from the food source alone (control), were tested: low (3.129 X 10-8 mol/L) representing field application levels and high (5.2 X 10-7 mol/L) representing repeated usage or even spillage. For the lifespan assay, 90 worms were examined in a total of three trials, 10 per treatment group. Worms were allowed to lay eggs over a span of 8 hours; eggs were then counted followed by a larval count 24h later for confirmation. Worms were observed for 20 days. Chemo-taxis utilized avoidance to an odorant (0.01% benzaldehyde in 100% ethanol). Worms were age synced, 10 per treatment group, and tested every odd day. Assay was performed with a hair that had been soaked in benzaldehyde and reversal times were recorded. Similarly, motility worms were age synced, 10 per treatment group, and tested every odd day. Assay consisted of examining the number of body bends in 20 seconds. Results indicated that both groups with imid concentrations had minimal to no survivors, longer chemosensory response times (high- 6.5 s vs control- 4.4 s), and minimal to no body bends (high- 2.6 body-bends vs control- 16.35 body-bends). It is clear to see that imidacloprid exposure induces observable, adverse effects for all assays.

023.094 G **Removal of contaminants from aqueous solutions by biochar produced from locally sourced biomass**, *Sergio Mireles, University of Texas Rio Grande Valley*
Agricultural byproducts generate large amounts of biomass waste such as corn stover and orange peel waste in South Texas. The waste products can be utilized to generate biochar as a low cost adsorbent for heavy metals (e.g. lead, arsenic) in water systems. The objective of this study is to 1) produce biochar from three distinct waste products -- orange peel (OP), pistachio shell (PS), corn stover (CS -- and 2) evaluate the biochar's physico-chemical properties -- pH, surface area, electrical conductivity, and elemental composition. Feedstock materials were pyrolyzed under three temperature conditions at 300, 450, and 600°C, respectively. High pyrolysis temperature resulted in higher surface areas for PS and CS biochars which likely enhanced the adsorbent potential for lead (Pb). Moreover, solution pH effect on biochar ranging from pH 2 to 6 was conducted to assess the optimal solution pH for the maximum Pb adsorption onto the biochars. Results showed that the optimal pH was 6 for all biochar materials, with percent Pb removal being 96% for CS, 95% for OP, and 19% for PS biochar. Magnetized biochar will be produced to evaluate its adsorbent properties for arsenic removal in aqueous solution. Isotherm and pH studies will also be done for the magnetized biochar.

023.095 U **The Effects of Urban Heat Islands on the Number of Lightning Strikes Downwind from a City**, *Mary Celeste Kelley, University of the Incarnate Word*
The objective of this paper is to look at the impact that urban heat islands, from moderate to large cities, have on the number of lightning strikes a thunderstorm produces after moving over the heat island. Thunderstorms were examined during March to November, 2015 from ten cities in Kansas, Oklahoma, and Texas, where thunderstorms are common. Data from five thunderstorms per city were collected. The number of lightning strikes from the west of the city, over the city, and to the east of the city were recorded. When taking in to account the direction the storm was moving, it could be determined if the amount of lightning strikes increased after the storm moved over the heat island. Data was collected from the company Vaisala. The company has a lightning detection system that determines the number of lighting strikes inside a 10 by 10 mile box. The boxes were drawn on a map of the different cities to physically see the differences of the number of lightning strikes from different parts of the city. The conclusion of this research is urban heat islands help increase the number of lightning strikes downwind from the heat island.

Geosciences

Geosciences Posters

Participants:

023.096 G **A sequence stratigraphic analysis of**

mixed carbonate-evaporitic deposition in the Harrisburg Member of the Permian aged Kaibab Formation, *Cole Edward Hendrickson, Stephen F. Austin State University*
The Kaibab Formation is a carbonate system that outcrops across the Grand Canyon Region of northern Arizona and southwestern Utah, and is part of a 3rd order sequence representing the Leonardian and Guadaloupian series of the upper Permian. The Kaibab Formation was deposited on a broad shallow shelf of the Grand Canyon Embayment. It consists of the Fossil Mountain Member, deposited during a transgression representing open marine conditions overlain by the Harrisburg Member, deposited during a regression representing a sabkha-like, evaporitic environment. A disconformity separates the Permian Kaibab Formation from the overlying Triassic Moenkopi Formation and scattered lenses of fluvial deposits. Fourteen stratigraphic sections were measured across northern Arizona and southwestern Utah, allowing for the relatively high-resolution regional correlation of four limestone beds within the Harrisburg Member that have been interpreted as four 4th order sequences. In the east, the lower carbonate sequences are predominantly dolomitic mudstone containing large chert nodules and are interbedded with thick chert beds. The upper limestone sequences grade upwards from cherty mudstone into a silica-rich wackestone-to-packstone facies and ends up with mudstone separated by marine redbeds at the top of the sequence. To the west, there is a significant change in facies to predominantly evaporitic deposition. Further petrographic analysis verifies deposition on a broad carbonate shelf and provides information on the complex diagenetic history of the primary and secondary chert of the Harrisburg Member of the Kaibab Formation.

023.097 U **An Oligocene-Eocene Limestone in Big Bend Ranch State Park, Texas**, *Stephanie Nicole Elmore, Geology*
A thin (~1 m) relatively widespread Oligocene – Eocene limestone unit occurs within the Solitario Conglomerate (Henry, 1998) on the Big Bend Ranch State Park, West Texas. Cenozoic limestones are unusual in this region of Trans-Pecos, Texas because the area is dominated by volcanics, clastics, and the limestone is between two volcanic units. The limestone is thin-bedded, light-colored, locally dolomitic, and contains only 10 – 12 % insolubles. Travertine textures are abundant along with stromatolitic laminations, birdseyes, oncoids, and intraclasts. No bioclastic allochems were observed. SEM and EDS observations of fractured surfaces revealed calcified filaments of cyanobacteria penetrating the matrix. Absence of Cenozoic marine units in the region suggests a lacustrine depositional setting. Thinness of the unit, light color (lack of organics) and lack of variation in the carbonate facies indicates a closed lake. Stromatolites, lime mudstone rip-ups, and oncoids indicate very shallow conditions. Birdseye structures appear to be both stromatolite and travertine origin. An ephemeral lake or playa may have been fed by inflow from springs and groundwater seepage which explains the lack of clastics. The minor amount of clay-sized clastics is due to eolian processes. Besides seasonal variations, longer term changes in climate can cause the level of the water table to rise and fall through time causing a lake to form then revert back to a clastic setting when the water table drops. The lake may have been similar to modern playas in tectonically active areas which contain travertine and grade laterally into alluvial plains or fans.

023.098 N **Camelids (a giant camel and two llamas) from the the late Pleistocene of South Texas**, *Jon Baskin, Texas A&M-Kingsville; Ronny Thomas, retired*
Camelops is a giant camel from the Pliocene and Pleistocene of western North America. It is well represented by cranial and post-cranial material from Ingleside in San Patricio County and the Wright sand and gravel pits in Nueces County. This abundance of material indicates that almost all latest Pleistocene *Camelops* should be assigned to *C. hesternus*. In addition, there are possibly two additional, but poorly known, species: one with short, broad metapodials and one with short, slender metapodials. Two llamas, *Palaeolama* and *Hemiauchenia*, are also present in South Texas.

023.099 U **Comparison of Chert Geochemistry and Flint Knapping Workability**, *Joshua Cyrus Wynn, Wayland Baptist University; Tim R Walsh, Wayland Baptist University*
Possible relationships between the geochemistry of various chert samples and their workability into stone tools were investigated. A number of chert types utilized by ancient peoples in the manufacturing of stone tools were identified, including Alibates (TX), Arkansas Novaculite (AR), Caballos Novaculite (TX), and Burlington chert (MO). Samples of the chert were knapped and graded on a workability index. The index is based on key aspects of flint knapping which determine the difficulty in effectively obtaining a stone point. Geochemistry of these chert, obtained from published literature, was examined. The chert geochemical characterizations were compared to the workability index grades for investigating correlations between the two. For example, the research included a study of chert samples with higher traces of iron to find any possible knapping characteristics exclusive to that characteristic. Although study continues, “number of inclusions/sample purity” and “internal fractures” appear to play a greater role in workability than minor geochemical disparities. Also the quartz matrix size in chert could contribute to fracturing during the manufacturing process due to the gradual loss of flake momentum, and thereby reduce workability. Further

research is currently being conducted to test this reasoning. The selective use of a specific chert type by ancient stone workers may have been more driven by availability than by slight differences in workability resulting from geochemical variation.

023.100 G **Geology of the Alto Relex Area, Big Bend National Park, Texas**, *Robert Lee Schoen, Stephen F. Austin State University; Chris A. Barker, Stephen F Austin State University, Geology Department*
Big Bend National Park in SW Texas has a variety of geologic structures. The Sierra Del Carmen Mountains on the eastern side of Big Bend were mapped by Moustafa (1988), but the published maps lack detail. Along the west side of the range is Alto Relax, a prominent, near-vertical cliff and fault-line scarp rising about a thousand feet above the nearby valley. Multiple tectonic events affected this area. Late Cretaceous Laramide compression created folding, thrust faults and strike-slip faults. Middle Tertiary igneous intrusions, such as nearby McKinney Hills, displaced rocks and injected magma fluids into surrounding fault breccias. Early Miocene Basin and Range extension overprinted the older structures. Recent field mapping indicates that Cretaceous strata around Alto Relax have been warped into short and long-wavelength folds and broken by a variety of faults. Small thrust faults have been mapped striking N18W, 42° SW on average. A large left-lateral strike slip fault on the east side of Alto Relax has been traced for over 700 meters, striking N40W. Multiple outcrops of the Boquillas formation contain folds that have an average fold axial plane orientation of N30W, 86° SW and an average inter-limb angle of 95°. Some locations have slickenlines and chatter marks with different orientations within a short distance, suggesting a complex structural history. Further mapping will be conducted in this area.

023.101 N **Structural control of surficial and relict karst in the Owl Mountain Province, Fort Hood Military Installation, Texas**, *Mindy Faulkner, Stephen F Austin State University; Jacob A Meinerts, Stephen F Austin State University*
The Owl Mountain Province is a karst landscape with Lower Cretaceous Fredericksburg Group carbonates found in outcrop and in the sub-surface. The topography is dominated by a broad, dissected plateau capped by the rudistid-rich Edwards limestone. Steep scarps along the edges of the plateau expose the inter-fingering relationship of the Edwards and Comanche Peak limestones; and the lower valleys along the creeks are mantled with thick soils derived over the Walnut Clay. Exposures along these scarps reveal significant karst development near the Comanche Peak and Edwards boundaries, including grottos and niches exposed in scarp faces, tafoni and spongework structures in over-steepened slopes, upward stoping features along permeability boundaries, and caves. Surficial karst features include sinkholes, springs, incised canyons, solutionally widened joints, and shelter caves. Both surficial and relict karst features occur associated with local and regional deformation trends, including the Balcones Fault Zone and the Moffatt Mound trend formed along the western flank of the Belton High. Geochemical analyses of springs within the study area indicate a mixed fluid system where deeper seated phreatic or semi-confined hypogenic waters may have contributed to karst development. Permeability varies greatly over the lithologic boundaries and conjugate joints have likely created a conduit for semi-confined fluids migrate upward through low permeability strata along preferential flow paths to create surficial and relict karst features. These features are spatially oriented along local and regional deformation trends, and are exposed as a result of surface denudation and slope retreat.

Marine Science

Marine Science Posters

Participants:

023.102 H **A Comparison of Faunal Diversity in the Lower Laguna Madre and Arroyo Colorado, Texas.**, *Chelsey L. Faris, The International Baccalaureate Program at Lamar Academy; Taylor L. Cedillo, The International Baccalaureate Program at Lamar Academy; Gabriella L. Mata, The International Baccalaureate Program at Lamar Academy; Vallery L. Valle, The International Baccalaureate Program at Lamar Academy; Ricardo L. Sammons, The International Baccalaureate Program at Lamar Academy; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*
The Arroyo Colorado is a source of low salinity in the Laguna Madre, while the rest of the lagoon has more oceanic salinities. This poses the question of whether faunal diversity is affected by different salinity zones. The Arroyo Colorado, an engineered agriculture and municipal drain, is also a source of high nutrient concentrations and low oxygen bottom waters. Consequently, the Arroyo Colorado may have the greatest faunal diversity because of its broader range of environmental (salinity) zones. To assess this prediction, stern trawls were made from south to north at four sites in the Laguna Madre and Arroyo Colorado. Samples were typically identified to species when possible, counted and measured for length to the nearest mm. A Simpson's Diversity Index was calculated for each location. Location in the Laguna had no significant influence on length within and between species. The "Three Islands" site, south of the Arroyo Colorado, with the second to lowest salinity, had the highest diversity index (18), but the fewest number of species (7). The lowest diversity (3.6) was found closer to the oceanic Brazos-Santiago Pass had 9 species. This indicates that having a lower salinity level may

correspond with a higher diversity index, however, the Arroyo Colorado was the location with the lowest salinity and had the second to lowest diversity at 5.9 and 7 species. This may be associated with hypoxic bottom water. Aside from the Arroyo Colorado, the results appear to indicate that lower salinity correlates with a higher diversity index.

023.103 U **A Comparson of Dark Spot Syndrome Frequencyin the Bay Islands: Utila and Roatan, Honduras**, *Erin Castillo, Mclennan Community College*

Dark Spot Syndrome (DSS) is prevalent on Caribbean corals, but there is little information on its abundance, spread, and interactions with marine life. As DSS spreads through coral tissues, it affects coral color, sometimes killing affected tissue. This study was conducted to compare disease frequency and coverage of DSS on the coral reefs surrounding Roatan and Utila, Honduras. Surveys were conducted at five established dive sites in Utila from May 16-20, 2016 and Roatan 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 to navigate through the reef starting at the deepest depth of the coral species range (17.7-22.3m) ending at the shallowest depth (4.6m). For each coral species observed, data was collected for frequency and disease status. Affected coral of DSS compromised of 42% in Roatan (2015) and 27% in Utila (2016). The larger amount of healthy coral found in Utila could be due to the smaller size of the island, local and tourist populations. As this is the first study of DSS in this area, this information provides a baseline for future studies.

023.104 U **Age and growth of the Smooth Butterfly Ray (***Gymnura micrura***)**, *Emily Richey, Texas A&M University Galveston Campus*

Apex predators such as pelagic sharks play an important role in ecosystems by maintaining a healthy balance. However, important prey items of these predators, like stingrays, are being caught as bycatch in high quantities and their population health is left unchecked. This study aims to develop an age and growth model for *Gymnura micrura* using vertebrae to assess the populations' health. Multiple methods such as transmitted light and staining will be used to determine age. Age and growth studies for significant prey items of apex predators are needed to maintain the health of ecosystems. Where research on these species are extremely limited, this study can contribute to proper management plans, ecosystem models, and future elasmobranch studies.

023.105 U **Cleaning Station Behavior of the *Elacatinus* spp. and Clients in the Mesoamerican Barrier Reef, Utila, Hondura**, *Kennedy Lynn Chudej, McLennan Community College*

Gobiidae is the largest family of marine fish. The four most common species of cleaner fish in the Bay Islands are the *Elacatinus louisae*, E. lori, E. colini and E. lobeli. Cleaning stations are sites where cleaner fish and client fish interact; these interactions have been considered to be mutualistic. Through this relationship, cleaner fish feed off ectoparasites and client fish benefit through reduction of parasite loads. This study was conducted to (1) catalog behaviors of Elacatinus species and client fish at individual cleaning stations in Utila, Honduras (2016) and (2) compare those behaviors with those observed in Roatan, Honduras, 2015. Research dives were conducted from May 17-20, 2016 at five dive sites around Utila. Water conditions, substrate, and conditions of the substrate of cleaning station were recorded. All coral species with the exception of O. faveolata and A. cervicornis had similar abundance between Roatan and Utila. However, data is unavailable to analyze the differences in Brian corals and U. agaricites abundance between Roatan and Utila. Elacatinus lobeli was the only species of goby observed cleaning in Roatan 2015 and Utila 2016. Chromis cyanea was one of the main client fish observed in Roatan and Utila. Based on observed goby and client behavior differences between Roatan 2015 and Utila 2016, future studies should sample different dive sites within the Bay Islands and survey the dive sites multiple times for more data sets. Also, fish populations between the islands should be conducted.

023.106 U **Cleaning Station Behavior of the *Elacatinus* spp. and Clients in the Mesoamerican Barrier Reef, Utila, Honduras**, *Austin Ryan Biddy, McLennan Community College*

Gobiidae is the largest family of marine fish. The four most common species of cleaner fish in the Bay Islands are the *Elacatinus louisae*, E. lori, E. colini and E. lobeli. Cleaning stations are sites where cleaner fish and client fish interact; these interactions have been considered to be mutualistic. Through this relationship, cleaner fish feed off ectoparasites and client fish benefit through reduction of parasite loads. This study was conducted to (1) catalog behaviors of Elacatinus species and client fish at individual cleaning stations in Utila, Honduras (2016) and (2) compare those behaviors with those observed in Roatan, Honduras, 2015. Research dives were conducted from May 17-20, 2016 at five dive sites around Utila. Water conditions, substrate, and conditions of the substrate of cleaning station were recorded. All coral species with the exception of O. faveolata and A. cervicornis had similar abundance between Roatan and Utila. However, data is unavailable to analyze the differences in Brian corals and U. agaricites abundance between Roatan and Utila. Elacatinus lobeli was the only species of goby observed cleaning in Roatan 2015 and Utila 2016. Chromis cyanea was one of the main client fish observed in Roatan and Utila. Based on observed goby and client

behavior differences between Roatan 2015 and Utila 2016, future studies should sample different dive sites within the Bay Islands and survey the dive sites multiple times for more data sets. Also, fish population assessments between the islands should be conducted.

023.107 U **Effects of rapid salinity decreases on photosynthetic efficiency in *Halodule wrightii*.**, *Johnmarc M. Candelaria, University of Texas at Rio Grande Valley; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*
Seagrass populations establish the foundation of estuarine ecosystems by fulfilling key supportive roles and providing food, shelter, and nursery areas for fish and invertebrates. Factors which affect the health of seagrass beds, such as salinity, are of great interest. Rainstorms can quickly dilute seawater and decrease salinity levels in estuarine ecosystems. These decreases in salinity are the focus of this research. The seagrass Halodule wrightii (Hw) was subjected to small decreases in salinity in a controlled laboratory environment and pulse amplitude-modulated (PAM) fluorometry was used to assess photosynthetic efficiency (Fv/Fm; Y) on the effects of hyposalinity. Salinity treatments began at 35 and were decreased 9 times, every 15 minutes, to a final salinity of 15. Hw shows a considerable, but variable degree of flexibility in Y to decreased salinity. Results indicate an overall statistically significant decrease in Y to salinity. This study provides a framework for future PAM fluorometry studies to compare effects of salinity changes across different seagrass species.

023.108 U **Frequencies and Substrate Association of Excavating Poriferans in Utila, Honduras.**, *Collin M Harvey, McLennan Community College*
Excavating sponges are important competitors for space on the Mesoamerican Reef System (MRS). Encrusting sponges bore into the coral skeletons and are able to outgrow and eventually overtake entire coral. Some research has suggested that some excavating sponge species show associations with particular types of corals. This study was conducted in order to assess frequencies and substrate associations for excavating sponges on the coral reefs in Utila, Honduras. Utila is a small island 18 miles north of mainland Honduras and is part of the MRS, which is the largest system of its kind in the Atlantic Ocean. Multiple dive sites surrounding the island were surveyed using the Randell-Robertson Survey Technique, which called for the researchers to reach maximum depth then survey progressively shallower corridors parallel to the shore. For each excavating sponge found along the survey path, the depth was recorded and the sponge was photographed along with a meter stick, which served as a size reference. The only excavating sponges identified were Cliona delitrix and Aka coralliphaga. Cliona delitrix was encountered with much greater frequency (76%). Cliona delitrix also showed a positive association with massive coral types (85%), colonizing them in greater proportion than in other coral types (9%), such as branching or foliose. These results corroborate evidence from research in other areas of the MRS. Future studies should incorporate many different sites along the MRS in order to better assess boring sponge habitat associations.

023.109 U **Hydromedusae blooms and seasonal biodiversity changes in Galveston Bay**, *Catherine Risley, Texas A&M University at Galveston; Tess Heywood, Texas A&M University at Galveston*
Jellyfish of the class Hydrozoa (phylum Cnidaria) in the Gulf of Mexico are greatly understudied despite the fact that they are top predator and may have a significant ecological impact on fisheries and the marine plankton in general. This is part of a long term monitoring to better understand the biodiversity and seasonal changes of jellyfish populations in the Gulf of Mexico. Hydromedusae will be collected using plankton tows at the boat basin at the Texas A&M University at Galveston campus. In the laboratory, the hydromedusae will be isolated, examined, and photographed under a Leica microscope. The 16S gene from the mitochondrial DNA will be extracted and amplified using the Polymerase Chain Reaction (PCR). After sequencing at the laboratory at Texas A&M University Corpus Christi, the DNA will be run through the BLAST web application for species identification. A calendar of hydromedusae species found during the sampling month will be created by compiling photographs of the specimen collected.

023.110 G **Identification and Quantification of Seagrass Algal Epiphytes**, *Melissa Fisher, Texas A&M University-Corpus Christi; Kirk Cammarata, TX A&M Univ-Corpus Christi; Whitney Roberson, TX A&M University-Corpus Christi; Lucas Martinez, Texas A&M University-Corpus Christi; Chelsea miller, Texas A&M University-Corpus Christi*
This study initiated an inventory of epiphytic algal species found on seagrasses near Corpus Christi, Texas. Seagrass communities are safe harbors, nurseries, and feeding grounds that support diverse and economically beneficial fisheries. Epiphytic algae are primary producers in the marine environment and provide food sources for the next trophic level of foragers. Higher than average rainfall in 2015 created hyposaline conditions in local bays and the resultant influx of freshwater and nutrients is expected to impact both the presence and prevalence of different algal species. An understanding of epiphyte community dynamics will facilitate simple epiphyte-scanning based indicators of water quality which need to be calibrated to community characteristics. Stedman's Island in Redfish Bay was chosen as a study site based on the availability of all 5

local seagrasses: Cymodocea filiformis, Halodule beaudettei, Halophila engelmannii, Thalassia testudinum, and Ruppia maritima. Seagrass specimens were harvested and imaged with both visible and fluorescence scanners. Imaging was used to record and quantify epiphyte accumulation patterns as a more robust alternative to dry biomass measurements. Algal epiphytes were visually examined and identified using taxonomic keys, and samples were collected for subsequent DNA fingerprinting (18S RNA, 16S RNA, rbcL, CO1). We have tentatively identified 15 epiphyte taxa, finding abundant cyanobacteria and diatoms, a prevalence of red alga, but a deficiency of greens and browns. Notable differences were observed between the different seagrass host species.

023.111 H **Net community primary productivity and respiration in Lower Laguna Madre and Arroyo Colorado, Texas.**, *Adilene L. Barrios, The International Baccalaureate Program at Lamar Academy; Alondra L. Medina, The International Baccalaureate Program at Lamar Academy; Bianca L. Garcia-Gonzalez, The International Baccalaureate Program at Lamar Academy; Kassandra L. Guerra, The International Baccalaureate Program at Lamar Academy; Ricardo Zamora, The International Baccalaureate Program at Lamar Academy; Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*

The Arroyo Colorado (AC), located in South Texas, is rich in nutrients. The AC delivers runoff from storm water, agricultural fields, and municipal wastewater, to the Laguna Madre (LM). This runoff delivers nutrients to the LM in abundance, enriching the water column and allowing phytoplankton primary productivity to occur at fast rates. To assess primary productivity patterns under the influence of different salinity and nutrient regimes, in both the AC and LM, we conducted an experiment that consisted of measuring primary productivity with the light/dark bottle method. This method allowed us to test the hypothesis that primary productivity in the AC would be greater than more distant LLM sites since water quality to the LM would improve as we moved away from the AC. The experiment consisted of taking water samples from the mouth of the AC and three different sites in the LM, south of the AC. Water temperature, salinity, and other physiochemistry factors were recorded. Results showed that net community primary productivity rates and relative fluorescence increased significantly (>10 times) from the Brazos-Santiago Pass site, with open ocean salinities, to the north at the mouth of the AC. While community respiration rates likewise increased from south to north, the differences were not significant. One possible contribution to trends in primary productivity is that water column phosphate was more than 10 times that of nitrate and ammonia at all sites. These results underscore the effects of elevated nutrient concentrations on the water column of the AC and adjoining LM.

023.112 G **Parasite richness and abundance in *Pterois volitans* along the Gulf of Mexico**, *Danielle Fails, Sam Houston State University*

Invasive species are known to be detrimental to both the economy as well as to environmental stability. One of the most successful invaders to date is the red lionfish, Pterois volitans, which first invaded the western hemisphere around 30 years ago. In this short amount of time, the lionfish has decimated native fish populations at a rate of roughly 7,500 lbs. per acre per year. Not only are these fish extremely efficient hunters, but they have no natural predators and seem to be fairly resistant to parasitism. To date, few species of parasites have been found in lionfish and studies show that even when infected, lionfish display no negative host effects due to the presence of parasites. With such low susceptibility to parasitism, the lionfish have been able to establish populations along the length of the Gulf of Mexico as well as the Caribbean and northern parts of South America. Early results indicate a prevalence of 0% in lionfish collected from sites in Florida and Texas. Using these preliminary results and the hypotheses on parasite transmission mechanisms, our hope is to achieve a better understanding as to the mechanism that is contributing to the success of the invasive lionfish. We hope to achieve this by collecting data along the Gulf of Mexico, and then expand our research eastward along the Atlantic Coast. The expansion of the project may also open opportunities for parasitism research following geographic distribution, climate effects, and natural predator influences.

Mathematics/Computer Science

Mathematics & Computer Science Posters

Participants:

023.113 U **Balancing Selection Pressures, Multiple Objectives, and Modular Networks to Form Complex Agent Behavior**, *Alex Rollins, Southwestern University; Jacob Schrum, Southwestern University*

Previous research using evolutionary computation in Multi-Agent Systems indicates that assigning fitness based on team vs individual behavior has a strong impact on the ability of evolved teams of artificial agents to exhibit teamwork in challenging tasks. However, such research only made use of single-objective evolution. In contrast, when a multiobjective evolutionary algorithm is used, populations can be subject to individual-level objectives, team-level objectives, or combinations of the two. This paper explores the performance of cooperatively coevolved teams of agents controlled by artificial neural networks subject to these types of objectives. Specifically, predator agents are evolved to capture scripted prey

agents in a torus-shaped grid world. Because of the tension between individual and team behaviors, multiple modes of behavior can be useful, and thus the effect of modular neural networks is also explored. Results demonstrate that fitness rewarding individual behavior is superior to fitness rewarding team behavior, despite being applied to a cooperative task. However, the use of networks with multiple modules allows predators to discover intelligent behavior, regardless of which type of objectives are used.

023.114 U **Evolving Tetris Players Using Raw Screen Inputs**, *Lauren Gillespie, Southwestern University*

Artificially intelligent agents have a wide range of applications in robotics and computer simulations. However, fully general intelligent agents need to be able to function with as little human guidance as possible. Specifically, agents should learn from raw state variables instead of hand-designed features. This research applies the well-known evolutionary algorithms NEAT (NeuroEvolution of Augmenting Topologies) and HyperNEAT (Hypercube-based NEAT) to the domain of Tetris, a popular and challenging video game, in order to show how HyperNEAT makes better use of raw screen inputs than NEAT. The main advantage of HyperNEAT over NEAT is its ability to generate large neural networks that can take advantage of the geometry of the domain's input space. This research shows how HyperNEAT far surpasses NEAT when using the same raw screen inputs, thus showing how HyperNEAT can discover complex behavior in a challenging, complex domain.

Neuroscience

Neuroscience Posters

Participants:

023.115 N **Analysis of Cu(II)-mediated dityrosine cross-linking of amyloid-beta in-vitro and in-vivo by MALDI MS**, *Andrea Renee Kelley, University of Texas at San Antonio; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO; Stephan Bach, University of Texas at San Antonio*

A dramatic increase in amyloid-beta deposits in the brain in the form of senile plaques is representative of the progression of Alzheimer's disease (AD) in humans. One theory of pathogenesis is the aggregation of amyloid-beta through dityrosine linkages produced by Cu-mediated redox chemistry. In the presence of an oxidant (H2O2), the Cu(II) mediates tyrosine cross-linking that potentially aids in the aggregation of amyloid-beta and strengthens the structure. We have developed reproducible laser-induced fragmentation patterns of synthetic amyloid-beta via MALDI MS and used these patterns to analyze the ways in which Cu(II) and Zn(II) bind to monomeric amyloid-beta and which fragments experience significant binding. These experiments lead to the development of new sample preparation methods for these biologically relevant analytes. The new methods improve signal to noise and greatly reduce ion suppression commonly seen with MALDI MS analysis of complex biological samples. In addition, we have been able to produce Cu-mediated dityrosine crosslinks of amyloid-beta peptides prominent in the brains of people with AD. Spectra of isolated senile plaques from a sucrose gradient of homogenized human brain and the amyloid-beta dimers in the isolated samples can be analyzed in-vivo for comparison of cross-linking as modelled by the synthetic peptides. We present a systematic study of the effects of the addition of Cu(II) and Zn(II) to synthetic amyloid-beta and the spectra obtained from the in-vitro analysis of Cu(II) mediated dityrosine cross-linking and apply these findings to the in-vivo analysis of the amyloid-beta binding seen in isolated senile plaques.

023.116 N **CX3CR1 and DAP12-TREM1&2 Signaling in MS-vs-AD: Biosimulations of proteomics differences and effects of a novel orally active CX3CR1 blocker (AZD8797)**, *Clyde F Phelix, The University of Texas at San Antonio; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO*

TYROBP gene is a regulator for immune and microglia response in Alzheimer's disease. TREM2 and CX3CR1 were minor nodes in the signaling network. Reactome.org includes TYROBP and TREM1&2 in the DAP12 signaling pathway and CX3CR1 in the fractalkine and G-protein-coupled -receptor pathways. Microglia are CNS 'sweepers' and tissue homeostasis 'gatekeepers'; implicating IL-34 and Csf1 receptor mechanism for DAP12 activation (cell survival), TREM2-DAP12 signaling (phagocytosis), CD200 (resting), and the CX3CR1-dependent ERK signaling (CNS chemotaxis recruitment) and cAMP inhibitory pathways. Our study utilized Transcriptome-To-Reactome™ technology for neuron-microglia biosimulations to examine differences using COPASI software and determining kinetic parameters from NCBI-GEO transcriptome sets GSE28146 & GSE38010. The Transcriptome-To-Reactome™ also tested an [IC50]=350nM effect of AZD8797 (AstraZeneca's developmental non-competitive allosteric CX3CR1 inhibitor to treat MS) to normalize ERK and cAMP biomarkers in both MS and AD, in silico. Autodock-Vina was used for ligand-protein docking and proteomic heatmap results were generated with Cluster and Treeview. Principle component analysis was performed with R using FactoMineR. AD as mild, moderate, and severe were clustered with age-matched control, but separated from control, acute and chronic MS plaques, which were separated from each other. Heatmaps revealed distinctions among groups and showed normalization by AZD8797. Fractalkine sequentially binds two sets of residues in the extracellular pocket of CX3CR1, activating G-proteins; AZD8797 binds the secondary residues. AZD8797

increases cAMP levels and lowers ERK markers by 72% and 42%, respectively. Microglial activation pathways are not identically altered in AD and MS, but both diseases might be treatable with novel drugs targeting CX3CR1.

023.117 N **Characterization of amyloid-beta peptide aggregation induced by copper ions**, *Germán Plascencia Villa, THE UNIVERSITY OF TEXAS AT SAN ANTONIO; George Perry, THE UNIVERSITY OF TEXAS AT SAN ANTONIO*
Alzheimer´s disease (AD) is a chronic disease becoming a major public health issue in the United States. AD is a progressive neurodegenerative disease affecting over 5 million patients un USA and around 350,000 of those are Texans. AD is mostly present in adult-onset, remaining undiagnosed until late stages, closely related with presence of abnormal toxic proteins aggregates (amyloid-beta and tau), misbalance in biometals in brain, enhanced reactive oxygen species production and oxidative stress. In this work, we studied the in vitro formation of amyloid-beta aggregates induced by copper ions (Cu2+) and the structural characterization of the aggregates by using microscopy techniques. The aggregation of amyloid-beta showed a dependence on the amount of copper ions added, pH, and counter-ions in buffering solution. Imaging of morphology and analysis of amyloid aggregates was performed through an integrative set of advanced analytical microscopy techniques. Particularly, epifluorescence, dark-field and polarized light optical microscopies confirmed the formation of spherical aggregates of 2-10 microns with morphology that resembled amyloid plaque cores present in AD. High detail structural characterization and chemical identity of inorganic materials associated to aggregates were performed with scanning electron microscopy (SEM), scanning transmission electron microscopy (STEM) and energy dispersive X-ray spectroscopy (EDX), confirming presence of well-organized aggregates of peptide-copper, and other compounds from buffering media, such as phosphates and oxygen. These observations confirmed the high affinity of amyloid beta for copper ions, and the capacity of peptide to effectively direct the formation of well-organized aggregates under controlled physicochemical conditions.

023.118 U **Characterization of spatial and temporal expression of the gene *c16orf54* in Zebrafish**, *Zachary Warren, The University of Texas at Tyler; Brent Bill, The University of Texas at Tyler*
Autism is a neurodevelopmental disorder characterized by deficits in social comprehension, and the presence of stereotypical and restricted behaviors. Presently, the etiology of autism spectrum disorder (ASD) is unknown; however, ASD and other neurological developmental disorders have been associated with genetic abnormalities within the human genome. This research attempted to characterize the gene *c16orf52* in the model organism, *Danio rerio* (zebrafish), which appeared to have a mutated genotype within several individuals having ASD. Functional studies lacking for this gene; therefore, we have initiated studies to elucidate its function within the nervous system. RT-PCR demonstrated that *c16orf52* is expressed at all times, and we currently are attempting to obtain spatial expression patterns for this gene. The genetic techniques employed here are broadly applicable to the functional characterization of other genes associated with ASD.

023.119 G **Neonatal seizures lead to call-specific changes in the quantitative and spectrotemporal features of mouse ultrasonic vocalization behavior**, *Conner Reynolds, University of North Texas Health Science Center; Suzanne O Nolan, Baylor University; Jessica Huebschman, Baylor University; Joaquin Lugo, Baylor University; Samantha Lee Hodges, Baylor University*
Seizures during the neonatal period are known to cause long-term deficits in social behavior, learning, and memory. However, little is known regarding the acute behavioral impact of early-life seizures. Ultrasonic vocalization (USV) recordings have recently been developed as a tool for investigating early communicative deficits in mice. Previous investigation from our lab found that seizures on postnatal day (PD) 10 cause male-specific suppression of 50-kHz USVs on PD12 in 129 SvEvTac mice pups. The present study aims to extend these findings by examining putative differences in spectrographic characteristics of USVs following kainic acid-induced seizures in mouse strains with known resistance (129 SvEvTac) and sensitivity (C57BL/6) to the drug. On PD10, male pups were administered intraperitoneal injections of 0.5% kainic acid (2.5mg/kg), or an equivalent dose of 0.9% physiologic saline. On PD12, pups were removed from the home cage, then isolation-induced recordings were captured by a broad-spectrum ultrasonic microphone and Avisoft Automated Recording software. Quantitative analyses revealed altered call type utilization in mice after seizures. Further investigation of spectrographic features identified call-specific changes in fundamental frequency, peak amplitude, and duration. Our findings enhance existing evidence that neonatal vocalizations indicate select impairments of early communication behavior in mice. Additionally, this investigation provides the first known spectrographic characterization of USV behavior following neonatal seizures.

023.120 U **Synaptic level alterations which underlie plasticity events during regeneration of** *Lumbriculus variegatus***.**, *Miguel Madrigal, Univ. of the Incarnate Word; Katherine Michelle James, Univ. of the*

Incarnate Word; Veronica Giselle Martinez-Acosta, Univ. of the Incarnate Word
Lumbriculus variegatus undergoes regeneration for replacement of body segments lost on their apical ends, a process known as epimorphosis. Regeneration involves the replacement of all body tissues including the nervous system. Posterior regenerating fragments become positioned in a more anterior location during regeneration. As the regenerating posterior fragment becomes more anteriorly located, they exhibit anterior specific behaviors. Lumbriculus not only regenerates missing body structures but also demonstrates 100% recovery of function appropriate for the new axial position of the body fragment. Our lab is particularly interested in regeneration of the nervous system. While we have previously presented work on molecular aspects of nervous system regeneration, the rapid recovery of nervous system function raises questions regarding plasticity at the synaptic level. In this study, we present transmission electron microscopy imaging characterizing synapses that interact with main components of the worm central nervous system. We also present immunohistochemical analysis of synaptic vesicle proteins. We demonstrate the presence of the synaptic protein, Synapsin, a vesicle SNARE protein, in non-regenerating and regenerating worm fragments. Lastly, we present immunoblot analysis of changes in Synapsin expression, described at different time points (24hr, 1wk, and 3wk) of regeneration. Taken together, we present the first pieces of data that characterize changes occurring at the synaptic level which underlie plasticity events which are the hallmarks of functional recovery in Lumbriculus during regeneration.

Engineering/Physics

Physics & Engineering Posters

Participants:

023.121 U **Developing a Robotic Farm Assistant**, *Madelyn Akers, Southwestern University; Diana Beltran, Southwestern University; Susana Beltran, Southwestern University; Jiawen Zhang, Southwestern University*

Overuse of fertilizer by farms has a number of environmental consequences. To solve this problem, we developed a robot (nicknamed Roverine) that can perform soil samples over a wide area. This robot was constructed with an open, cart-like design to allow space for its motors, a large battery, and the electronics that command it. Roverine uses a GPS-compass system to navigate and a garden probe to measure soil quality. This self-sufficient robot can accurately find a location specified by the user and measure and record the soil quality at that coordinate. If adopted, Roverine could reduce environmental contamination and productively optimize crop yields.

023.122 U **Exploring photometric methods for identifying emission-line B-type stars**, *Amy Glazier, Austin College; David Whelan, Austin College*

Emission-line B-type stars, or Be stars, are a mysterious class of stars defined by their unique behavior: These stars eject material from their surfaces, forming a disc of gas that surrounds them. Furthermore, the gaseous disc is not necessarily a permanent feature of its host star. Some Be stars' discs vary in structure over time, and may even disappear only to be regenerated later. Other Be stars may never show appreciable changes in the natures of their discs once they have been formed. The disc's existence causes the appearance of characteristic emission lines in Be stars' spectra, making spectroscopy the traditional method for identifying Be stars. However, spectroscopy is an inefficient and time-consuming method of finding Be stars, because it allows for only a single star to be observed in each exposure, and each star may require multiple exposures for durations of many minutes. Photometry, on the other hand, can be used to observe many stars simultaneously, but at the cost of the greater detail afforded by spectroscopy. While photometry has been used to identify Be stars, its success has been limited. In this work, we explore novel photometric techniques that enable efficient identification of Be stars.

023.123 U **Testing a flared disk model against spectroscopic data for *Be* stars**, *Niki Stavrianopoulos, Austin College; Sophie Anderson, Austin College; Ryan Hood, Austin College; David Whelan, Austin College*

Be stars are B-type stars that are known to exhibit emission lines in their spectra due to a circumstellar disk. The shape of the circumstellar disk is not entirely known, although there are a few hypotheses. One possibility is the flared disk model, which was found using the theoretical considerations of hydrostatic equilibrium; it has a disk height that grows exponentially as distance from the star is increased. Using Cloudy, a program designed to predict spectra, we have developed models that fit known hydrogen spectroscopic signatures by changing parameters that are not known, such as hydrogen density and stellar luminosity. Strong matches between Sigut's model and the data were found with physically meaningful parameters, showing that the flared disk could be the correct shape.

023.124 U **Using 9-axis motion sensors to model and classify motions of the lower jaw**, *james roddy, Schreiner university*

Bruxism, more commonly known as teeth grinding, can cause permanent damage to teeth, and many people are unaware that that they are afflicted or reject the diagnosis when identified by a dentist. Verification methods range from in-mouth bite guards to Electromyography (EMG) procedures. This project will lay the groundwork for an in-home, outside-the-mouth method to track jaw motion, by using two sensors to

record and plot movement of the lower jaw. Each 9-axis sensor will be combined using sensor fusion software to transmit via Bluetooth the 3-D coordinate locations as well as roll, pitch, and yaw angles to completely model the absolute position of each sensor. Using two sensors, one on the jaw, and a reference sensor on the head, relative position of the jaw can be determined and studied separate from overall head motion. This project will present results analyzing two important questions when using external sensors to analyze jaw motion. First, different sensor locations, for example on the front or bottom of the chin or along the side of the jaw near the hinge, will be compared to determine which is able to most clearly identify different types of motion. Second, using a single sensor location, different types of jaw motion will be performed, and the data will be analyzed to identify distinguishing dynamic motion characteristics between test cases including chewing and talking.

Systematics & Evolutionary Biology

Systematics & Evolutionary Biology Posters

Participants:

023.125 U **Cryptic yet curiously common: Population genetic structure and diversity of a cryptic** *Pomacea* **sp. and its better known congeneric** *P. canaliculata*, *Sofia Campos, Southwestern University; Cristhian M. Clavijo, Museo Nacional de Historia Natural, Montevideo, Uruguay; Fabrizio Scarabino, Centro Universitario Regional Este; Romi L Burks, Southwestern University; Kenneth Hayes, Howard University*

Phylogenetic and phylogeographic studies provide insights into fundamental processes shaping biodiversity. Apple snails (Ampullariidae) within the genus *Pomacea* have high abundances, considerable diversity, and wide distributions in South America. Many *Pomacea* spp. share similar gross morphologies, which can make accurate species delineation dependent on genetic approaches. To understand population structure and diversity of two species (*Pomacea* sp., a putative cryptic species and *P. canaliculata*, a global invasive) in their overlapping native ranges, we analyzed 579 COI sequences. Using phylogenetic analyses, we confirmed the presence of *Pomacea* sp., and phylogeographic analyses revealed that *Pomacea* sp. is widespread and occurring in nearly twice as many sites as *P. canaliculata*. Haplotype analyses recovered 82 haplotypes from *Pomacea* sp. (N = 351; $h = 0.967$; $\pi = 0.01260$) and 24 from *P. canaliculata* (N = 228; $h = 0.799$; $\pi = 0.02659$). The lack of any clear geographic structure of *Pomacea* sp. over such a wide range may indicate recent range expansions. Genetic variance was greater within populations (66%) than among populations (34%) for *Pomacea* sp. (AMOVA), but the opposite pattern held for *P. canaliculata* (44% within, 56% among). Our results reveal that *Pomacea* sp. is the dominant *Pomacea* species in Uruguay, a finding that starkly contrasts previously reported species distributions that possibly misidentified this species as *P. canaliculata* or *P. maculata*. The difficulty of morphologically identifying this cryptic species, combined with its wide range expansion, raises a concern regarding how long before this species ends up introduced elsewhere.

023.126 U **Development of the** *IRBP* **gene as a new nuclear marker for phylogeny reconstruction in** *Thomasomys* **(Rodentia: Cricetidae)**, *Jessica A James, Abilene Christian University; Paulina J Sanchez, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*

Thomasomys is a genus of mouse-like rodent species distributed primarily in northwestern South America. Previous investigations based on mitochondrial genes have provided well resolved nodes at the species level. In contrast, most deep nodes needed for reconstructing evolutionary adaptations in 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 interphotoreceptor retinoid-binding protein (*IRBP*) gene. Early results suggest that this marker is less variable than previously used mitochondrial markers but could contain significant amounts of phylogenetically informative characters. Although phylogenetic resolution has been lower, this nuclear gene can provided independent evidence supporting mitochondrially based hypotheses.

023.127 U **Evolution of mitochondrial gene order in gastropods**, *Glory Hughes, University of Houston Clear Lake; Michael Meriano, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake*

Euthyneura is a taxonomic group of snails and slugs including species found in terrestrial, freshwater, and marine habitats. Members of the group exhibit euthyneury, a derived condition where the twisting of anatomical structures caused by torsion has been secondarily untwisted. Based on DNA and amino acid sequences from mitochondrial genomes, Euthyneura is considered to be monophyletic. However, no substantive analysis of mitochondrial gene order has been performed for Euthyneura nor Gastropoda. To examine the evolution of gene order in gastropods, we used a maximum likelihood approach to analyze 125 gastropod mitochondrial genomes. Our results indicated that Euthyneura was the only higher taxonomic snail group well supported by gene order. We present the reconstructed gene order from the hypothetical euthyneuran ancestor and illustrate major rearrangement events across lineages. We also provide rationale for why Euthyneura is the sole taxonomic

group recovered in our analyses, and discuss future applications for our data.

023.128 U **Phylogeny of rodent genus *Thomasomys* (Rodentia: Cricetidae) based on the nuclear gene recombination activating gene 1**, *John P Placide, Abilene Christian University; Hannah M Lantrip, Abilene Christian University; Marissa C Horne, Abilene Christian University; Cameron D Ludwig, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*
Thomasomys is a South American rodent genus occurring in high-elevation habitats. Previous phylogenetic hypotheses describing speciation within *Thomasomys* have been based on morphology or mitochondrial gene sequences. However, additional evidence is necessary in order to resolve the order of several rapid speciation events early in the diversification of *Thomasomys*. This study adds phylogenetically informative DNA sequences from the recombination activating gene 1 (RAG1) in order to strengthen support for previously generated hypotheses. We performed PCRs to amplify RAG1 using the recently developed primers TDF2 and TDR2. PCR products were direct sequenced, and maximum likelihood (ML) searches were performed using RAxML to determine the best tree and bootstrap support for clades. Although RAG1 has proven to be less informative than previously sampled mitochondrial genes, phylogenetic results were congruent with analyses from mitochondrial genes and provided support and increased resolution for our previous hypotheses, including evidence that the taxon *Thomasomys cinnameus* is paraphyletic.

023.129 U **Using *ITS-2* as a DNA Barcode to elucidate *Hemerocallis* hybrid paternity and maternity: A Pilot Study**, *Joel David Rodgers, East Texas Baptist University; Catherine Cone, East Texas Baptist University*
The purpose of this pilot study was to elucidate the efficacy of utilizing the *ITS-2* sequence as a means of determining paternity and maternity of *Hemerocallis* hybrid plants. The study was limited to *Hemerocallis* hybrids that are diploid. The chloroplast *rbcL* sequence was used as a control. Six *Hemerocallis* hybrid plants from a personal collection were used. Leaf samples were taken from plants of known parental pedigree, three full sibling plants and one half sibling plant. DNA barcoding results using *rbcL* DNA sequence showed 98%-100% consensus for the *Hemerocallis* hybrid samples BLAST analysis with the *H. fulva* DNA sequence. The discriminatory power of *ITS-2* nuclear DNA sequence was analyzed using PCR and Sanger sequencing.

Terrestrial Ecology and Management

Terrestrial Ecology and Management Posters

Participants:

023.130 N **A comparison of flower visitors to Texas native and exotic ornamentals**, *Richard James Wilson Patrock, Texas A&M, Kingsville; John Reilley, PMC Manager, E. "Kika" de la Garza PMC, USDA; Maher Shelley, E. "Kika" de la Garza PMC, NRCS, USDA*
We planted native and exotic plants in a small field plot to observe flower visitation diversity among some commonly grown local ornamentals. These included native Esperanza, Salvia greggii, lantana, Turk's cap Cenizo and the exotics Euonymous, Ixora, Oleander, Waxleaf ligustrum and Indian Hawthorne. We expected lower insect diversity and abundances on the exotic plants relative to native plants. Native ornamentals generally had larger and more frequent displays of flowers which resulted in a much higher level of temporal and spatial apparencies that likely led to the observed greater biodiversity in the planted native flora. We also compared the insect diversity on these plants with data collected elsewhere in the area and on non-target vegetation in and around these plots to make more general statements about insects on our local and exotic ornamentals.

023.131 U **Analyzing environmental factors linked with bird diversity across an urban landscape**, *Jonatan Valentin Salinas, St. Edward's University; J. Amy Belaire, St. Edward's University*
The process of urbanization leads to increased impervious cover and a decreased area of natural habitats. As cities continue to grow, people change the environment in various ways, including introducing new plant species and potential predators. However, it is not yet clear how the process of urbanization affects the wildlife around us. We surveyed birds at 10 urban sites and compared them to four nature preserve sites in Austin, Tx to investigate the differences in bird species richness and community composition. We analyzed different environmental characteristics (impervious cover percentage in 1k radius, vegetation cover percentage in 1k and 25-meter radii, and the distance to nearest main road and water source) to identify the driving factors that determine bird community composition. In summer of 2016, the total number of bird species observed across all sites was 24, with 12 species that were shared between Wild Basin and the urban sites. The bird communities in three different site types (low, medium, and high impervious cover) were significantly different from one another. The biggest difference was that the bird communities in the urban sites were unevenly distributed, but were more diverse compared to Wild Basin. This suggests that bird diversity varies substantially across an urban ecosystem and is linked with anthropogenic factors such as the amount of impervious cover surrounding a particular area. This study indicates that Austin is home to a diverse bird community, due to the abundant resources it provides both in preserves like Wild Basin and in residential neighborhoods.

023.132 U **Baseline Survey of Texas Horned Lizards in the Texas Panhandle**, *Sara van der Leek, Wayland Baptist University; Andrew Kasner, Wayland Baptist University*
This baseline survey was conducted een betwMay-Sept 2016 using pitfall traps and visual encounters to determine the presence and habitat associations of Texas horned lizards in Hale and Floyd counties, Texas. A total of 25 lizards were documented, including 12 visual encounters and 13 captures. Of the 13 captured, 4 were males and 9 were females, with an average snout to vent length =55.8 mm (range = 21.8-85.3 mm). Percent vegetation cover was measured using the Daubenmire cover class method. The average percent grass cover =7.04%, forb cover =4.60%, litter cover =2.88%, and bare ground =85.84% of 20x50-cm quadrats centered on lizard locations. The height of vegetation was measured using a Robel pole, and the average height =2.56 cm. The percent cover and height were not different between locations for males and females nor between adults and young. All lizards were <1 m from the nearest escape cover providing total visual concealment from overhead predators.

023.133 U **Bees of Nacogdoches County Regional Airport**, *Ryan Joseph Pingenot, Stephen F. Austin State University; Daniel Bennett, Stephen F. Austin State University*
The bee fauna of grasslands and woodlands surrounding the A.L. Mangham Jr. Regional Airport, Nacogdoches County, Texas, was investigated during the fall of 2016. Pan trapping and sweep-netting collecting techniques produced 453 individuals representing 17 genera. Comparisons of habitats and collecting methods are provided.

023.134 U **Characterization of the bacterial flora of the Sorcerer's Cave, deepest cave in Texas**, *Samantha N Studvick, Abilene Christian University; Allysa J Wilder, Abilene Christian University; Diana P Desai, Abilene Christian University; Joshua Michael Brokaw, Abilene Christian University*
At 558 feet, the Sorcerer's Cave, in Terrell county, is the deepest cave in Texas. Because great depth is expected to comprise unique and isolated habitats, bacteria samples have been collected from the cave for identification and characterization. Previous research from portions of this site led to the identification of Pseudomonas as the main genus of the bacteria collected. In this study we identify samples from a side wall of Sorcerer's Cave near Guano Lake. Samples were collected aseptically and inoculated on 15 ml slants of TSA with screw caps. The isolates were kept cold until incubation and incubated at room temperature until growth appeared. We performed PCR of the 16S rRNA gene using the 27f and 1492r primers and obtained 16s DNA sequences. We performed preliminary identification of 16S sequences through comparisons with accessions from Genbank and the Ribosomal Database Project. In addition to the ecological characterization of the microbial flora in the Sorcerer's Cave, this research project is the precursor to further studies of the bacterial isolates, including antibiotic resistance testing.

023.135 U **Comparing Potential Allelopathic Activities of Four Native South Texas Tree Species Against Three Invasive African Grasses**, *Amber Dixie Michalk, University of Texas Rio Grande Valley; Emily Zamora, University of Texas Rio Grande Valley; Cynthia Lilliana Cantu, University of Texas Rio Grande Valley; Andrew McDonald, University of Texas Rio Grande Valley*
Widespread disturbance of natural vegetation in South Texas has encouraged the invasions of three African grasses: Guinea grass (Megathyrsus maximus (Jacq.) B. K. Simon and S. L. Jacobs), buffelgrass (Cenchrus ciliaris L.), and Kleberg bluestem (Dichanthium annulatum Stapf). The current domination in the region by these invasive plants in secondary vegetation impedes natural succession and thwarts attempts at habitat restoration programs. Having observed exotic grass growth inhibition under the canopies of two primary tree species [Texas ebony (Ebenopsis ebano (Berland.) Barneby & J.W. Grimes), and huizachillo (Acacia schaffneri (S. Watson) F.J. Herm.)], presumably due to allelopathic effects, and the lack of inhibitory effects under the canopies of two secondary tree species [mesquite (Prosopis glandulosa Torr.) and huisache (Vachellia farnesiana L.)], we are measuring the potential inhibitory growth effects that extracts of these four native tree species have on each of the invasive grasses. We treated a total of 40 individual grass plants with water (control) and 5g vs. 25g aqueous extracts (6 liters of water) of dried leaf, stem and fruit materials of each of the four tree species. We performed four replicate treatments of 10 individual grass shoots. Upon completing the growth trials, we will measure the statistical significance of differences among exotic grass species' growth rates and biomass under treated and untreated plant samples. Significant results will help direct future investigations on specific plant parts and/or chemical constituents that might play allelopathic roles in countering the continuing expansion of invasive grass populations.

023.136 U **Dispersion of black Walnut (*Juglans niger*) in relation to small mammal activity: preliminary findings**, *Rileigh Welch, East Texas Baptist University; Troy A Ladine, East Texas Baptist Univeristy*
We present the preliminary findings of dispersion of black walnut (*Juglans niger*) in a 60 ha forested area within an urban system located in on the Environmental Studies Area of East Texas Baptist University. Currently, six trees have been located with DBH (mean

= 15.3 ± 5.6 cm; range 10.5 - 23.1 cm), crown width (mean = 5.7 ± 3.4 m; range 2.5 - 12.2 m), height (mean = 23.0 ± 9.3 m; range 11.9 - 35.0 m) and height:crown width ratio (mean = 5.2 ± 3.5). Nearest neighbor was measured for the four cardinal directions. Mean distance of neighbors is 9.3 ± 1.9 m. Sweet gum (*Liquidambar styraciflua*) is the most common species of nearest neighbor. The closest any walnut is to another walnut is 21 m with the mean distance 77 ± 35 m. The objective of the study is to examine the dispersion of black walnut in the system in relation to presence of small and medium-sized mammals that are likely to forage on the species. This data is being collected in a separate study.

023.137 U **Effects of Body Manipulation On Insect Succession and Postmortem Interval in the Transpecos Region of Texas**, *Yelixza Avila, Sul Ross State University - Biology; Christopher M. Ritzi, Sul Ross State University*
We address the effect on insect succession and postmortem interval following cadaver manipulations with the use of forensic entomological tools. We hypothesized that bindings would delay both bodily decomposition rates and rate of insect succession when compared to a control. Over the course of 45 days, three pig cadavers-two treatments, one control-were observed. Insects associated with the carrion were collected to later pin and identify. Daily photos were logged to keep track of decomposition. Once the time frame was completed, the findings were analyzed. Results showed that the hypothesis on the delay of insect succession was not relevant because the arrival of insects occurred within the same time frame for the different treatments. However, differences in the intensities and the amount of time different insects spent on the carcasses were observed. Each cadaver had different rates in which they went through the decomposition stages. Overall, this project will provide a baseline on insect succession associated with mammalian carrion in the Trans Pecos region.

023.138 U **Food habits of raccoons (*Procyon lotor*) in an urban ecosystem**, *Benjamin Rhodes, East Texas Baptist Univeristy; Troy A Ladine, East Texas Baptist Univeristy*
Food habits of raccoons (*Procyon lotor*) have been well documented. However, little is known of the food habits of the species within urban ecosystems. Scats have been collected since 1 April 2015 in an urban system located at Marshall, TX (32^o33'N; 94^o22'W) on the Environmental Studies Area of East Texas Baptist University. To date, 12 latrines have been identified with the scat collected and analyzed for food habits of raccoons. Through the summer and fall, the predominate food items in the latrines were crickets (Family Gryllidae; 69.2% of scats), beetles (Order Coleoptera; 38.5% of scats), and seeds of grasses (38.5% of scats). The most common mammal present in the diet of raccoons in this study was black rat (*Rattus rattus*; 23.1 % of scats). The 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. The results of the current study concur with previous studies in that the raccoon is an opportunistic generalist.

023.139 U **Occurrences at one location of multiple individuals of a solitary species**, *Delaney Laznovsky, East Texas Baptist Univeristy; Itzel Morales, East Texas Baptist Univeristy; Troy A Ladine, East Texas Baptist Univeristy*
Motion-sensor cameras provide several benefits for research not available through mark-recapture and other more traditional methods of assessment of medium-sized mammals. While live-traps generally only indicate the presence of a single animal, cameras provide the researcher with the ability to note the presence of multiple animals in an area at one time. Raccoons (*Procyon lotor*) are a relatively common medium-sized mammal in most forested regions and have adapted well to urban systems; thus, provide an excellent subject for camera-based research. Our study investigates the occurrence of multiple raccoons in single photos from 12 cameras located on the Environmental Studies Area of East Texas Baptist University (ETBU) in Marshall, TX. The research site is located within the city limits and adjacent to the athletic fields of ETBU. From 14 October 2014 to 30 November 2016, there were 32 occurrences of multiple raccoons in photos (29 with two individuals, 3 with three individuals). The month with the most common occurrence of multiples was September (24). The only months without multiples in photos were from March to June. The occurrences in July were of juveniles. All other months were adults. The occurrence of two raccoons mating in a photo taken on 26 Sept. 2015 indicates that mating season for the species in this urban area is earlier than previously recorded dates for mating.

023.140 U **Preliminary Biodiversity Survey of Mammals in Taylor County Area**, *Elizabeth Donice Lopez, Hardin Simmons Umiversity; Michaela Gephart, Hardin Simmons University; Dejah Braxton, Hardin Simmons University; Wendi Wolfram, Hardin Simmons University*
Studying biodiversity in a specific region allows us to gain more knowledge about factors underlying the coexistence of species in communities in the area. Increasing this knowledge and reporting it to local and state registries provides additional references for the development of management strategies for conservation, land management, and aids in

understanding the overall relationships between animals in the region. In 1998 a study was conducted by Hanson et al, on the small mammal biodiversity of Taylor County, Texas using standard trapping practices that identified multiple rodent species. The current study uses a variety of additional methods to identify multiple mammal species found in the Taylor County region. These methods include camera trapping, box traps, hair samples, scat collection, track identification, and road-kill surveys. Through these methods several mammal groups were identified in the Taylor County area.

Saturday, March 4

028. Botany Oral Session and Section Meeting
8:00 to 9:00 am
Isabelle Rutherford Meyer Nursing Education Center, NEC 105
Botany
Botany Oral Session and Section Meeting
Participants:

8:00 028.141 U **DNA barcoding of plants in selected taxa of Euphorbiaceae in Central Texas**, *Madalynne Michelle Gatto, Texas Lutheran University; Savannah Hight, Texas Lutheran University; Tamara Kotin, Texas Lutheran University; Mark Gustafson, Texas Lutheran University; Alan Lievens, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*
For over a decade, the Weston Ranch Research Project has sought to survey plants, lichens, and insects on the Weston Ranch, a large plot of land in northern Guadalupe County, Texas. Research in the summers of 2015 and 2016 has also included a molecular project using DNA barcoding with the rbcL gene. The rbcL gene encodes the large subunit of the Rubisco protein. In the summer of 2016, the plant family of focus for the DNA barcoding studies was the Euphorbiaceae. DNA was extracted from 68 plant specimens, either freshly collected or from dried vouchers. A segment of the rbcL gene was amplified and sequenced for each DNA sample. The DNA sequences, referred to as DNA barcodes, were then uploaded to the BOLD Systems Database with collection site information and photos of each plant. In addition to making these sequences available to the scientific community, the DNA sequences were used to create a phylogenetic tree of all the specimens collected. The data include the percent divergence among the species and genera. This technique was useful in verifying identifications and correcting previous misidentifications of specimens based on morphological keys. Overall, this study indicates that the rbcL gene was a fairly good DNA barcoding region for distinguishing the species of Euphorbiaceae that were collected. However, this region could not distinguish *Croton monanthogynus* Michx. from *Croton capitatus* Michx., two species that are easily separated based on morphology.

8:15 028.142 U **Flavonoid Production in Two Genoytypes of Ozone-stressed** *Glycine max* **(L.) Merr.**, *Ashley Elizabeth Moreno, St. Edward's University*
Tropospheric ozone is one of the most harmful air pollutants to plants, including agronomic crops. Eudicots like soybean (*Glycine max* (L.) Merr.) are especially sensitive. It has been shown that ambient ozone in excess of 50 parts per billion by volume (ppbv) can decrease soybean yields in the Midwest Corn Belt by 10%, which equates to more than $1 billion dollars in crop losses. Ambient ozone levels in that area in 2005 for the high-ozone season of July to September averaged between 45-60ppbv. This underscores the need to better understand how soybeans potentially mitigate ozone damage, and the need to characterize why some soybean varietals can better mitigate ozone damage than others. In this project, we looked at flavonoid concentrations in two varietals of soybeans: Fiskeby III and Mandarin Ottawa. These varietals were chosen because Fiskeby III has demonstrated ozone resistance while Mandarin Ottawa has demonstrated ozone sensitivity. We chose to look at flavonoid concentrations because they are known antioxidants and may be produced to mitigate the type of oxidative stress produced by ambient ozone. We hypothesize that Fiskeby III plants, when exposed to elevated ozone levels, will produce greater concentrations of flavonoids than Mandarin Ottawa, which could contribute to Fiskeby's ozone resistance. In this presentation, we explain the results of our investigation.

8:30 028.143 N **Cretaceous and Paleocene fossil woods of eastern Terlingua Ranch, Brewster County, Texas**, *David E Lemke, Texas State University*
Late Cretaceous and early Paleocene strata (Aguja, Javelina and Black Peaks formations) exposed across the eastern portions of Terlingua Ranch in southern Brewster County, Texas, contain an abundance of fossilized wood specimens. Material ranges from large logs 1.6 m in diameter and 15 m in length to much smaller logs and float. This study focuses on material collected from the Upper Cretaceous/Paleocene Black Peaks formation (ca. 67–54 mya) in the eastern portion of Terlingua Ranch in proximity to Big Bend National Park. In contrast to the underlying late Cretaceous Aguja Formation, which is characterized by the presence of only coniferous taxa, preliminary examination of thin sections prepared from Black Peaks material indicates the occurrence of a diversity of conifers and angiosperms. A comparison between these fossil woods of Terlingua Ranch and those previously documented for Big Bend National Park, as well as implications for the paleoecology of the area, will be discussed.

029. Chemistry & Biochemistry Oral Session III and Section Meeting

8:00 to 9:30 am
Isabelle Rutherford Meyer Nursing Education Center, NEC 125
Chemistry and Biochemistry
Chemistry & Biochemistry Oral Session III and Section Meeting
Participants:

8:00 029.145 G **Synthesis, characterization, optical, and computational studies of BODIPY amide derivatives.**, *Laura Saucedo, University of Texas at El Paso; Yangjie Li, Beijing Normal University; Lainqian Tan, Beijing Normal University; Alejandro J Metta-Magaña, University of Texas at El Paso; Robinson I. Roacho, University of Texas at El Paso; Keith Pannell, U. T. El Paso*
BODIPY (4,4-difluoro-4-bora-3a, 4a-diaza-s-indacene) molecules have been used for everything from protein tagging, laser dyes, metal sensors, and in solar cells due to their strong fluorescence and energy transfer. It has been postulated that this is because of the delocalization of the nitrogen lone pair electrons into the BODIPY core, 8-amino-BODIPYs yield a blue fluorescence. This research will show that by creating an 8-amido-BODIPY, the nitrogen's electrons will delocalize into the substituent rather than the BODIPY core, leading to a green fluorescence from the fluorophore. The synthesis, structural characterizations, optical properties and computational studies using Gaussian09 will be provided. We thank the Welch Foundation for support of this research.

8:15 029.146 U **The role of RecA in tuberculosis drug resistance**, *Mason Ryan Taylor, Wayland Baptist University; Robert Moore, Wayland Baptist University*
RecA is a DNA repair protein that uses sequence exchange in order to repair DNA. RecA can tolerate a certain amount of mismatch during sequence exchange, but given the absence of any mismatch repair mechanism in Mycobacterium tuberculosis, it is possible that RecA can be implicated in the large number of drug-resistant strains caused by single-nucleotide polymorphisms. Electrophoretic-mobility shift assays (EMSA's) were used to evaluate affinity of RecA to multiple 83 nucleotide-long single stranded DNA segments (and their complements), each corresponding to areas in the M. tuberculosis genome and centered on a codon that, when mutated, yields drug resistance. RecA demonstrated different binding affinities between complementary strands, suggesting sequence specificity. To explore the source of this differential binding affinity, the oligomer corresponding to a sequence from the katG gene, centered on the S315 codon, which when mutated to threonine, yields isoniazid resistance, was divided into three 23 nucleotide-long sections, dubbed A, B, and C. EMSAs were run on oligonucleotides AAA, BBB, CCC, and their complements. RecA exhibited a consistently low affinity with the BBB and CCC complements, that is, the regions on the non-coding strand including and immediately prior to the codon which, when mutated, leads to drug resistance. In conjunction with previous research that demonstrated that RecA is directed more strongly to damaged DNA with low thermostable mismatches, and given that the nature of this mutation would involve a fairly thermostable mismatch, our data suggest that RecA would tolerate the S315T mutation if it arose during DNA repair.

8:30 029.147 U **The synthesis and characterization and of new anilino and thiophenoxy BODIPYs.**, *James Alexander Leventis, Newcastle University; Laura Saucedo, U. T. El Paso; Alejandro J Metta-Magaña, University of Texas at El Paso; Keith Pannell, U. T. El Paso*
BODIPY (4,4-difluoro-4-bora-3a,4a-diaza-s-indacene) molecules are widely studied due to their potential use as laser dyes, metal sensors and biomarkers. Previous results have shown that substitution of an amino group in the 8-position of the BODIPY produces a strong blue emission, thought to originate from the delocalization of the N lone pair to the BODIPY core. However, simple 8-anilino derivatives do not exhibit such emission. We have synthesized a series of 8-anilino-BODIPYs containing strongly electron-releasing groups, e.g. Me2N, MeO, that could facilitate N lone pair delocalization to the core. Related substituted 8-arylthio derivatives have also been obtained and characterized. To date, we have observed that emission can be enhanced for the 8-substituted methoxyphenylthio derivative. We shall present the synthetic route, spectral analysis and single crystal X-ray analysis of the new materials. We thank the Welch foundation for the support of the research. Authors: James A. Leventis1, Laura I. Saucedo2, Alejandro J. Metta-Megaña2, and Keith H. Pannell*2 1Newcastle University Department of Chemistry 2University of Texas at El Paso, Department of Chemistry

8:45 029.148 N **Theoretical Calculations of Dipole Moments of mono, meta, and ortho halobenzenes**, *Brian Barngrover, Stephen F. Austin State University; Alyx Frantzen, Stephen F. Austin State University*
A quantum mechanics/molecular mechanics (QM/MM) approach is used to calculate the dipole moments of mono, meta, and ortho halobenzenes. QM/MM is applied to this system because pure QM did not match what the experiment had calculated for the dipole moment. QM/MM is employed to give the quantum mechanics accuracy to the halobenzene while the solvents are modeled with molecular mechanics. This theoretical approach is used in collaboration with experiment to help educate students in dipole moments and how to calculate them. It also gives the students an introduction to computational chemistry.

9:00 029.149 U **Transesterification of ethyl acetate and**

furfuryl alcohol using base catalysis, *Jenny Beldin, Stephen F. Austin State University; Russell J Franks, Stephen F. Austin State University*
As part of our ongoing efforts to synthesize and characterize biodiesel fuels made from novel triglyceride and alcohol sources, we have been working to synthesize biodiesel fuels made using furfuryl alcohol. Furfuryl alcohol is a by-product of sugar production, and is abundant and inexpensive. Difficulties that have been encountered while attempting to synthesize biodiesel via transesterification of furfuryl alcohol and common triglycerides (e.g. canola oil and soybean oil) have led us to search for a simpler ester system. Such a system could potentially be used as a model for developing synthetic methodology that will allow us to be able to achieve the overall project goals of synthesis and characterization of fatty acid furfuryl ester (FAFurE) mixtures. Literature precedents led to the choice of ethyl acetate as a model system for this work as a simplified model of the ester moiety in triglycerides. Ethyl acetate was converted into furfuryl acetate by heating with furfuryl alcohol in the presence of a weak base catalyst (potassium carbonate). Transesterification reactions were performed using conventional reflux heating as well as microwave heating. Problems encountered with low solubility of the catalyst in the reaction mixture led to the use of THF as a co-solvent. The resulting products from these reactions were analyzed and percentage conversions were calculated using 1H-NMR spectroscopic data.

030. Conservation Ecology Oral Session II and Section Meeting
8:00 to 9:15 am
Wells Science Hall, WSH 241
Conservation Ecology
Conservation Ecology Oral Session II and Section Meeting Participants:

8:00 030.151 U **Re-evaluating trap efficiency: cameras reveal species-specific captures per visit**, *Gregory Partridge, Schreiner University; Chris Distel, Schreiner University*
The study analyzed trap efficiency (captures per visit) and favorable baits amongst medium-sized vertebrates. By using the trail cameras to conduct this research we were able to monitor the activity around the traps that were baited with 1 of 3 baits: peanut butter, bacon grease or sardines. The trail cameras were able to detect passing animals that did not desire to eat the bait, or animals that did not set off the trap. Capture rates were species-specific. Gray foxes showed 10% captures per visit while raccoons showed 90% captures per visit. Conservation implications are discussed.

8:15 030.152 N **Red Wolf (*Canis rufus*) in east Texas: Rediscovery and activity patterns**, *Troy A Ladine, East Texas Baptist Univeristy*
The red wolf (*Canis rufus*) is thought to be limited in the wild to the Red Wolf Recovery Experimental Population Area on the Albermarle Peninsula, North Carolina. I present evidence that the species is present in east Texas through use of trail cameras. Several black-and-white photos placed on the Environmental Studies Area of East Texas Baptist University indicate the presence of a large canid possessing wolf-like characters. Two color pictures, in particular, indicate the wolf-like characters with one photo taken on 16 August 2016 showing a canid with an estimated body lentgh ca. 1.5 m. Hair samples collected on the study site key to red wolf confirming the presence of *Canis rufus* in east Texas. Demographics of the population are not known. Activity patterns of the population, based on trail camera data, indicate the population in east Texas is predominately nocturnal (82.7% of pictures between sunset and sunrise) with the mean time of activity ca. midnight and a peak of activity ca. 1.5 hr after sunset.

8:30 030.153 U **Snail Slime in Real Time: qPCR Detection of Environmental DNA with Apple Snails**, *Madison Granier, Southwestern University; Matthew Barnes, Texas Tech University; Romi L Burks, Southwestern University*
Understanding origin, state, transport, and fate of environmental DNA (eDNA) provides insight into its utility and limitations, thereby improving confidence in conservation studies. Environmental DNA represents extra-organismal genetic traces that individuals release into their environment such as sloughed cells or bodily fluids. Conservation efforts have documented more sensitive, cost effective results from eDNA rather than traditional survey methods. Studies that develop eDNA approaches in aquatic systems commonly use amphibians and fishes, despite the fact that freshwater snails represent highly diverse and widely distributed invertebrates. We focused on eDNA production from freshwater apple snails (*Pomacea maculata*) and investigated how abiotic factors influence eDNA degradation. We placed adult snails in a two-by-two mesocosm design (N=5) with warm and cool temperature treatments crossed with freshwater and salt treatments (6 ppt). DNA accumulated over 72 hours, at which point snails were removed and DNA degradation occurred over the next 72 hours. We took water samples (250 mL) at 12 time points and then ran material through 1.2 µm Isopore membrane filters to retain eDNA (feces, slime, tissue, etc...), which we later extracted with chloroform to obtain total genomic DNA for use in quantitative PCR (qPCR). At peak eDNA accumulation, our preliminary results show an increase in eDNA production at higher salt and warmer temperature, possibly due to the active nature of the snails or stabilization of eDNA by salt. Overall, this research will continue to add valuable insight into the ecology and persistence of eDNA, particularly about

the ultimate fate of eDNA.

8:45 030.154 U **Using citizen science to predict migration patterns: a case study with hummingbirds**, *Houston Glover, Schreiner University; Wesley Craig McCain, Schreiner University; Chris Distel, Schreiner University*
Citizen science databases like eBird can be useful tools for predicting when certain species will appear regionally, but are based on non-standardized survey methods. We compared migration timing and abundance of black-chinned hummingbirds predicted by eBird with standardized observations in Kerr County. Total eBird predictions did not match our observations. However, using only el Nino year predictions approached observed hummingbird abundances. Using this common species as a surrogate we hope to help streamline predictive power of citizen science projects for threatened species.

031. Freshwater Science Oral Session II and Section Meeting
8:00 to 9:15 am
York Science Center, YSC 117
Freshwater Science
Freshwater Science Oral Session II and Section Meeting Participants:

8:00 031.156 U **Effects of the Insecticide Imidacloprid on Competitive Feeding and Mating Behaviors in the Western Mosquitofish,** *Gambusia affinis*, *Skylor Ryan Matchett, St. Edward's University; Bailey Ann Pishner, St.Edward's University; Fidelma O'Leary, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*
The central focus of this research was to identify the effects of the organophosphate Imidacloprid, an insecticide found in stream runoff, on aggressive and foraging behaviors in the Western mosquitofish, *Gambusia affinis*. We tested the hypothesis that individuals exposed to the pesticide would show reductions in competitive abilities and disruptions in mating behaviors. Natural levels of Imidacloprid concentrations were mimicked in laboratory (low, medium, high concentrations) and males and females were exposed to their randomly assigned concentration treatments over four weeks. Two weeks into the experiments, and then again at four weeks, foraging and mating behaviors of focal males and females were recorded after inducing competition with unexposed fish (control treatment). To date, preliminary results show that there is no significant impact on the behavior of mosquitofish when exposed to Imidacloprid, however further analysis is required. Due to the widespread range of mosquitofish and the large-scale use of Imidacloprid as a pesticide, this experiment seeks to find what adverse effects impact non-target organisms in aquatic ecosystems. *Gambusia affinis* play an integral role within various aquatic communities, while also serving as a model organism for the potential effects that Imidacloprid runoff could have on other insectivorous, freshwater fishes.

8:15 031.157 U **Effects of the Insecticide Imidacloprid on Female Life History and Fitness in the Western Mosquito Fish** *Gamusia affinis*, *Bailey Ann Pishner, St.Edward's University; Skylor Ryan Matchett, St. Edward's University; Fidelma O'Leary, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*
The effects of cognitive disruptors such as insecticides on non-target organisms have global implications and need further research. This study was conducted to analyze the effects of the organophosphate insecticide Imidacloprid (found in freshwater runoff) on reproduction and fitness of the female western mosquitofish *Gambusia affinis*. Under controlled laboratory conditions and using natural concentrations of pesticide found in local streams we exposed female fish over 28 days to three levels of pesticide (low, medium, and high) with a control treatment of no pesticide. After 28 days of exposure, the female's eggs/embryos were extracted, staged and classified as reabsorbing, a potential signal of compromised reproduction from pesticide exposure. Body condition (soluble fats) of females was also assessed using a series of petroleum ether washes. Results currently are being analyzed and will be presented for our full sample of experimental individuals (N=34).This research will shed light on the impacts of a widely used insecticide on a model vertebrate aquatic organism, allowing us to better understand effects of pesticides on reproduction of non-target organisms.

8:30 031.158 U **Habitat Selection and the Ideal Free Distribution in a Freshwater Crustacean**, *Devin John Herd, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*
Habitat selection is a fundamental element of an organism's fitness because habitat determines availability of food, mates, and other resources. Habitats are often patchy, and vary substantially in quantity and quality. This, in turn, may affect the dispersal of organisms within patches. We used the freshwater amphipod *Hyallela azteca*, an important indicator species for freshwater aquatic ecosystems, to determine if freshwater crustaceans disperse themselves among habitats according to the ideal free distribution. Ideal free distribution predicts that individuals will place themselves in their most preferred habitat patches that will yield for them their best fitness. Laboratory experiments were conducted using field samples collected from the San Marcos River in order to determine habitat preference of the amphipods. Sets of ten replicates were done at a time using three different forms of habitat vegetation algae, *Hydrilla*, and coontail. Vegetation was cleaned, inspected, and

weighed and for each replication the amphipods were sexed. Vegetation was then placed in smalls bins with spring water, then an amphipod (either male or female) was placed in the middle of the bin. Results were then recorded 24 hours later. Our results showed a preference between algae and coontail. We are currently in the process of testing these two preferred habitats with leaf litter in order to quantify their habitat preferences. Habitat preferences will be determined and quantified to be used in ideal free distribution experiments.

8:45 031.159 U **Vertical distribution and seasonal recruitment of zebra mussels in a central Texas reservoir**, *Devin Garcia, Temple College; Jason L Locklin, Temple College*
The continued southern expansion of zebra mussels through North America demonstrates the mussel's invasion success despite the variability of the systems they invade. In this ongoing study, we estimate mussel recruitment and the vertical distribution through time in Lake Belton, a system that was first reported to have mussel infestations in September 2013. Three 3/16-in chains were suspended from a marina to the substrate every eight weeks beginning in March 2016. Mussel counts on each chain were made monthly at 1-m intervals. Water temperature was measured every six hours and dissolved oxygen (DO) monthly. Little recruitment was observed during the first eight weeks of exposure in all treatments; however, after 12-weeks of exposure, recruitment improved so we report recruitment densities following a 12-week exposure period. Mussel densities ranged from 0 – 4,715 /m2 with most recruitment occurring between April-July. Water temperatures range from 15°C (59°F) in March to 31°C (87°F) in August with no summer stratification evident at the collection site. DO ranged from 3.03 – 9.53 mg/L. Shortly after the peak density was observed, a drastic decline in population numbers occurred (4,715/m2 to 36/m2). We suspect that the elevated temperatures and/or decreased DO levels, possibly associated with a wet late spring and early summer, may have been the source of the decline. Although thermal limits of zebra mussels were predicted to restrict their expansion into southern subtropical systems, DO fluctuations associated with excessive heavy allochthonous inputs during wet seasons/years that are typical of reservoirs may be the critical stressor.

032. Graduate Student Competition I
8:00 to 9:00 am
York Science Center, YSC 102 - Brindley
Graduate Student Paper Competition
Graduate Student Competition I
Participants:

8:00 032.161 G *Through the eyes of a salamander*, **a transcriptome wide analysis of ocular development**, *Ruben Tovar, The University of Tulsa; Ron Bonett, The University of Tulsa*
Comparative studies in evolutionary developmental biology have revealed otherwise enigmatic genetic mechanisms underlying divergent phenotypes. Cave adapted organisms provide an ideal platform for comparing disparate phenotypes, yet most remain understudied due in large part to their relatively inaccessible habitats. Interestingly, the central Texas *Eurycea* clade exhibits a continuum of karst salamander phenotypes. The Comal blind salamander (*E. tridentifera*) is considered a stygobiont because it completes its life cycle in an aquatic subterranean habitat where it lives in perpetual darkness. Consequently, *E. tridentifera* exhibits a broad head, gracile limbs, limited pigmentation and highly reduced eyes. In contrast, the Texas salamander (*E. neotenes*) is epigean and is endemic to surface habitats, and exhibits small robust limbs, pigmentation, and well developed eyes. Given the paucity of studies holistically identifying gene expressions responsible for divergent phenotypes, our goal is two-fold; First, to determine the genes responsible for divergent ocular phenotypes through development. Second, to identify differential expression and potentially novel candidate genes. To determine the sequence of events during development that lead to widely disparate ocular outcomes and to gain insights into the molecular mechanisms responsible, a series of developmental stages were obtained from the two species (*E. neotenes* and *E. tridentifera*). We used RNA-sequencing (RNA-seq) to compare gene expression through a developmental series between the two divergent phenotypes by identifying Gene Ontology terms. Herein, we present an ongoing transcriptomic analysis of two divergent *Eurycea* species. Importantly, this study provides initial insight to the genes responsible for divergent ocular phenotypes in a stygobitic tetrapod.

8:15 032.162 G **Analysis of skeletal part proportions of mammalian microvertebrates taken by barn owls (*Tyto alba*) in southern Africa**, *Timothy Lee Campbell, Department of Anthropology, Texas A&M University; Zachary W. Pierce, Department of Biological Sciences, Sam Houston State University; Frank Senegas, Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements, Université Pierre et Marie Curie; Patrick J. Lewis, Department of Biological Sciences, Sam Houston State University*
Owls are predators of small animal communities and are useful in studying them as they preserve parts of prey consumed in the form of regurgitated pellets. Analyses of pellet contents have long contributed valuable information on modern microfaunal community composition. Additionally, the contribution of owls to the fossil record is also well documented with the fossilized remains of prey commonly used to reconstruct paleoenvironments. In many studies prey

craniodental remains feature prominently in analyses, while postcrania are generally not considered. As studies have noted inter and intraspecific variation among owls in prey skeletal part proportions recovered, sole reliance on craniodental remains may underestimate the true number of prey taken, thus influencing analyses relying on count data. Here we present results on the skeletal part proportions of mammalian microvertebrates recovered from six barn owl roosts: three from Namibia, two from South Africa, and one from Botswana. Individual skull (mandibles and maxillae), appendicular long bone (femora, tibiofibulae, humeri and radii), and girdle elements (scapulae and os coxae) were sided, identified to order, and used to calculate minimum number of individuals (MNIs) per skeletal region. Results show that for most roosts, MNIs calculated using the appendicular elements are higher than those calculated using skull elements, with the tibiofibula being the most common postcranial element found. Counts of girdle elements produced the lowest MNIs, while the highest were calculated using all elements combined. Supporting previous studies, these results further highlight the need for including postcrania in any analyses dependent on accurate prey count data.

8:30 032.163 G **Biopolymers as Treatment Agents for Crude Oil-Contaminated Seawater**, *Thelma Ameh, Tarleton State University; Rajani Srinivasan, Tarleton State University*
Crude oil spillage a global environmental issue, requires technical knowledge for its recovery. Various mechanical, chemical and biological techniques have been used to recover oil spills from coastal waters, however such processes are cost-demanding and may often lead to subsequent environmental pollution. The present feasibility study aims to develop plant sorbent materials for cleaning crude oil spills. Plant materials offer the advantage of affordability, biodegradability, hydrophobicity and high absorption rate. The plant materials include fenugreek seeds (*Trigonella foenum-graecum*), psyllium husk (*Plantago* spp.), okra fruit (*Abelmoschus esculentus*) and tamarind seed (*Tamarindus indica*). Research on these plant polymers have shown interesting properties in removal of suspended and dissolved solids from industrial waste water. Tamarind and psyllium polymers were obtained from industrially prepared samples while fenugreek and okra polymers were extracted in the laboratory using standard methods. Seawater was also prepared in the laboratory. Treatment groups include aqueous mixtures of the 4 single polymers as well as 6 combinations of 2 polymers. These treatments were added in 12 concentrations ranging from 0.10 g/L to 12.00 g/L to seawater samples spiked with 5% crude oil. Crude oil recovery was achieved by using the U.S.EPA Method 1664B with n-hexane as the extraction solvent. Chromatographic analysis on the crude oil recovered after extraction will determine the hydrocarbon components removed by the plant polymers. Results obtained from this research would further enhance knowledge on the application of biopolymer-based crude oil treatment as well as promote their application in an effort to phase out synthetic sorbent materials.

8:45 032.164 G **Honey bee health in Texas: A comprehensive survey**, *Nicole J. Traub, Texas Invasive Species Institute, Sam Houston State University; Bridgette N Rose, Texas Invasive Species Institute, Sam Houston State University; Autumn J. Smith-Herron, Texas Invasive Species Institute, Sam Houston State University; Alexandra Herrera, Texas Invasive Species Institute, Sam Houston State University; Brian Chapman, Texas Invasive Species Institute, Sam Houston State University*
Wild and commercial honey bee populations play a significant role as pollinators. Unfortunately, honey bees are declining due to a phenomenon known as Colony Collapse Disorder (CCD). Several potential agents (i.e. pesticides, loss of habitat, disease) have been hypothesized to cause CCD; however, no definitive cause has been identified. We are the first to perform a two-year holistic statewide survey to examine honey bees and apiaries for the presence of external and internal parasites, pest species, and hybridization with African honey bee populations in Texas. We visited 60 apiaries and sampled 12 feral colonies throughout 10 Texas ecoregions from April-October, 2016. We found 4 colony pest/disease agents in 50 apiaries: *Varroa destructor* (varroa mite), *Aethina tumida* (small hive beetle), *Nosema ceranae*, and *Galleria mellonella* (greater wax moths). We used honey bee behavior to preliminarily determine if the colony was hybridized with Africanized honey bees. We used molecular analysis to determine the lineage of the honey bees and identified 7 subspecies from 8 Texas ecoregions in 2016. We developed a cost-effective system to help maximize sampling efforts to apiaries we were not able to visit. We involved apiarists and the community by way of attending local beekeeper association meetings and developing a dedicated webpage within our website (tsusinvasives.org) that provides distribution maps, taxonomic keys, written descriptions, and photographs of the pest/parasite species for educational purposes.

033. Neuroscience Oral Session and Section Meeting
8:00 to 9:00 am
Wells Science Hall, WSH 131
Neuroscience
Neuroscience Oral Session and Section Meeting
Participants:

8:00 033.165 G **The Impact of Sub-Chronic Exposure to Ozone on the Electroretinogram: Rodent Scotopic Vision Alterations**, *Jordan Michele Wetz, University of the Incarnate Word*

This work is an extension of the previous work, and will discuss the response to extended period of air pollution, or sub-chronic exposures. The Electroretinogram (ERG) is used to assess photoreceptors and second order neurons in the retina. The purpose of this study is to investigate the effects of ozone in the dark and light adapted retina of Long Evans rats. Age- and sex- matched rats were randomly separated into two groups; six control (clean air) and six acute O3- exposed (0.4 ppm for four hours/day). In each rat, the scotopic and photopic ERG was measured for 1, 7 and 14 days. Recordings were performed under general anesthesia (ketamine 70mg/kg, xylazine 2.5 mg/kg, IP). Active corneal electrodes were designed for use in rats. A ground needle electrode was placed subcutaneously in the flank of the animals. Pupils were dilated with 2.5% phenylephrine and 1% tropicamide. Lubrication and proper electrical conductance of the active electrode were maintained with Refresh lubricant eye drops. Rats were dark-adapted for 30 minutes before ERG responses were measured. Experimental results indicate sub-chronic exposures to O3 significantly reduced the scotopic a-wave amplitude as a function of time at intensities ranging from -0.001 to 25 cd.s/m2 increasing from a wave through mean of 11 μV. The photopic response was not significantly changed. This work demonstrates ozone exposure results in alterations in the rod photoreceptor vision pathway as indicated by the scotopic ERG and suggests that air pollution may contribute to night-vision deficits in populations living in air-polluted environments.

8:15 033.166 U **The octopamine receptor Octβ1R is required for olfactory memory formation.**, *John Martin Gabriel Bermeo Sabandal, MARC Program*
Associative learning is a fundamental form of behavioral plasticity. It is indispensable for many organisms to appropriately respond to external cues predicting danger or reward for survival. Monoamines are key mediators of learning and memory. In particular, dopamine regulates both aversive and appetitive learning and memory while octopamine mediates appetitive olfactory learning. Here, we investigated the role of octopamine in aversive learning and memory using the negatively reinforced olfactory conditioning. Wild-type *Canton-S* flies showed robust learning and normal memory. However, the flies deficient in the octopamine receptor Octβ1R exhibited poor learning with relatively normal memory decay. The critical neural site where Octβ1R regulates aversive olfactory memory formation is the mushroom bodies, an important neural substrate previously demonstrated to mediate various forms of high order brain functions. This suggests that the octopamine signal through the Octβ1R receptor in the mushroom bodies is critical for aversive memory formation.

8:30 033.167 G **Transcranial laser stimulation of the human prefrontal cortex improves decision-making**, *Celeste Lizeth Saucedo, University of Texas at Austin; Nathaniel J. Blanco, Ohio State University; Douglas Barrett, University of Texas at Austin; Francisco Gonzalez-Lima, University of Texas at Austin*
Transcranial infrared laser stimulation is a novel, non-invasive technique that uses directional low-power and high-fluence light from infrared lasers to enhance neurobiological functions. The molecular target is the mitochondrial respiratory enzyme cytochrome oxidase, which is the major intracellular acceptor of photons from near-infrared light in the brain. Applying laser light with the specific wavelength of 1064 nm maximizes tissue penetration and upregulates cytochrome oxidase activity. This upregulation enhances cerebral oxygenation and energy production, which facilitates cognitive performance. Aimed at the prefrontal cortex, a single session of transcranial infrared laser stimulation has caused improvement in sustained attention, working memory, and executive functions. This evidence suggests this technique may have a broad range of applications; however, other cognitive functions have yet to be investigated, including decision-making. Considering the increasing importance of our decisions as we get older, and the pressure under which these decisions are often made, there is a pressing need for developing new empirically-validated neurocognitive approaches to enhance decision-making. We directly investigated the influence of transcranial infrared laser stimulation on decision-making tasks in healthy adults. Participants received either active or placebo transcranial laser stimulation targeted at the right lateral prefrontal cortex. Results showed transcranial infrared laser stimulation provided significant beneficial effects on decision-making processes. These included the participants' ability to better explore alternatives, and to learn the value of actions when those values are contingent upon past behavior. We concluded that prefrontal infrared stimulation improves human decision-making performance.

034. Systematics & Evolutionary Biology Oral Session II and Section Meeing
8:00 to 9:15 am
Wells Science Hall, WSH 341
Systematics & Evolutionary Biology
Systematics & Evolutionary Biology Oral Session II and Section Meeing
Participants:

8:00 034.169 U **Male sperm expenditure and behavioral shifts across varying social conditions in the western mosquitofish**, *Amber Raven, St. Edward's University; Donelle Robinson, City of Austin; Raelynn Deaton Haynes, St. Edward's University*
The western mosquitofish (*Gambusia affinis*) are a live bearing species in which males employ a coercive

mating system. Our objective in this study was to determine whether the social environment of these male *G. affinis* affects their sperm expenditure and mating behaviors. This was done by separating focal males into tanks with varying social settings, including a control with no stimulus fish, a treatment with only female stimulus, and competition treatment each with a female and either one or two stimulus males. These males were in these settings for 7 days, with sperm being collected on days 4 and 7, and behaviors observed on day 4 previous to sperm collections. We hypothesized that the social environment would indeed affect the mating behaviors and sperm expenditure in this model species. Our initial prediction was that males that had been exposed to male competitors would display fewer mating behaviors but more gonopodial displays and sperm expenditure. Conversely, males that had been isolated or exposed only to females would mate more frequently but would have lower sperm expenditure and fewer gonopodial displays. To date, our behavioral data has been analyzed and indicates that the social environment of male *G. affinis* does not influence their mating attempts or the frequency of gonopodial displays, though mating attempts were approaching significance with a p value of 0.147. However, we have yet to complete analysis of our sperm data. These samples are currently being counted and will be presented.

8:15 034.170 G **Succession of microbial communities within bone marrow over the course of human decomposition**, *Mary Nichole Ruble, Department of Biological Sciences, Sam Houston State University; Patrick J. Lewis, Department of Biological Sciences, Sam Houston State University; Aaron Lynne, Department of Biological Sciences, Sam Houston State University*

Decomposition is not a static state. Scavengers, weather, and various other biotic and abiotic factors all play a role in the rate and stages of decomposition. Microbes are also included in these factors, acting as agents of decomposition from the start of cell death through the bloat and purge stages to the dry phase. Decomposition studies focus on characteristic stages of decomposition and the factors that affect them; however, only recently has research utilized metagenomics to look at shifts in microbiomes, or microbial succession, as another aspect of these stages. Here we present a novel methodology for observing microbial succession during decomposition as well as our preliminary data. Three cadavers were placed at the Southeast Texas Forensic Science (STAFS) facility in Huntsville, TX in May 2016. Bone marrow from the femur, pelvis, and humerus of each cadaver was extracted over the course of three months using a medical-grade bone marrow biopsy tool. Bones on the left side were sampled every two days for the femur and pelvis and four for the humerus while bones on the right side were sampled every ten and eight days, respectively, as a control for contamination. Samples were submitted for PCR amplification and Illumina sequencing of the 16S rRNA gene. Resulting sequences were analyzed for differences within and between cadavers as well as for changes over time. Preliminary data suggests that the succession of the bone microbiome over time may improve estimates of postmortem interval and be of use to forensic investigations.

8:30 034.171 G **When adding data to a morphometric analysis is more hindrance than help**, *William Gelnaw, The University of Texas at Austin*

Intuitively, it would make sense that adding information should improve an analysis. The trends in comparative methods and the use of morphometrics over the last decade have been toward adding more measurements or landmarks to estimate the shape of a feature, and towards adding a phylogenetic context. However, there are scenarios when adding landmarks and phylogenetic context actually leads to less accurate results. Most techniques for estimating the shape of a structure involve some form of dimension reduction, usually principal components analysis or factor analysis. However, unless there are at least five times as many observations as there are variables, then accuracy of the dimension reduction model decreases dramatically with each additional variable. Because landmarks used in geometric morphometrics are composed of two or three variables each, adding landmarks on a small sample of specimens can give wildly inaccurate principal components. Phylogenetic context can actually be a hindrance when attempting to identify an unknown sample using discriminant function analysis. In cases where there is an ecological signal overprinted on the phylogenetic signal in the data, adding a phylogenetic context actually limits the flexibility of discriminant function analysis, and diminishes the accuracy of its classifications. These phenomena are often overlooked and should be considered as potential pitfalls when using morphometrics.

8:45 034.172 G **Range Expansion Of An Exotic Asian Snail (Melanoides Tuberculata) Into Central Texas Rivers, And The Parasitological Consequences Thereof**, *Stephen Harding, Texas State University and Bio-West, Inc.*

The invasive snail *Melanoides tuberculate* Thiaridae) has been established in Texas since the 1960s. Prior to 2009, known distributions of M. tuberculata in Central Texas were restricted to thermally stable spring runs. Previous studies have experimentally established the lethal thermal minimum and maximum for this species and suggest survival outside stenothermal conditions is unlikely. In 2012, snails were detected outside of these known thermal ranges in waters colder than the experimentally determined lethal thermal minimum.

The objective of this study was to assess phenotypic and genetic differences between snail populations found in thermally stable and unstable habitats. Multivariate analyses were used to qualitatively and quantitatively partition variation in conch morphology within and among several Texas snail populations. A subset of snails was subjected to molecular analyses using primers targeting the mitochondrial 16S rRNA gene. Phylogenetic analyses of molecular data revealed snails from thermally unstable habitats are genetically divergent from snails found in thermally stable habitats. Genetic diversity of local snail populations was compared against global *M. tuberculata* 16s rRNA sequence data available from GenBank. This study detected evidence for multiple *M. tuberculata* introduction events in Texas, and it also suggests stenothermal restrictions are not applicable to all haplotypes.

036. Poster Session II
10:00 to 11:30 am
Isabelle Rutherford Meyer Nursing Education Center, NEC Hallway
Botany
Botany Posters
Participants:

036.174 U **Bacterial characterization of the root microbiome**, *James Stewart, St. Edward's University*
The root microbiome is defined as the fungal and bacterial communities present in soil interacting with plant roots, contributing to plant health, pathogen resistance, and nutrient acquisition. The root microbiomes of nine species of plants were sampled at Wild Basin Creative Research Center in Travis County, Texas. The samples were derived from four regions: (1) bulk soil (soil outside the rhizosphere not penetrated by plant roots); (2) neighboring soil (soil that surrounds the rhizosphere), (3) rhizosphere (within 2mm of soil touching the root and root hairs), and (4) endosphere (plant tissues). Total genomic DNA was isolated from each of these fractions and bacterial 16S rDNA (V4-V5) sequenced. We report data derived from the analysis of 16S rDNA sequences from all nine species using the QIIME analysis pipeline. Preliminary analysis supports the hypotheses that there are species-specific microbial communities, and for recruitment of specific communities within each soil fraction sampled. Further analysis grouped genomic data comparing monocots and eudicots in order to identify class-specific communities. Support for monocot- and eudicot-specific communities for neighboring, rhizosphere, and endosphere has been obtained. Further research seeks to identify possibly co-occurring bacteria, and predict metagenome functional content.

036.175 G **Does parasitism in a mutualistic pollination system of water lilies increase plant fitness?**, *Ernesto Herrera, The University of Texas - Rio Grande Valley; Sarrah Rodriguez, The University of Texas - Rio Grande Valley; Raymundo Davalos, The University of Texas - Rio Grande Valley; Andrew McDonald, University of Texas Rio Grande Valley*
Water lilies (*Nymphaea* spp.) have flowers that open for three consecutive days, during which they are functionally pistillate on the first day and functionally staminate on the second and third days. On the first day, flowers fill their ovary disk with a nectar-like fluid that washes the pollen off visiting insects to affect pollination. Some insects, mainly smaller bees, may get trapped in this liquid and drown. To further explore this parasitic behavior in a pollination system, we have studied wingless *Drosophila* under experimental bathing conditions and find that nectar from *Nymphaea ampla* DC. stupefies the bees more than baths in water (control) and aqueous solutions of 10% ethanol. This finding suggests that the flowers are producing a chemical that slows down pollinators, presumably for a more efficient transfer of pollen from moribund visitors. We are currently measuring differing rates of seed set in the field that result from flowers that have no visitors, that experience pollinator visitations without lethal events, and that experience one or more lethal events. Statistical analyses will be undertaken to ascertain if a lethal event or multiple lethal events in a single flower correlates with higher seed set for that flower, thereby affecting plant fitness. Future research will be undertaken on physiological effects of nectar from *N. ampla*, *N. elegans* Hook., and *N. nouchal* Burm. on *Apis mellifera* L. and native bees.

036.176 U **Effects of the fungal microbiome on phosphorus sensitivity in the common bean, *Phaseolus vulgaris* L.**, *Jacquelyn Turcinovic, St. Edward's University; Charles Hauser, St. Edward's University*
The plant microbiome provides critical links between above and below ground processes in terrestrial ecosystems, and its composition has been attributed to various factors including plant genotype. Additionally, fungal assemblages are known to facilitate plant uptake of essential nutrients, such as phosphorus. This element is essential for plant growth and nutrition; however, phosphorus-depleted soils limit plant growth worldwide. This greatly reduces farmland productivity, and phosphorus-efficient plant varieties are of great interest to agricultural researchers. To investigate phosphorus-efficiency in the common bean, *Phaseolus vulgaris* L., the fungal microbiomes of phosphorus-insensitive (BAT477) and phosphorus-sensitive (DOR364) varieties were sampled after five weeks of growth in a 1:1 sand:vermiculite soil. Watering with Hoagland's solution thrice weekly controlled access to essential nutrients. We hypothesize phosphorus-insensitive plant varieties are able to sustain normal metabolism under phosphate stress by interacting with select fungi that facilitate phosphorus uptake; thus, we

predict there will be enrichment of certain fungi within BAT477 roots not enriched in DOR364. DNA will be extracted, and 18S rDNA (ITS1-ITS2) will be sequenced from three soil fractions associated with each *P. vulgaris* variety: soil outside the rhizosphere not penetrated by plant roots (bulk); one to two millimeters of soil touching the root and root hairs (rhizosphere); and within plant tissues (endosphere). The QIIME analysis pipeline will be used in conjunction with ITS extraction (ITSx) to analyze fungal populations based on ITS2 sequences, which will allow the characterization of alpha and beta diversity.

036.177 G **Floristic records and major range extensions for vascular plants from Erath County**, *Turner Cotton, Tarleton State University; Allan D Nelson, Tarleton State University*
Having an updated list of flora for a county is important for identifying changes in species' distributions. This can be used in management plans for conserving endangered species, documenting the spread of invasive plants, and to record plants that occur in the county. New plant records and major range extensions were reported for 22 locations across Erath County. Plant specimens were mostly collected from September 2003 to April 2008, with new collections occurring at the Bosque River site. Recent collections were compared to known distributions in Erath County based on the atlas of plants for the state. There were 79 plant records for Erath County and 28 major range extensions found.

036.178 G **Mulitivariate comparative analysis of eight Tamaulipan plant communities: structure and ecological characterisitics**, *Raziel Flores, University of Texas Rio Grande Valley (UTRGV)*
South Texas occupies a biogeographic transition zone between temperate North America, the Mexican neotropics and Chihuahuan desert, and has consequently been recognized distinctly as the "Tamaulipan brushlands." No comprehensive, comparative study has ever been undertaken, however, on the many and varied plant communities that occur in the region. Ongoing studies are comparing and contrasting eight refugial, primary plant communities in the Lower Rio Grande Valley to test the null hypothesis that they comprise to a single definable vegetative type. Two 50 m transects have been established randomly at each site and all woody plants over 1 m in height are being mapped within 10 m to each side of the transect. A total of 2,000 m² will be surveyed at each site. Plant height, spatial distance from neighboring plants, and canopy cover will be recorded to measure frequency, density, dominance, and the importance value of each woody species. Species-area curves will estimate the minimum quadrant size necessary to adequately characterize a community. R statistical software using the multivariate analysis package "MVA" and the ecological analysis package "Vegan" will be used to compare and contrast similarity between each site using multivariate analyses. Results will provide baseline data and perspectives on the variability of two of South Texas's natural habitats.

036.179 G **Prevalence of arbuscular mycorrhizal populations in salt impacted soils on Galveston Island**, *Angela Rittenberry, Stephen F. Austin State University; Jezreel Lopez, Stephen F. Austin State University; Josephine Taylor, Stephen F. Austin State University; Stephen Wagner, Stephen F. Austin State University; David Creech, Stephen F. Austin State University*
Microbiological and microscopy techniques were used to assess arbuscular mycorrhizal (AM) populations in salt-contaminated soils from Galveston Island, Texas. *Gomphrena serrata* L. (Amaranthaceae), *Gaillardia puchella* Foug. (Asteraceae), and *Digitaria* spp. (Poaceae) were collected from the plant community to determine the prevalence of AM colonization on these native species. Roots were cleared in 10% KOH and stained in 5% Schaffer's black ink dissolved in vinegar prior to analysis with light microscopy. Soils from the same area were diluted using a sand vermiculite mixture then seeded with ryegrass (*Lolium* spp., Poaceae) to perform a most probable number (MPN) assay in order to estimate native AM populations overall. Ryegrass roots were cleared and stained as described above. Through microscopic examination it was determined that all three native plant species exhibited AM associations, as evidenced by the presence of fungal hyphae, vesicles, and arbuscules within their root tissues. Results of the MPN index revealed a range of 2.9 x 10⁴ to more than 1.1 x 10⁸ AM propagules per gram of soil. Taken together these data indicate that plants on Galveston Island are associated with an active AM community. Research is ongoing to determine the role of that these fungi play in alleviating salt stress for their plant symbionts.

036.180 U **The effects of phosphorus deficiency in two genotypes of** *Phaseolus vulgaris* **L. (Fabaceae)**, *Kaitlyn Shay Cox, Student; William Quinn, St. Edward's University*
Throughout the world, especially tropical areas, soils are phosphorus deficient, and agricultural production is adversely affected. Fertilization with phosphorus can alleviate that, but such fertilizers can be harmful to aquatic ecosystems, are expensive, and are a limited resource. Some cultivated varieties of staple crops outperform others in phosphorus deficient areas without fertilization. Root hair length in particular increases phosphorus acquisition rates in plants by expanding the zone of maximum absorption in low phosphorus conditions. In this project, we examined how two cultivars of *Phaseolus vulgaris* L. (Fabaceae), one of

which has been shown to perform well in both high and low P environments (P insensitive, BAT477) and the other of which performs poorly in low P environments (P sensitive, DOR364), responds to different levels of available P. We hypothesized that BAT477 would have longer root hairs than DOR364 in low P environments. Our results support that hypothesis. However, we also hypothesized that root hair length would increase in low P environments for both varieties. Our results contradict that hypothesis.

Cell and Molecular Biology

Cell & Molecular Biology Posters

Participants:

036.181 N **A Preliminary Analysis of the Bacteria Harbored by Pillbugs**, *David E. Starkey, The University of the Incarnate Word*

Pillbugs (Armadillidium vulgare) are ubiquitous. As result, humans frequently encounter them in nature. One of the most frequent things people do when they find these animals is to pick them up and watch their characteristic behavior - curling up in a ball. In performing this activity, people are exposed to any bacteria that are harbored by the pillbugs – which could be transferred to them. Therefore, the purpose of this study was to identify the bacteria that are commonly found on pillbugs and determine if there are any that are potentially pathogenic to humans? Overall, 11 distinct genera of bacteria were isolated across our 4 time points. These 11 genera were found to represent 18 unique species of bacteria. Bacillus was represented by the most species with 6 followed by Aeromonas with 3. B. cereus was found across all time points. Two species were found at 2 time points, no other species was found at more than a single time point. Of the bacteria identified in this study, there are 2 (B. cereus and A. hydrophila) that are potential human pathogens. Overall, this study suggests that there is a wide array of bacterial diversity associated with pillbugs. In addition, these data suggest that the bacterial fauna associated with these animals changes overtime. Lastly, these data suggest that there are potential human pathogens harbored by pillbugs and care should be taken when handling these organisms so these pathogens are not transferred to humans.

036.182 U **Characterization of stem cell populations using EdU proliferation assay in a regenerating model system.**, *Christina N Mercado-Venegas, Univ. of the Incarnate Word; Veronica Giselle Martinez-Acosta, Univ. of the Incarnate Word*

Lumbriculus variegatus is an ideal model organism for studying regeneration. In regenerating annelids, a population of stem cells called neoblasts, have been described to migrate from along the ventral nerve cord to a wound site for tissue repair (Zattara and Bely, 2016). Our lab would like to demonstrate if neoblasts or another population of stem cells is utilized in Lumbriculus to complete regeneration. The Click-iT EdU imaging kit (ThermoFisher Sci.) was used to identify and label stem cells in fixed tissues. The Click-iT EdU protocol does not denature the integrity of DNA and is a relatively quick labeling method. Previously we had some success with the use of Bromodeoxyuridine (BrdU) as a stem cell marker however, the resultant staining was not as robust as seen with the EdU kit. Thus, we would like to complete a time course of EdU expression in regenerating worm fragments. We begin with treatment using different concentrations of the EdU solution ranging from 10 µM to 200 µM on age-matched regenerating worm fragments (n=12). Segmental regeneration was monitored over the course of exposure time and overall health of each worm was recorded. Worms treated with 50 µM EdU maintained proper segmental regeneration. As EdU concentration increased segmental regeneration and recovery of function was impaired. Initial imaging data suggests that posterior fragments treated between 10 µM – 50 µM, were able to incorporate EdU and thus could be effective concentrations for the full study.

036.183 U **Comparing the Effects of p53 Mutations in Mammary Carcinoma and Mutated Cancer-like Cell Lines**, *Victoria Campbell, Austin College; Madison Aliff, Austin College; Lance Barton, Austin College*

As heterogeneous diseases, cancers have multiple phenotypes that allow them to survive, proliferate, and disseminate throughout the human body. In order to circumvent apoptosis, cancer cells often develop a mutation which causes a loss of function in tumor suppressor genes. Normally, tumor suppressor p53 allows for programmed cell death. In cancer cells, mutating p53 is the most common way to avoid apoptosis and growth suppression. In this study, the effects of p53 mutations in a mammary carcinoma cell line, was compared to a another cell line undergoing the development of cancer phenotypes. This comparison was done through investigating a few of the various hallmarks of cancer, including resistance to cell death, activation of invasion and migration, and genomic instability and mutation. Data suggests that the cell line being compared to the mammary carcinoma cells is in fact cancer-like as they show some, but not all, hallmarks of cancer.

036.184 U **Effects of Hydroquinone on S17 Murine Stromal Cells**, *Geremy Lerma, Texas Lutheran University; Stephanie Perez, Texas Lutheran University*

Hematopoiesis is regulated intrinsically by cell-autonomous mechanism and extrinsically by the bone marrow microenvironment; therefore, modifications to the bone marrow microenvironment could lead to altered hematopoiesis and even hematological disease development. Exposure to higher concentrations of

benzene and its metabolites has previously been shown to be associated with the development of hematological disorders including myelodysplastic syndrome and acute myeloid leukemia. Benzene exposure can occur through contact with products and byproducts of the petroleum industry, industrial work involving benzene, and cigarette smoke. Here we determine if hydroquinone, a benzene metabolite, alters murine S17 bone marrow stromal cells including their ability to support hematopoietic cells. Cell viability tests such as the MTT and trypan blue exclusion assays showed that S17 cells treated with higher concentrations of hydroquinone had decreased cell viability measure by mitochondrial activity and membrane integrity. Cell toxicity was apparent at hydroquinone concentrations greater than at 25 μM. In addition, Annexin V detention and Caspase 3 activity assays detected membrane and protein indicators of cell apoptosis pathways with various hydroquinone concentrations. Then to determine if these alterations affected the ability of the S17 cells to support hematopoietic cells three coculture assays were performed. The ability of S17 cells to support primary whole bone marrow cells was reduced, in most when exposed to 1.25 and 10 μM hydroquinone. The results from these experiments suggest that S17 cell viability, proliferation and their ability to support primary whole bone marrow are affected by hydroquinone exposure.

036.185 U **Examining genetic and phenotypic variation of *cis*-regulatory elements in *D. simulans* and *D. melanogaster* embryos**, *Amber Randolph, St. Edward's University; Lisa M. Goering, 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. We have analyzed the *otd* CRE sequence from 9 isofemale *D. simulans* lines and find that this CRE is shorter than *D. melanogaster* sequences, harboring many additional deletions. Additionally, two of the lines show sequence elements not seen in *D. melanogaster*, suggesting the possibility of a unique haplotype structure among *D. simulans* populations. We are now determining whether these unique sequences are responsible for changes in the spatial expression of *otd* by performing in situ hybridizations to examine the pattern of mRNA expression in the different lines.

036.186 U **Exploration of the effects of *bicoid* dosage on larval phenotypes in *Drosophila melanogster***, *Zaira Villa, St. Edwards University; Lisa M. Goering, St. Edward's University*

Variation in morphological phenotypes is associated with genetic variation in developmental regulatory pathways like the anterior-posterior (AP) patterning system in Drosophila melanogaster. bicoid mRNA is maternally provided to the oocyte; after fertilization, the protein product acts as a morphogen, having concentration-dependent effects on AP pattern. Previous studies demonstrated that bicoid is dosage sensitive; variation in the number of maternal copies produces a corresponding change to the embryonic AP pattern. Variation in patterning along the AP axis can be detected in natural populations of Drosophila melanogaster. Interestingly, these embryos develop into 'normal', viable, adults, although the sizes and proportions of various segments have not been examined. In this study, the phenotypic effects of altered bcd dosage on larval morphology were investigated to determine later stage effects on AP patterning. Our hypothesis is that increased bicoid dosage will enlarge the size of the anterior larval segment thus decreasing the size of the posterior larval segments. Using four lines of D. melanogaster with varying bicoid dosages, we measured the size of the anterior segment in first instar larvae using landmark analysis; larval size was controlled using two point registration. Preliminary results suggest that there is no significant difference between the size of the anterior segment of larvae born to mothers with double the bicoid dose, however our sample size is small. If these results hold, it suggests that variation in bicoid dosage might be buffered out during embryogenesis to maintain a uniform body pattern.

036.187 U **Geographic variation of *Wolbachia*-induced cytoplasmic incompatibility in the fly *Drosophila recens***, *Sydney Keane, East Texas Baptist University; Kelly Dyer, University of Georgia*

Wolbachia are bacterial parasites that commonly infect arthropods and nematodes. These parasites have damaging effects on the progeny of those they infect, including cytoplasmic incompatibility (CI). CI occurs when an infected male and an uninfected female mate, resulting in fewer eggs that successfully hatch into larvae than normal. In this study, infected virgin males from *Drosophila recens* were collected from multiple strains across three locations, and coupled with uninfected virgin females from the same species. After

allowing the females to lay eggs for 72 hours, the number of eggs that hatched and that did not hatch were recorded. Males were tested for *Wolbachia* infection using PCR. After analyzing the data, it was found that the overall hatch rate in each location was low, the amount of CI in each location did not vary significantly, the amount of CI in the experimental group compared to the control was significantly high, and that the number of total eggs produced varied significantly between the locations. The overall percentage of CI found within all of the locations examined was approximately 72%. These results show that the presence of *Wolbachia* is similarly effecting various populations of the fly throughout North America and that the level of CI occurring within this species may cause a drastic decrease in the population size over time.

036.188 U **High fat diet increases serum estradiol in a hibernator,** *Callospermophilus lateralis*, *Ethan A Brem, Austin college; Alexandra Louise Hoffman, Austin college*

Hibernation is a highly regulated energy-saving process that some mammalian species, including the golden-mantled ground squirrel (GMGS) (Callospermophilus lateralis), undergo in order to survive periods of low food availability. Post hibernation, females undergo reproduction and lactation during which they exhibit high serum estradiol levels. Estradiol (through its receptor, ERa) is anorexigenic in non-hibernating mammals, so post-hibernation females may have conflicting hormonal signals driving food intake. To better understand how hibernators gain sufficient energy stores to survive hibernation and begin reproduction, levels of the energy-sensing enzyme, pAMPK, and the estrogen receptor ERα were examined in white adipose tissue (WAT), muscle, and the hypothalamus (the energy control center of the brain). GMGS were placed on high fat and control diets and euthanized directly prior to or directly following hibernation to determine changes in the concentrations of the proteins of interest, which were measured using western blots. Serum estradiol concentrations were measured by enzyme immunoassay. Western blot analysis and enzyme immunoassay of estradiol showed an increase in WAT, muscle, and hypothalamic pAMPK as well as in estradiol and ERα in the pre hibernation season compared to the post hibernation season. Serum estradiol concentrations were higher in the high fat group and WAT pAMPK levels were higher in the control group. Comparisons of estradiol and pAMPK in the WAT and hypothalamus as well as between estradiol and food intake and estradiol and ERa did not show the predicted correlations, indicating that estradiol may not be anorexigenic in golden-mantled ground squirrels.

036.189 N **Knockout of the HDC/histamine axis and reduction of mast cell number/function rescues Mdr2-/- mice from PSC-related biliary proliferation and fibrosis**, *Laura Anne Hargrove, Baylor Scott & White Health/Texas A&M HSC/UMHB; Heather Francis, Texas A&M University/Baylor Scott & White Hospital*

Multidrug resistance-2 gene knockout mice (Mdr2-/-) mimic human primary sclerosing cholangitis (PSC). We have shown that histamine (HA), catalyzed by l-histidine decarboxylase (HDC) induces fibrosis and knockout of HDC decreases fibrosis. Mast cells (MCs) infiltrate the liver contributing to hepatic damage. There are few MCs in HDC-/- mice and HA levels are negligible. The aim was to determine the effects of knockout of the HDC/HA axis in Mdr2-/- mice on hepatic damage/fibrosis. Mdr2-/-HDC-/- double knockout mice (DKO) were generated and homozygote DKOs obtained. Mice (DKO and Mdr2-/-) were sacrificed at 4, 8 and 12 weeks and serum and liver obtained. HA serum levels were measured by EIA. Liver damage was assessed by H&E staining and IBDM/biliary proliferation by CK-19/Ki67 immunohistochemistry. MC marker expression was measured by qPCR. MC presence was detected by mouse mast cell protease-1 immunohistochemistry. Fibrosis was evaluated using Fast Green/Sirius Red staining and qPCR for α-SMA, collagen-type 1a and fibronectin-1. HA serum levels were significantly diminished in 4, 8, and 12 week DKO mice. Hepatic damage decreased in 4, 8, and 12 week old DKO compared to Mdr2-/- controls. IBDM, biliary proliferation significantly reduced in 4, 8, and 12-week-old DKOs. MC presence and marker expression was downregulated in DKO mice at 4, 8, and 12 weeks compared to controls. Knockout of the HDC/HA axis results in loss of MCs and inhibits PSC in Mdr2-/- mice. Targeting or blocking infiltration of MCs and the HDC/HA axis may provide an alternative strategy to patients with PSC.

036.190 U **PA28γ Expression Affects the Acquisition of Cancer Phenotypes**, *George Melchor Jr., Austin College; Kylie Peterson, Austin College; Hannah Butterfield, Austin College; Bethany Bundrant, Austin College; Lance Barton, Austin College*

Although cancers arise through unique mutations, they exhibit common phenotypes including uncontrolled proliferation, avoidance of apoptosis, genetic and genomic instability, and contact-independent growth. PA28γ is a proteasome activator that is commonly overexpressed in many cancers, and correlated with the aforementioned phenotypes. The transcriptional regulator, p53, is responsible for a myriad of cell fate decisions and is mutated in over 50% of cancers. PA28γ catalyzes the ubiquitylation of p53 by MDM2, for subsequent nuclear export and degradation. In this study, PA28γ+/+ and PA28γ-/- murine embryonic fibroblast (MEF) cells were compared with a gradient

of abnormal cell lines, ranging from tumorigenic to malignant. Protein and gene expression of PA28γ and p53 were elevated across mutated and cancerous cell lines, indicating that alteration of both transcriptional and proteostatic regulation contributes to the observed accumulation. The elevation of p53 in the cancerous cell lines corresponded with lower concentrations of MDM2, indicating that in these cell lines MDM2 is more heavily implicated than PA28γ in p53 regulation. Localization of p53 across cancerous and mutated cells showed primarily nuclear residence. However, expression of p53 downstream reporters were reduced across these cell lines, indicating loss of normal function of p53. After sequencing, a single amino acid substitution was found in A9 and M158 cancerous cell lines. When treated with SCH529074 and Nutlin-3 to reactivate p53 through either reactivation of function, or decrease in degradation, cancerous cells exhibited varied responses, indicating that a combination of p53 regulation and abnormal activity through mutation contributed to resulting abnormal phenotypes.

036.191 U **Role of PA28γ in Development of Cancerous Hallmarks in Cancer Clone and Control Fibroblast Cell Lines**, *Alexandria Fusco, Austin College; Daniel Ahle, Austin College; Lance Barton, Austin College*

PA28γ is overexpressed in various cancers and correlated with the short-term prognosis. Therefore analyzing the mechanisms by which PA28γ contributes to the development of tumorigenic properties is essential. PA28γ is thought to affect tumorigenesis by degrading multiple tumor suppressor proteins which are crucial for limiting cell growth and proliferation. This study examined the development of various cancer hallmarks with differing expression of PA28γ in two different cell lines. Both the absence (PA28γ-/-) and presence (PA28γ+/+) of PA28γ were used to compare potential phenotypic differences associated with certain cancer hallmarks. Results of this study depict differences between the wild type cells and knockout cells for all the following cancerous hallmarks: resisting cell death, genome instability and mutation, and activation of invasion and metastasis. Mutagenesis enhances the presence of hallmarks in both cells irrespective of PA28γ expression. This study provided further understanding of the role that PA28γ plays in the development of certain cancer hallmark phenotypes.

036.192 U **SPOP as an Emerging Key Player in Breast Cancer Progression**, *Everardo Ramirez, University of the Incarnate Word; Marieke Oldenbroek Burleson, University of the Incarnate Word*

Personalized treatments designed to block oncogenic pathways activated by specific cancer mutations are rapidly rising as superior treatments for cancer. SPOP, Speckle Type POZ protein, mutated highly in various cancers, is a substrate binding subunit of an E3 ubiquitin ligase. We found that SPOP binds directly to GLI3, a downstream effector in Sonic Hedgehog (SHH) signaling, targeting it for degradation in a manner that is disrupted by prostate cancer-associated SPOP mutations. Recent studies indicate that SPOP is downregulated in numerous breast cancer tumors and, furthermore, a correlation has been found between high levels of SHH signaling and poor prognostic pathological breast cancer features. Therefore, we propose that downregulation of SPOP induces hyper-activated SHH signaling to promote breast cancer progression and that SHH inhibitors could prove highly beneficial for SPOP-downregulated breast cancer patients. For this study, we will generate stable knockdown breast cancer cell lines through SPOP-specific lentiviral shRNA targeting and SPOP knockout cell lines through CRISPR/Cas9 genome editing. Successfully targeted cells will be tested for hyper-activated SHH signaling through immunohistochemistry and western blotting of SHH effector proteins. Cells will then be assayed for tumorigenic properties including cell proliferation, migration, invasion, and colony formation. Finally Vismodegib's effects, a FDA approved SHH inhibitor, will be tested on SPOP-downregulated versus SPOP wildtype cells. Vismodegib is expected to greatly effect SPOP-downregulated cells making it an attractive personalized treatment for patients with SPOP-downregulated breast cancer. Since breast cancer is the second cause of cancer deaths among American women, these studies will significantly impact the epidemic.

036.193 U **Selection of suppressors of negative genetic interactions between genes involved in chromatin structure and gene expression in** *Saccharomyces cerevisiae*, *Tim Kang, Abilene Christian University; Austin Parsons, Abilene Christian University; Julia Taylor, Abilene Christian University; Sarah Lee, Abilene Christian University*

The Spn1 protein is a highly conserved and essential factor composed of an ordered core domain and disordered N- and C-termini. While current appreciation of Spn1 function is limited, the protein has been shown to function in transcription and in controlling structure and access to the DNA template. A broader understanding of the interaction partners of this protein will help to shed light on the functions of this important and essential factor. In order to identify key interaction partners of Spn1, we took advantage of negative genetic interactions between a mutant of Spn1 containing only the ordered core domain (called mini-Spn1) and genes that encode proteins involved in chromatin structure or gene expression (HTZ1, GCN5, RTT106 and DST1). We selected for spontaneous suppressors of these negative interactions and isolated several novel yeast strains capable of alleviating the negative genetic interactions of mini-Spn1.

Characterization of these strains and eventual revelation of the novel mutation will provide valuable insight into the interaction partners of the essential Spn1 protein.

036.194 U **The Story of p53 and PA28gamma**, *Simran Likhari, Austin College; Brandon Dang, Austin College; Lance Barton, Austin College*
Loss of function of p53 is present in a majority of human cancers, but more than 75% of the mutations lead to dominant-negative regulation over wild-type p53. Novel oncogenic functions that develop from these mutants lead to further exacerbation of the cancer phenotype, and propagation of mutations by genomic and genetic instability. In this study, the relationship between p53 mutations in the DNA binding domain and potential oncogenic functions are explored. Karyotype analysis of A9 cells and PA28γ-/- cancer clones containing mutant p53 show that these cells possess abnormal chromosome counts, indicative of genomic instability. Interestingly, A9 viability is not affected by SCH529074, a p53 reactivator, suggesting that the mutations may have an effect on the folding capability of the protein. Proteasome inhibition appears to also have differential effects depending on the presence of PA28γ. A9 cells are capable of migration and invasive phenotypes, while PA28γ-/- cancer clones show very little motility, which suggests that lack of PA28γ may impact migration. In conclusion, these data suggests that p53 mutations and elevated PA28γ expression may synergistically enhance the acquisition of phenotypes of cancer.

036.195 U **The role of epigenetic regulator *wdr82* in kidney formation and function**, *Eris Terra Tock, Southwestern University; Taylor Cravens, Southwestern University; Airon Wills, Southwestern University*
The gene wdr82 is a highly conserved member of the histone-modifying SET 1/COMPASS complex. Mutations in wdr82 result in multiple defects in zebrafish, a vertebrate model organism with developmental mechanisms similar to those of humans. wdr82 mutants exhibit craniofacial abnormalities as well as an absence of kidney filtration. Previous research has linked the facial deformation present in wdr82 mutants to loss of positional identity in jaw cartilage segments. Therefore we hypothesized that the observed impairment in renal function might be the result of a similar loss of positional identity. This possibility was investigated through in situ hybridization of zebrafish embryos, utilizing an RNA probe tagged with a purple stain to highlight areas of specific gene expression. In this case, the targeted genes were wt1a, which is expressed in the glomerulus at the anterior end of the kidney, and cdh17, which is expressed in the entire latter part of the organ. Following processing, the presence and correct positioning of kidney elements along the anterior-posterior axis was assessed by visually examining stain position in relation to striated muscle segments known as somites. Results showed no significant variation in the presence or location of these kidney structures between wdr82 mutants and their wildtype counterparts. Currently, we are using qPCR analysis to quantify changes in the expression of developmental markers, and plan to use in situ hybridization to examine the presence and position of other kidney segments.

036.196 U **Using forward genetic screening to uncover genes important for autophagy in** *Arabidopsis thaliana*, *Kevin Chappell, The University of Mary Hardin-Baylor; Pierce Young, Rice University; Andrew Woodward, The University of Mary Hardin-Baylor; Bonnie Bartel, Rice University*
Peroxisomes play key metabolic roles, and peroxisome malfunction causes diverse problems within organisms. One of the vital functions of a cell is to dispose of malfunctioning peroxisomes in a specialized autophagy process known as pexophagy. Currently, little is known about the cellular pathways that lead to pexophagy, so we are using the model organism Arabidopsis thaliana to uncover the mechanisms of pexophagy within plant cells. To accomplish this task we are focusing on the peroxisomal protease LON2 that has previously been associated with pexophagy. When the LON2 protease is dysfunctional, plant cells increase the rate of pexophagy, resulting in phenotypical differences compared to wild-type Arabidopsis. We are screening for secondary mutations that offset lon2 defects and partially restore cellular functions. Because disrupting autophagy suppresses lon2 defects, we expect to recover both general autophagy and specific pexophagy mutants in our screens. In the future, these plants will be subjected to further genetic testing so that we can learn more about LON2 and the specific roles it plays in the pexophagy pathway.

Chemistry and Biochemistry

Chemistry & Biochemistry Posters

Participants:

036.197 U **"Super Bulky" Guanidinates for the Synthesis of Low-Coordinate Metal Complexes**, *Brenda Ontiveros, University of Texas at El Paso*
The use of guanidinates as ligands to support metals with different oxidation states is widely explored. Their good electron-donating ability and easy modulability have led our group to explore these ligands. We have recently reported the synthesis of a "Super Bulky"guanidinate [RC(NR')2] (R = tBu2C=N, R' = 2,6-bis(diphenylmethyl)-4-tbutylphenyl) which is a highly encumbering ligand that has been shown to support formally two coordinate alkali metals of different sizes. We have begun to explore the coordination chemistry of this 'super bulky' guanidinate with various 3d-metals, such as Iron, in an

attempt to stabilize low-coordinate metal centers.

036.198 U **A Comparison of Viscosity and Surface Tension Measurements of Biodegradable and Non-Biodegradable Skin Emollients with Application to Their Environment Impact**, *Savannah Leigh Robinson, University of Mary Hardin-Baylor*
Non-biodegradable silicones are used to formulate cosmetics and topical medications. The lack of ability for these silicones to biodegrade may negatively impact the environment. In this temperature controlled investigation, the viscosities of octamethylcyclotetrasiloxane (I) and dimethylpolysiloxane (II) solutions are measured using an Ostwald viscometer, and the surface tensions of these emollient solutions are obtained using a capillary tube. These two silicones, (I) and (II), have been deemed potentially harmful to the environment by Health Canada and are under review by the United States Environmental Protection Agency. Viscosity and surface tension data of biodegradable coconut oil are determined in addition to that of the non-biodegradable silicones. The physical properties of the emollients are then compared. The results of the experiment will be analyzed to determine the possible environmental impact of commonly used compounds (I) and (II) which are widely used as skin emollients, with that of the biodegradable product.

036.199 U **A Synthesis Porphyrin-Ruthenium Polypyridyl complex for Splitting Water to Oxygen Gas**, *Aqeeb Ali, Stephen F. Austin State University; David Gonzalez, Stephen F. Austin State University*
A porphyrins ruthenium (II) polypyridyl complex (PorRuthCatalyst) was prepared to generate oxygen gas (O2) from water in hypoxic conditions. The aqueous solution of PorRuthCatalyst was found to produce oxygen gas from water upon irradiation with visible light without aid of externally added electron acceptors and photosensitizers. Interestingly, the catalytic solution was observed to be stable and its catalytic action is independent of the pH of the solution. The same catalytic solution produces singlet oxygen (1O2) in a hypoxic (a state of low oxygen concentration) aqueous solution. The singlet oxygen generation in solution was confirmed by the photooxidation of 1,5-dihydroxylnapthalene (DHN). Our results open up a new area for the development of single homogeneous PorRuthCatalyst for water oxidation and photodynamic therapy in hypoxic solution.

036.200 U **Analysis of Metal Ions in Texas Hill Country Rivers using Inductively Coupled Plasma-Mass Spectroscopy**, *Adrian J Contreras, University of the Incarnate Word; Abraham A Williams, University of the Incarnate Word; Patricia P Gonzalez, San Antonio Water Supply; Alakananda Ray Chaudhuri, University of the Incarnate Word; Nicholas Leed, University of the Incarnate Word; Edward E Gonzalez, University of the Incarnate Word*
The purpose of this study was to analyze the river waters flowing through the Texas Hill Country near the Edward's Aquifer Authority for total metal content and check the levels of toxic elements following EPA methods. The EPA has set federal standards for the amount of pollutants and metal ions allowed in surface and recreational waters. Edward's Aquifer is the major source of drinking water in many municipalities in this geographical area. Water samples were analyzed in 1) Blanco River near Blanco State Park, 2) Colorado River near Lake Buchanan, 3) Guadalupe River near Kerrville State Park, 4) Pedernales River near Pedernales State Park, and 5) Sabinal River near Lost Maples State Park. Water samples were collected in 1-liter polystyrene bottles and immediately preserved with (1:1) nitric acid and later filtered through a 0.45 μm filter. A 100 mL sample was digested with concentrated nitric acid by gentle refluxing in a hot water bath following EPA method 200.8 and analyzed for twenty-seven metals by ICP-MS (Varian 820-MS model). The results were compared to EPA limits for recreational water. Most of the metal ion levels were under the EPA regulated limits and also the State of Texas recommended levels that ensure safety for human consumption and wildlife habitation. The Sabinal River had the highest concentration of silver and copper; and the Blanco River showed the highest levels of aluminum, barium and molybdenum ions. Selenium levels were relatively similar across all rivers. Future studies will analyze organic contaminants for toxic levels.

036.201 U **Antimicrobial and Antioxidant Properties of Extracts from** *Nannochloropsis oculata*, *Gabriela A. Ortiz, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*
Nannochloropsis oculata is a marine microalgae that is commercially important for its production of omega-3 fatty acids and as a source of biofuels. In the present study, three types of extracts have been prepared from axenic *N. oculata* cultures and examined in terms of antioxidant capacity and inhibition of bacterial growth, biofilm formation, quorum signaling, and infection by human and plant pathogens. Extracts prepared for analysis included crude cell extracts (CCEs), ethyl acetate extracts of *N. oculata* growth media (MEs), and hexanes:isopropanol extracts (HIPEs, 3:1) of *N. oculata* total cell lipid (TLEs). Antioxidant capacity and biofilm formation were each assessed in TLEs and MEs using established *in vitro* assay methods. Effects on bacterial communication, or quorum signaling (QS), were evaluated through HPLC analysis of QS signal integrity in samples exposed to *N. oculata* crude cell extracts. Lipid extracts of *N. oculata* exhibited limited bacterial growth inhibition and no significant effect on biofilm formation in the Gram negative pathogens, *Stenotrophomonas maltophilia* and *Pseudomonas aeruginosa*, either alone or in combination with

selected antibiotics. Media extracts of *N. oculata* did not contain detectable amounts of the quorum signals used by many pathogenic bacteria to mediate pathogenic functions, nor did the MEs inhibit signaling or infection in bacterial assays. Crude cell extracts (CCEs) of *N. oculata* demonstrated antioxidant activity comparable to extracts of *Phaeodactylum tricornutum*, a commercially relevant marine diatom, and demonstrated significant quorum signal degradation activity according to HPLC analysis.

036.202 U **Axenation of Freshwater Microalgae Using Singlet Oxygen Generation**, *Kimberly Foster, University of the Incarnate Word; Daniel Sisco, University of the Incarnate Word; Justin Lamontagne, University of the Incarnate Word; James Martinez, University of the Incarnate Word; Maria Monroy, University of the Incarnate Word; Betsy Leverett, University of the Incarnate Word*

Axenation of microalgal cultures from three classes of algae was performed using an established method and either the singlet oxygen producing agent, Tris-(2,2′-bipyridine)ruthenium(II) ([Ru(BPY)3]2+), a non-emitting ruthenium compound, Bis-(2,2',2"-terpyridine)ruthenium(II) ([Ru(TPY)2]2+), or a combination of penicillin and streptomycin. The hypothesis of this study was that producing bacteria-free algal cultures could be accomplished as conveniently and economically with singlet oxygen generation as it can with antibiotics. The singlet oxygen agent, [Ru(BPY)3]2+, was as effective in producing bacteria-free cultures as the penicillin/streptomycin combination, and [Ru(TPY)2]2+ was not more cytotoxic to the species of algae examined than [Ru(BPY)3]2+, indicating that ruthenium toxicity will not hamper the use of these type of singlet oxygen emitters in the axenation process. Final axenic cultures obtained either with antibiotics or with [Ru(BPY)3]2+ were found to exhibit comparable growth characteristics and antioxidant activity when compared to axenic cultures obtained without any additives.

036.203 U **Blood partitioning and elimination study with SDMEX, a new cyanide antidote**, *Morgan Carpenter, Sam Houston State University; Emily Kefer, Sam Houston State University; Ivana Barrera, Sam Houston; Ramesha Dilhani Gaspe Ralalage, Sam Houston State University; Afshin Ebrahimpour, Dr.; Ilona Petrikovics, Prof.*

The toxic effect of cyanide is attributed to the inhibition of the electron transport chain and the cell's ability to utilize oxygen. SDMEX is a sulfur donating cyanide antidote. This research studied the metabolism and partitioning of SDMEX in blood. Whole blood, plasma, red blood cells, and albumin were tested. In a micro centrifuge tube, 90µL of the component being tested were mixed with 10µL of the corresponding SDMEX. Five concentrations of SDMEK were tested: 0, 50, 100, 150, and 200 µg/mL. The reaction was stopped by the addition of ACN at 0, 2, 5, 10, 15, and 20 minutes. The tubes were vortexed and centrifuged before HPLC analysis to determine the amount of SDMEX remaining. It was found that SDMEX bound to red blood cells at a higher percentage than to plasma. After 20 minutes, the concentration of SDMEX was reduced in the plasma and red blood cells by approximately 90%. The reduction of SDMEX was both time and concentration dependent.

036.204 U **Characterization of the R136W point mutation in Hsp27 that leads to neurodegenerative disease.**, *Anna K Orta, University of Texas at El Paso*

Hsp27 is a stress induced protein associated with cytoskeleton remodeling and apoptosis inhibition. The replacement of amino acid arginine to tryptophan in the 136 position has been correlated with the conversion of Hsp27 to a hyperactive state leading to the degeneration of peripheral neurons manifested as Charcot-Marie Tooth neuropathy (CMT). This project focuses on the structural characterization of the wild type Hsp27 and of the mutation R136W in Hsp27. Structure characterization and activity assays will aid linking the mutation's effect on the protein structure to the associated disease CMT. Cloning of wild type and R136W Hsp27 was successful as well as its overexpression in BL21 cells. Hsp27 was purified through anion exchange and size-exclusion chromatography. The oligomerization state and activity of the wild type and mutant will be analyzed in the near future.

036.205 U **Cloning and expression of** *Pseudomonas aeruginosa* elastase in E. coli **for examining inflammatory response of lung tissue**, *Christy Hjorth, University of Texas at Tyler; Ali Azghani, University of Texas at Tyler; Dustin Patterson, University of Texas at Tyler*

Pseudomonas aeruginosa is a bacterium that produces Elastase, a proteolytic enzyme. Elastase disrupts the tight junctions of epithelial cells in the lungs, so in Cystic Fibrosis patients it can cause acute and further chronic infections that potentially spread, leading to increased medical complications. This study represents a valid protocol and experimental design to express elastase using the plasmid-cloning vector PET28b and the purification of Elastase in E. coli. Genomic DNA was isolated from P. aeruginosa (PAO1, ATCC) and selected regions were amplified using PCR with lasB gene specification. Amplified DNA was ligated into the plasmid PET28b and E. coli were transformed to support the recombinant vector and produce a viable elastase product. The recombinant DNA was sequenced and accurately matched the pro-Elastase sequence (1497 bp in length). Purification of enzyme produced via heterologous expression in Clear Coli LPS free E. coli was aided via NTA-Ni Liquid Chromatography

system by the incorporation of a 6xHistidine affinity tag engineered on the C-terminus of elastase. Analysis by SDS-PAGE revealed a product of ~34 kDa,consistent with the molecular weight of the naturally produced mature Elastase. Proteolytic activity was determined via Skim Milk Agar diffusion displaying an active recombinant product and activity determined using Elastin-Congo Red substrate.

036.206 U **Comparison of cation exchange capacity determination methods**, *Alyx Frantzen, Stephen F. Austin State University; Lillie Zech, Stephen F. Austin State University*
The determination of the cation exchange capacity (CEC) of smectite clays can be performed using several different methods. The most common of these is to use an ammonia gas sensing electrode. The clay is prepared and exchanged with ammonium ion; suspended in water; concentrated sodium hydroxide solution is added and the ammonium ions are converted to ammonia and the amount of gas is measured with the electrode. There should be a direct 1:1 relationship between the measured ammonia gas and the cation exchange sites on the clay, leading to the determination of the CEC of the clay. This method is fraught with problems. If the particle size is too large and not uniform, when the clay is exposed to the sodium hydroxide, the conversion to ammonia will not be uniform and there will be issues with the detection of the gas. The accepted range for determination of the CEC using this method is ±20%. In the research presented, the ammonia electrode method of CEC determination will be compared to a method using the flame AA. In this method, the clay will be exchanged with cobalt (II) ions and run through the AA. There should be a 1:2 relationship between the measured cobalt ions and the CEC of the clay. This method should not be dependent on the uniformity of the clay particles and should give a more acceptable value range.

036.207 U **Constructing Peptide-Based Molecular Building Blocks for the Controlled Assembly of Nanomaterials**, *Jessica Bird, The University of Texas at Tyler; Leif Laperriere, The University of Texas at Tyler; Howard Gray, UT Tyler; Dustin Patterson, University of Texas at Tyler; Sean Butler, The University of Texas at Tyler*
A major challenge in the construction of nanomaterials is synthesizing materials with well defined, homogeneous structures. However nature shows the innate ability to construct diverse bio-nanomaterials through the non-covalent self-assembly of proteins, often yielding homogenous structures that are arranged at the molecular level. Self-assembly of proteins is driven by non-covalent association of short peptide sequences or small molecular surfaces through complementary molecular interactions. Inspired by the bio-specificity of protein/peptide driven assembly, the research presented investigates the use of peptides to construct molecular building blocks (MBB) that provide step-by-step, MBB-by-MBB, control over the bottom up self-assembly of nanostructures. The strategy looks at exploiting coiled coil forming peptide sequences to construct MBBs with two connected faces that are bio-specific and only associate with their designed partners allowing association and assembly when complementary building blocks are added. The results presented here are for the synthetic peptide synthesis of the coiled coil peptides containing non-natural amino acids that allow cross-linking between peptides to produce MBBs and preliminary results for their construction and assembly.

036.208 U **Discovering New Inhibitors against New Delhi Metallo β-lactamase (NDM-1) through Virtual Screening.**, *Sabi Shrestha, The University of Texas at Austin; Sonia Hernandez, University of Texas at Austin; Josh Beckham, University of Texas at Austin*
New Delhi Metallo ß-lactamase (NDM-1) is associated with many nosocomial infections with high mortality rates. The resistance to most of the ß-lactamase antibiotics by *Klebsiella pneumoniae*, which expresses NDM-1 is an emerging medical threat because there are no effective treatments against these infections. Therefore, it is important to find novel inhibitors against NDM-1. Competent BL21(DE3) cells were transformed with a T7 IPTG-inducible expression plasmid vector containing the NDM-1 coding DNA sequence to yield the enzyme in the presence of supplemental zinc. After purification by nickel affinity chromatography with 6xHIS tag, the samples were characterized on SDS-PAGE gel. Further purification was done using a gel filtration, size exclusion column on an FPLC machine and Ion Exchange. Activity of the enzyme was analyzed by enzyme spectrophotometric assay at 485 nm wavelength with Nitrocefin as the substrate for the hydrolysis reaction. Ten compounds found through a virtual screening approach using GOLD molecular docking software and the structure of NDM-1 from the PDB (4RBS) were tested for their ability to inhibit the activity in the presence of substrate, Nitrocefin. The results of these assays may contribute to the public health goal of discovering inhibitors against the NDM-1 enzyme which provides virulence to several species of infectious bacteria.

036.209 U **Discovering Novel Inhibitors for N-acetylneuraminic Acid Synthase in Neisseria meningitidis**, *My Quan, University of Texas at Austin*
Neisseria meningitides (N. meningitidis) is one causative agents of bacterial meningitis, a lethal disease that kills thousands of people worldwide every year, especially those in the Meninges Belt of the Sub-Saharan region. While N. meningitidis proliferates in the brain, it mimics the host's cells by modifying its

neural cells adhesion molecules with polysaccharides composed of polysialic acids, hence evading the immune system. Products of the protein N-acetylneuraminic acid synthase (NmNAS) participates in the formation of the polysialic acids. Due to its importance in pathogenic activity, NmNAS serves a potential target for drug therapy. By disabling NmNAS, the pathogen is no longer able to disguise itself within the host's body. Furthermore, NmNAS is not found in humans; therefore, potential inhibitors against this enzyme are not likely to affect activities of human proteins. Contrary to the traditional high-throughput drug discovery, the 3-D molecular ligand-docking program GOLD is applied to virtually screen libraries of 200,000 compounds to identify potential inhibitors against NmNAS. The top performing compounds will be tested in vitro for enzyme inhibition efficacy. The coding sequence NmNAS is synthesized through overlapping PCR and cloned into the pNIC-Bsa4 vector for expression in E. coli BL21 (DE3). The novel compounds identified may lead to more effective treatments and prevention against bacterial meningitis.

036.210 U **Discovery of novel inhibitors for *Plasmodium falciparum* reductase enzyme through virtual screening**, *Nishtha Sharma, The University of Texas at Austin*
Plasmodium falciparum is a disease caused by the protozoa genus *Plasmodium*. To combat antibiotic resistance developed by P. falciparum, an enzyme vital to the protozoan's life has been targeted: P. falciparum FabG 3-oxoacyl-(acyl carrier protein) reductase, commonly known as PfFabG. PfFabG is used in the production of fatty acids in the plastids that the protozoan carries. The specific function of this cytosolic acyl carrier protein reductase includes catalysis of the first step in the synthesis of the fatty acids using the following substrates: 3-hydroxyacyl-[acyl-carrier-protein] and cofactor NADPH. To identify top compounds for PfFabG inhibition, virtual screening of PfFabG was performed using a crystal structure from the Protein Data Bank (2C07, Resolution 1.5 Å) and the GOLD molecular docking program with a Chembridge ligand library containing 100,000 diverse compounds. In order to obtain protein to test the compounds in inhibition assays, wet lab procedures included the transformation of competent BL21(DE3) cells using a IPTG – inducible T7 expression plasmid vector containing the PfFabG coding DNA sequence. Nickel affinity chromatography with a 6xHIS tag was used to purify PfFabG and was characterized on SDS-PAGE gel. Gel filtration using size exclusion chromatography on an FPLC machine was used to further purify sample. Differential scanning fluorimetry which determines the melting temperature was used to test the binding of PfFabG to substrates or to another known ligand, ethyl acetoacetate. Further testing includes inhibition testing against compounds found through virtual screening in hopes of finding a new inhibitor for this malarial enzyme.

036.211 U **Effects of Nutrient Deprivation on Cell Fate Decisions in Mouse Embryonic Fibroblasts**, *Alexandra Marie Taylor, Southwestern University*
Cells respond to stress such as nutrient deprivation or other changes in growth conditions by mechanisms such as apoptosis or autophagy. The aim of this project was to determine whether there were differences in cell fate decisions in response to nutrient deprivation by KBalb and Balb3T3 cells. Apoptosis, programmed cell death, is one way that cells may respond to these stimuli. During this cellular process, caspase proteins are cleaved, which activates them for the initiation and execution of apoptosis. Cells were initially grown under nutritionally optimal conditions. This optimal medium was then replaced with a minimal medium containing neither glucose nor glutamine. These replacements occurred at twelve and twenty-four hours prior to cell lysis and caspase activity measurement. A Promega Caspase Activity Assay was utilized to monitor the activity of caspases 3 and 7, both of which are involved in the induction of apoptosis and the degradation of cellular contents. Relatively high amounts of caspase activity were induced within the KBalb cells, with a higher amount of activity within twelve hours of nutrient deprivation. In the Balb 3T3 cell line, relatively little caspase activity was observed, with little difference occurring across the incubation periods.

036.212 U **Enzyme Folding Improves Catalytic Activity of Enzyme Cargos in Virus-Like Particle Nanoreactors**, *Andrea Hernandez, University of Texas at Tyler; Dustin Patterson, University of Texas at Tyler*
Encapsulation of enzymes into protein cage structures holds promise for better understanding enzyme function in cellular environments, by mimicking the crowding and confinement conditions, and for developing new catalytic nanomaterials. However, it has been observed that encapsulation inside protein cages can modulate the activity of an enzyme, which has been attributed to crowding or confinement effects. The research presented here evaluates the encapsulation of enzymes inside the virus-like particle (VLP) derived from bacteriophage P22 using a genetically programmed encapsulation strategy for temporally controlled encapsulation of enzymes inside the P22 VLP in vivo. Results suggests that some enzymes require maturation to their active conformation before encapsulation in order to obtain optimally active enzymes. The strategy and results reported highlight important considerations for the encapsulation of enzymes inside confined reaction environments towards the development of active functional nano-reactors.

036.213 U **Fabrication and comparison of Prussian Blue related hexacyanoferrates for battery application**, *Charles Punnathara, University of*

Houston- Downtown
Renewable energy has received increasing interests in recent years. Portable batteries are the natural match of this subject and low-cost electrode material holds the key for the portability. We systematically studied Prussian Blue (PB) in its film fabrication and characterization. This classic molecule has found many applications in dye, medicine, and nuclear chemistry. The present study revealed a novel deposition of PB onto cost-effective substrates for a battery application. Further, we examined PB analogs for their adaptability into battery study, namely, reversibility and stability. The PB film formation was found to be done by either chemical spontaneous deposition or electrochemical in situ reduction preparation. The latter displays a controllable nature. The effects of pH, existing ions, redox species, substrates, and organic species on the battery performance were researched. The optimal operation condition for PB is potassium-containing supporting electrolyte. This work was supported by MSEIP-Re-Energize Project, NRC, UHD-MiniGrant, and Welch Foundation (BJ-0027).

036.214 U **Finding Novel Inhibitors of 6-phosphogluconate-dehydrogenase of Leishmania major through Virtual Screening**, *Laura L Luo, University of Texas at Austin*
Leishmaniasis is currently still a widespread disease that is left untreated. Known as a silent disease, symptoms of Leishmaniasis appear long after the user is affected. Current treatments and complication arises because Leishmaniasis subdue the immune system and mucous membrane of the respiratory pathways. Leishmaniasis subdues the immune system and mucous membrane of the respiratory pathways. The parasitic disease transmits through sand flies that carry the protozoa specie Leishmania major. The enzyme 6-phosphogluconate-dehydrogenase, putative (Lmaj6PGDdp) is a potential drug target that catalyzes the reduction of NADP-dependent oxidative decarboxylation of 6-phosphogluconate (6PG) to ribose 5- phosphate (Ru5P) (E.C. 1.1.1.44). This target has the potential to accommodate the substrate 6PG due to its high specificity and affinity. The coding sequence (CDS) of the target protein Lmaj6PGDdp was synthesized by overlapping primers through PCR. Ligation independent cloning was done on the target protein Lmaj6PGDdp with the accepting plasmid vector Escherichia coli pNIC-Bsa4 DH5alpha. A large library of compounds from ChemBridge were virtually screened with GOLD in order to find a potential drug target. This research seeks to find novel inhibitors towards this target protein, Lmaj6PGDdp, by virtually screening through a library of ligands, computationally. Then, in silico, the enzymatic activities of Lmaj6PGDdp will be tested from the top scoring ligands through an enzyme assay.

036.215 U **Gold(I)-Catalyzed Synthesis of 1H-Isochromenes**, *Dakota Butler, Southwestern University; Parker Wilson, Southwestern University; Michael R Gesinski, Southwestern University*
1H-Isochromene derivatives are found in a variety of biologically active molecules and are therefore of interest to the pharmaceutical industry. These organic moieties have been successfully synthesized using a novel gold(I)-catalyzed cyclization. This reaction affords 1H-isochromenes in 41% yield from simple benzylic alcohols. This methodology has been applied to the implementation of gold-cleavable alcohol protecting group that generates a similar 1H-isochromene as a byproduct. The cyclization of a protected alcohol regenerates the alcohol with a 59% yield. These results present a promising approach to production of isochromene derivatives, which could lead to a greater understanding of their full biological potential.

036.216 U **Identification of Microbial Volatile Organic Compounds in Wild Basin Soil**, *Elizabeth Ademski, St. Edward's University; Mary Kopecki-Fjetland, St. Edward's University*
Soils of all types emit volatile organic compounds (VOC's), chemicals that vaporize easily, however these compounds are not fully understood. The purpose of this study was to characterize the effect of soil moisture content on microbial VOC's in the Wild Basin Research Preserve. The VOC profile of the soil is a good representation of not only the microbial metabolic activity in the environment, but also the taxonomy of the microbes. VOC production in soil strongly depends on nutrient availability as well as microbial physiological states. Soil moisture is one key factor that impacts nutrient availability. Four differing soil types with varying moisture content were collected from the preserve during the Summer and Fall of 2016. Soils were sequenced for microbial classification using 16S rRNA gene sequencing, and microbial abundances were quantified using colony forming units. Soil VOC's were collected using solid-phase micro-extraction (SPME) techniques, and analyzed using gas-chromatography and mass spectroscopy. Potential VOC's identified include, but are not limited to, carbon dioxide, furfural, and propanoic acid. Future directions include manipulating moisture content of each soil type in order to test the effects of extreme precipitation or drought on microbial metabolic activity. The data collected from this project will contribute to the growing knowledge of this field, and can also be used to further understand applications of VOC's to large scale questions such as the effects of climate change on soil microorganisms.

036.217 U **Investigation of possible inhibitors against multidrug-resistant New Delhi Metallo-Beta Lactamase (NDM-1)**, *Sonia Hernandez, University of Texas at Austin; Sabi Shrestha, The University of Texas*

at Austin; Josh Beckham, University of Texas at Austin; Walter L Fast, University of Texas at Austin
Since penicillin was introduced in the world of medicine, this antibiotic saved millions from infectious diseases. However, in the past decades, the population has developed antimicrobial resistance which is currently a public health threat causing high morbidity and mortality rates. New Delhi Metallo β-lactamase (NDM-1) is associated with many infections with high mortality rate. One of these organisms, for example, that is resistance to beta-lactam antibiotics is Klebsiella pneumoniae. This organism has become resistant by producing NDM-1 which hydrolyzes the beta-lactam ring found in beta-lactam antibiotics. Due to this mechanism, varies organisms have gained the ability to become resistant to common antibiotics like penicillin, making treatment difficult. Therefore, it is important to find novel inhibitors against NDM-1. In order to find potential inhibitors against NDM-1, a combination of wet lab and virtual screening procedures were performed. First, competent BL21(DE3) bacteria cells producing NDM-1 were transformed and then expressed using ZnSO4 and IPTG. In addition, three methods of purification were performed. Furthermore, protein activity of the enzyme was analyzed by series of enzyme assay techniques using Nitrocefin as a substrate and later potential inhibitors. Moreover, Differential Scanning Fluorimetry (DSF) was performed to analyze the binding impact of several potential inhibitors on the melting temperature of NDM-1. Also, along with wet lab, virtual screening was done to identity high scoring compounds using GOLD. Different virtual library were screened along with positive and negative controls. Overall, this project aims to find novel compounds to inhibit NDM-1 activity to overcome antibiotic resistance.

036.218 U **Organic content of waters associated with healthy and diseased** *Orbicella faveolata* **at the southern edge of the Mesoamerican Barrier Reef system**, *Sophia Isela Salazar, University of Texas at El Paso; Wen-Yee Lee, University of Texas at El Paso; Keith Pannell, U. T. El Paso*
For decades, scientists have documented the drastic decline of coral reef ecosystems as they endure environmental instabilities. Among them, the Mesoamerican Barrier Reef-building coral, *Orbicella faveolata*, is currently listed as a threatened species. Coral reef preservation efforts are seeking more in depth scientific investigation of coral reef decline. *In-vitro* studies suggest disturbance in coral homeostasis in the presence of crude oil. However, long-term effects remain to be investigated, especially in places of commercial and residential boating, oil run off from land, and possibly an exposure of residual oil from major spills. The distal end of the Mesoamerican Reef along the island of Roatan, Honduras, serves as an ideal location because of its distance from major oils spills and its proximity to shore and commercial and residential pressures. This project is aimed to establish a baseline of hydrocarbons present in the environment of healthy and diseased corals and to examine possible impacts of hydrocarbons on coral health. This study employed a novel *in-situ* sample collection technique, called Stir Bar Sorptive Extraction (SBSE), to extract hydrophobic molecules directly from the waters near diseased and healthy corals. The compounds extracted are analyzed by Thermal Desorption-Gas Chromatography and Mass Spectrometry. Compound profiles in water will be presented. We hypothesize that the presence of hydrocarbons present in the proximity of the corals may have an association with their decline of health. These techniques may help further understand the incidence of coral disease to ultimately help in the efforts to salvage extensive marine ecosystems from pollutants.

036.219 U **Reaction of** *Alizarin Red S Monohydrate* **dye with** *Alanine* **and** *Cysteine***, Absorption comparison with** *Enriochrome Black T* **Azo Dye**, *Aaron Torres, Scholars Academy-University of Houston Downtown; Denisse Velazquez, University of Houston Downtown; Charles Punnathara, no; Mian Jiang, University of Houston - Downtown*
Alanine and Cysteine are Amino acid compounds that have been used to study the effects in the liver, lungs tissue, body mass, and mortality rate of aged Wister rats. Rats with Cysteine diets have proven to increase the amount of Glutathione, a compound associated to the regulation of food intake and the maintenance of homeostasis in aged Wister rats. In addition, rats that were fed Alanine developed Anorexia and cellular degeneration problems. Theorized to be attributed to the absence of Glutathione of the aged Wister rats. The reaction between the Alanine and Cysteine with Eriochrome black T azo dye in buffer solutions have created interesting absorption trends that are observed using the Spectrophotometer. If there is data that demonstrates a change in absorbency or frequency, then it is an accepted sign of progress for the research. However, if there is a shift in frequency and a change in the color of the solution, then the data has priority over the absorbency change reactions. These trends will be compared with another dye called Alizarin Red S Monohydrate in order to identify similar or drastic changes in absorption. This work was supported by MSEIP-Re-Energize Project, Nuclear Regulatory Commission, UHD-MiniGrant, and Welch Foundation.

036.220 U **Reactivity studies on [{(CO)3Cr}η6-C6H5]SiMe2H: The formation of bimetallic chromium-iron complex**, *Deidrah Carrillo, University of Texas at El Paso; Alex Bradford, Newcastle University; Alejandro J Metta-Magaña, University of Texas at El Paso; Hemant Sharma, University of Texas at El Paso; Keith Pannell, U. T. El Paso*

The chemistry of [{(CO)3Cr}η6-C6H5]SiMe2H (1) was investigated to understand the effects that the electron-withdrawing (CO)3Cr group will have on the hydrosilation and reductive properties of the Si-H bond and the possibility of a silicon-metal complex formation. The hydrosilylations of both an alkene and alkyne, using Karstedt's catalyst, were successful. The reduction of N,N-dimethylformamide was also studied resulting in the formation of trimethylamine and the disiloxane, the siloxymethylamine intermediate was observed in the reaction. Irradiation of 1 in the presence of triphenylphosphine (Ph3P) produced the expected [(Ph3P)(CO)2Cr]η6-C6H5]SiMe2H (2). Both 1 and 2 were reacted with (η5-C5H5)Fe(CO)2Me in order to form new bimetallic silicon materials. The reaction of 1 successfully produced the bimetallic Cr-Fe complex, [{(CO)3Cr}η6-C6H5]SiMe2-Fe(CO)2(η5-C5H5) (3). The complex 3 was characterized by multinuclear NMR and single crystal X-ray diffraction. The reaction of 2 with (η5-C5H5)Fe(CO)2Me led to the transfer of the Ph3P group from Cr to Fe to produce (η5-C5H5)Fe(CO)(Ph3P)Me, a new chemical transformation.

036.221 U **Studies on Apoptotic Induction in Balb-3T3, K-Balb, and Jurkat T Leukemia Cell Lines**, *Morgan Nicole O'Neal, Southwestern University*
When cells are stressed, a series of biological consequences may result, possibly leading to cell death. Apoptosis is a cellular process often described as "programmed cell death" that leads to the death of cells. This project investigated the effects of cellular stress on K-Balb and Jurkat T Leukemia cells with Balb-3T3 cells as a control. Cell stress was administered by the introduction of a selectively cytotoxic peptide, synthesized in our lab. K-Balb, Balb-3T3, and Jurkat T Leukemia cells were grown in a 96-well plate. The activation of caspase proteins by proteolytic cleavage is involved in the apoptotic process. A Promega Caspase Activity Assay was performed and quantified with an Agilent Cary Eclipse Fluorescence Spectrophotometer. In comparison to the Balb 3T3 cell line and +/- controls, the K-Balb and Jurkat cells appeared to have undergone a small degree of apoptosis. However, the K-Balb cells without peptide had a higher degree of fluorescence than the K-Balb cells stressed with LfcinB. A second assay was performed just on the Jurkat T Leukemia cells and the opposite apoptotic trends as predicted were observed. A western blot will be completed to determine the effectiveness of our anti-FAS induced positive controls and the effects of serum concentrations in RPMI growth medium.

036.222 U **Synthesis and Characterization of Platinum/Ruthenium Nanoparticles for Methanol Fuel Cells**, *David McKinzey, UMHB; Linda gao, UMHB*
Platinum nanoparticles on Vulcan carbon black catalyze the oxidation reduction in methanol fuel cells. Platinum nanoparticles have been reported to increase efficiency in methanol fuel cells. A hybrid catalyst of platinum and ruthenium nanoparticles on Vulcan carbon black have been synthesized using microwave chemistry. Cyclic voltammetry was performed using a potentiostat. Testing solutions included 0.1M HClO4, 0.1M methanol in 0.1M HClO4, and 1M methanol in 0.1 HClO4. Data from this showed the hybrid nanoparticles which were coated onto a glassy carbon electrode showed increased current in the methanol redox oxidation. A comparison has been drawn between the hybrid platinum ruthenium nanoparticles, platinum nanoparticles, and solid platinum electrodes. Hybrid nanoparticles performed the best. Further tests will be conducted with the nanoparticles on multiwall carbon nanotubes.

036.223 G **Synthesis and stability analysis of N-alkylbenzoxazaboroles**, *Rathnayaka Mudiyanselage Chathurika Rathnayaka, Sam Houston State University; Sobiya George, Sam Houston State University; Dustin Gross, Sam Houston State University*
Dioxaboroles or boronate esters are widely used in dynamic covalent oligomeric systems such as covalent organic frameworks due to their dynamic covalent nature. Benzoxazaboroles are structurally similar to dioxaboroles in which one oxygen atom is replaced by a nitrogen atom. Therefore, the potential may exist for benzoxazaboroles to be used in the construction of organic covalent frameworks. We have synthesized several benzoxazaboroles from boronic acids and alkyl substituted aminophenols. Investigations into their stability have shown that benzoxazaborole formation is dynamic and that they have similar stabilities to benzodioxaboroles. The results of this work will be presented.

036.224 U **Synthesis of Novel Anticarcinogenic Peptides**, *Ramish Nadeem, Southwestern University*
Drawing on previous work with the anti-microbial peptide, Bovine Lactoferricin, this research project aimed to utilize Fmoc solid phase peptide synthesis techniques to develop two novel short-chain peptides with anti-carcinogenic properties. Previous literature examining selectively cytotoxic peptides derived from bovine lactoferricin evidenced that amphipathic, cationic peptides seemed to display selective cytotoxicity towards mammalian cell lines. The design of one of these peptides, designated here as *wpep*, closely mimics the biologically active portion of lactoferricin with slight modifications made to increase stability and allow facile synthesis, handling, and storage. The design of the alternative peptide, referred to here as *rpep* drew on coupling a remarkably short sequence of cell penetrating peptide derived from lactoferricin with a longer "cargo" peptide that had previously displayed selective cytotoxicity in a yeast

cell line. This selective cytotoxicity appears to be mediated through a pathway distinct from the expected receptor mediated induction of apoptosis, potentially through disruption of mitochondrial membranes and subsequent induction of caspase mediated eventual cell death. The effects of the novel peptides designed in this research on virally transformed and untransformed murine fibroblasts is under exploration.

036.225 G **Synthesis of diazaborole-based macrocycles with ethylhexyl ester functional groups**, *Thao Nguyen, Sam Houston State University; Sanjaya Lokugama, Sam Houston State University; Dustin Gross, Sam Houston State University*
Diazaboroles have potential applications in linear and nonlinear optics, signal amplification in sensory materials, and in organic light emitting devices. To date, diazaboroles have been mostly studied as the active linking unit in discrete small molecule-based systems. Currently, the use of diazaboroles in oligomeric systems such as macrocycles and covalent organic frameworks is being investigated by our research group. However, limitations on solubility of the intermediates during monomer and macrocycle synthesis have prohibited complete characterization. Efforts towards the synthesis of these materials by improving the solubility of monomers, macrocycles, and oligomeric intermediates will be presented.

036.226 U **Titanium-Mediated Synthesis of Cyclobutane Derivatives**, *Jillian Marie Bradley, Southwestern University; Renee Walker, Southwestern University; Michael R Gesinski, Southwestern University*
Substituted cyclobutanes are important intermediates in the syntheses of many organic materials, including several pharmaceutical compounds. However, they are difficult to synthesize due to the instability associated with their high levels of ring strain. In this study, a novel method for the formation of cyclobutane derivatives was developed using a variation of the Kulinkovich reaction. Using tosylates or mesylates of cyanohydrins as starting materials, substituted cyclobutanones were produced with up to 64% yield. This cyclobutanation procedure presents a promising technique to incorporate into future synthetic methods.

Conservation Ecology

Conservation Ecology Posters

Participants:

036.227 U **A Multi-year Analysis of Wing Loading in the Monarch Butterfly During the Fall Migration**, *Joshua Shayne Huckabee, Temple College; Jason L Locklin, Temple College; Clayton Sublett, Temple College*
Monarch butterflies (*Danaus plexippus plexippus*) are well-known for their annual migrations across North America. In the last 20 years, migratory monarch populations east of the Rocky Mountains have declined as much as 90%, and habitat loss along their migratory route in the United States and wintering site in Mexico have long been the leading hypothesis to account for the decline. The US Department of the Interior is currently conducting a status review of the butterfly under the Endangered Species Act; therefore, it is essential to better understand the migration dynamics to aid in their conservation efforts. Herein we present fall migration monarch wing loading and census results (our proxies for monarch condition) from a multiyear (2010-2016) study in central Texas, one of which (2011) includes a historical drought. In all years except 2011 and 2015, monarch wing loading decreased through the course of the migration, i.e. those arriving early each year in central Texas had heavier wing loading than those arriving towards the end. In 2011 and 2015, however, wing loading were consistent and relatively light. While the drought of 2011 likely contributed to the lack of wing loading variability and delayed arrival that year as it affected the distribution and abundance of nectaring and host plants needed to fuel the migration, 2015 was not affected by the same drought conditions. While our study focuses on a short term environmental stressors, it highlights the effects on migrating monarch condition and habitat loss.

036.228 U **Cataloging the Biodiversity of Waller Creek with a Publicly Accessible Repository**, *Jeff Brennan, University of Texas at Austin; He Bai, The University of Texas at Austin; Dean A Hendrickson, University of Texas; Adam Espelee Cohen, University of Texas; Mary F Poteet, The University of Texas at Austin*
The Waller Creek watershed in Austin, Texas is entirely urban with exceptionally high levels of anthropogenic water quality impairments and the focus of a multi-million dollar tunnel construction project designed to control flooding and transform public usage of its lower reach. To improve watershed-wide coordination and help provide a more comprehensive and interdisciplinary perspective for the watershed's stakeholders, we developed a publicly accessible, permanent repository of relevant information to archive baseline data, and facilitate continued research by students and faculty of this easily accessible laboratory that flows through the University of Texas (UT) campus. Funded by students through UT's Green Fee program, the repository (https://repositories.lib.utexas.edu/handle/2152/31304) contains all information we could find (via library, internet and word of mouth; peer reviewed journals, government and university reports, data files, photo archives, news articles, etc.) relevant to Waller Creek. All (nearly 600) of these are (or soon will be) in the public archive, with extensive metadata indexed by major search engines to improve findability. Also included is a large database of georeferenced repeated images taken at fixed locations along Waller Creek

between 2006 and 2008, all publicly viewable on a map. Now researchers, managers and citizen scientists can here learn about the rich history of this vital environmental resource and incorporate their own findings.

036.229 U **Comparing traditional and novel genetic surveillance for white-nose syndrome across Louisiana bats**, *Dakota Ashley Limon, Texas Tech University; Carlos Garcia, Texas Tech University; Beau Gregory, LA Dept. of Wildlife and Fisheries; Richard Stevens, Texas Tech University; Matthew Barnes, Texas Tech University*
White-nose syndrome (WNS) is an emerging infectious disease in bats caused by the fungal pathogen Pseudogymnoascus destructans (Pd). The fatal disease has devastated populations of several species of hibernating bats in North America, so there is much interest in delimiting its current range to aid containment and other management efforts. Between December 2015 and January 2016, we surveyed 200 culverts distributed across the northern portion of Louisiana for bats. In total, we encountered 778 individuals (332 Perimyotis subflavus, 299 Myotis spp., 54 Eptesicus fuscus, 47 Tadarida brasiliensis and 46 Corynorhinus rafinesquii). We used ultraviolet illumination to check each individual for presence of WNS symptoms, and no visible symptoms were detected. In addition, we swabbed the skin of up to 25 bats per site and habitat walls. Swabs were returned to the lab and analyzed genetically using qPCR and Pd-specific primers for presence of the pathogen. Here, we compare the results of physical monitoring and genetic detection of Pd. Where Pd is detected, it could indicate a risk of infection for local bat populations. Therefore, early detection of the fungus aids in risk assessment of the disease and managing its presence in areas with hibernating bats.

036.230 U **Effects of *Ligustrum* Removal on Herbaceous Plants in South Texas**, *Kody Ryan Windecker, Texas Lutheran University; Mark Gustafson, Texas Lutheran University*
Invasive plants often have negative impacts on native plants. *Ligustrum lucidum*, a native tree of China, has been introduced into the United States as an ornamental. It has become an invasive problem for native plants in Texas, specifically in major Texas cities.The intense shade created by *Ligustrum* leaves is likely the suppressor of herbaceous plant growth. We studied the effect of *Ligustrum* removal in an urban park in Seguin, Texas. We randomly selected plots in the *Ligustrum* dense and *Ligustrum* cleared areas and measured density and species diversity of herbaceous plants. Where *Ligustrum* had been removed, herbaceous plants had a higher species richness and Shannon-Weiner diversity.Two years after *Ligustrum* removal, species diversity was over three times higher in the *Ligustrum*-cleared plots. Our results show that the herbaceous plant assemblage responds quickly to *Ligustrum* removal.

036.231 U **Halophyte Biodiversity, its Linkage with Seagrass Biodiversity and the Impacts of Anthropogenic Activities along the Coast of Port Aransas, Texas**, *James Edsel Risinger, Student at Saint Edwards University; Gabriel Monticure, St. Edwards; David R. Johnson, St. Edwards University; Raelynn Deaton Haynes, St. Edward's University*
High biodiversity allows ecosystems to have many different species filling niches allowing ecological redundancies resulting in stability and resistance to disturbance. Halophytes are important primary producers in coastal environments due to their ability to thrive in high saline environments where most other terrestrial plant species would perish. Unfortunately, there have been large halophyte die-offs due to habitat loss in areas with increased sedimentation and erosion rates induced by human activity on land. Climate change is also predicted to magnify negative anthropogenic effects to the coastal systems. The Texas Gulf Shore ecology is predicted to change with climate change via sea-level rise, altered freshwater inputs from land, disturbance from direct and indirect human activities such as land use changes resulting in a decline of habitat for mangroves (a halophyte) and seagrasses. These potential changes to coastal ecology, leads to an important question: what is the halophyte biodiversity along the Texas Coast? We measured halophyte biodiversity between the bridge of the Redfish Bay Causeway and the ferry to Port Aransas, Texas. Every kilometer we established a site 20 x 20 m. At each site, we collected cover and abundance of halophytes in five randomly placed 1.5 x 1.5 m quadrats. Using non-metric multi-dimensional scaling, we determined how diversity is related to anthropogenic activities, such as proximity to an oil derrick, and linked halophyte diversity to the diversity of adjacent seagrass beds.

036.232 U **Tail Loss in Two Populations of the Georgetown Salamander (*Eurycea naufragia*)**, *Daniel Ramon Gonzalez, Southwestern University; Benjamin Allen Pierce, Southwestern University*
Tail loss is common in many species of plethodontid salamanders and is used as a defense mechanism against predators. However, tail loss has been documented mainly in terrestrial species, and little is known about tail loss in aquatic salamanders. This study examined tail loss in the Georgetown Salamander (*Eurycea naufragia*), a threatened and endemic species found exclusively in Williamson County, TX. We observed tail loss frequencies in two populations (Swinbank Spring and Twin Springs) using photographs taken of the animals. The study revealed that large salamanders were more likely to have suffered a tail injury than small salamanders. There was

also a trend of more tail injuries in salamanders during spring and summer than fall and winter, although the results were not significant. Relative tail width, a measure of body condition, was smaller in individuals with injured tails than those with no tail injury. The population at Swinbank Spring showed a higher percentage of individuals with injured tails than the population at Twin Springs. There was no significant difference in frequencies of tail injuries between gravid and non-gravid salamanders. This study suggests that tail loss and regeneration are common in natural populations of *Eurycea naufragia* and are related to biologically relevant variables such as population density, body size, and body condition. Future research might examine the causes of tail injury in the species and the relation of tail injuries to habitat variables.

Freshwater Science

Freshwater Science Posters

Participants:

036.233 U (Withdrawn) **Brazos River Database Biases Analysis: Comparing Various Data Sources to Describe Temporal and Spatial Fish Community Change**, *Christina Reidy Scanlon, University of Texas; Chelsea Jones, University of Texas at Austin*
Biodiversity databases like the Fishes of Texas Project, are working towards collecting, refining, documenting, and combining fish occurrence data that can be used to characterize species distributions and biodiversity patterns statewide. While the project has been focused on museum data they are also developing new datasets from other sources that are complementary to the specimen data. These new data sources are derived from citizen scientists , anglers, and state agencies, each obtaining data according to their specific mission and methodology and thus have various biases which must be understood in order to interpret their data. Those biases can be caused by differences in purpose (science vs recreation) and ability of the observers (trained vs untrained in fish ID), collection locations (reservoirs vs stream), etc. While these sources do contain factual and applicable observational data, the biases within each source can result in gaps and biases that could lead unaware researchers to erroneous conclusions relating to distributions and ecology and evolution of species and ecosystems throughout time. We attempted to find and describe these biases within a subset of those data from the Brazos basin. It is clear from our analysis that these data sets are complementary and best used in concert. We then compared the combined Fishes of Texas Project datasets to the Texas Parks and Wildlife Department's Kills and Spills database (which has biases of its own) to explore and attempt to find causal patterns of distribution change in fish communities within the Brazos River Basin.

036.234 U **Comparison of gut microbiomes between native and invasive viviparids (Gastropoda, Viviparidae)**, *Ernest North, University of Houston Clear Lake; Russell Minton, University of Houston Clear Lake*
Invasive species can be defined as those organisms introduced in areas where they did not evolve. Because of that, they are capable of adapting to biotic and abiotic conditions that can be very different from those found in their native range. In general, successful invaders possess high fecundity, fast growth rate, short generation time, and high genetic variability, traits usually associated with r-selected species. While the ecological and natural history impacts of invasive species are well documented, the role of microbiomes in these interactions has remained relatively unknown. Research has shown that alien species can alter microbiomes significantly in marine and terrestrial systems. We used two species of freshwater viviparid snail, one native (*Campeloma decisum*) and one invasive (*Cipangopaludina japonica*), and analyzed their gut microbiomes using next-generation sequencing of the 16S rDNA gene. We present comparisons of bacterial diversity at varying taxonomic levels and identify diagnostic taxa for each snail species. We also propose potential physiological differences between species' microbiomes that may give the invasive species an advantage in non-native habitats.

036.235 U **Crushing resistance of freshwater snail shells along environmental gradients**, *Kevin Hart, University of Houston Clear Lake; Riccardo Fiorillo, Georgia Gwinnett College; Christopher Brown, Georgia Gwinnett College; Russell Minton, University of Houston Clear Lake*
In freshwater snails, shell morphology is correlated with environmental conditions including flow rate and water depth. In rivers, snails follow Ortmann's rule, where those occurring downstream possess shells that are more robust, sculptured, and globose than their upstream counterparts. These differences may be due to predation and protection against tumbling and dislodgment. We measured shell strength in four nominal morphotypes of *Lithasia* (Pleuroceridae) species from the Duck River, Tennessee and compared it to shell shape and river position. We present comparisons of the different forms and discuss the results in the context of adaptation to clinal freshwater habitats.

036.236 U **How does disturbance of aquatic ecosystems affect gene flow among damselfly populations in central Texas?**, *Wesley Craig McCain, Schreiner University; Mary K. Huerta, Schreiner University; Natalie Requenez, Schreiner University; Ryan Matthew Caesar, Schreiner University*
We are using the tools of phylogenetic analysis and population genetics to characterize and monitor genetic

variation among populations of common damselflies across several freshwater ecosystems in the Hill Country of central Texas. These data will be used to determine the extent to which natural and human disturbances alter patterns of gene flow in these habitats. Such disturbances include periodic cycles of flood and drought, climate change, introduced species, alteration of stream structure and flow, agricultural and industrial input, and recreation. Implications for urban planning, landowners, conservation efforts, and the general public will be explored.

036.237 U **Recruitment, growth, and spatial distribution of zebra mussels in the flood pool of an infested central Texas reservoir**, *Ruopu Jiao, Temple College; Madeline Chaput, Temple College; Zachary Lopez, Temple College; Devin Garcia, Temple College; Jason L Locklin, Temple College*
The zebra mussel (*Dreissena polymorpha*) is an invasive mussel that was first reported in North America (the Great Lakes) in 1986. Although native to the cold waters of the Black and Caspian seas region, they have successfully colonized numerous southern North American systems over a relatively brief amount of time. Zebra mussels were first reported in Lake Belton in September 2013, which represented their southern-most distribution in Texas at the time. To better understand the seasonal mussel distribution in Lake Belton, a year-long survey began in spring 2016. During this survey, elevated lake water levels due to excessive rainfall in late spring providing an opportunity to describe the spatial distribution, recruitment, and growth of mussels in the flood pool over a 52-day period. Two months post-flooding, we surveyed nine sites along the shoreline of the lake approximately 605 feet above sea level, which was underwater from 1 June – 22 July (approximately 52 days). Mussel distribution varied among sites, ranging from 0 - 2.2 cm⁻². Mussel sizes ranged from 2.2 mm – 7.2 mm with a single cohort at all sites. Because the areas surveyed in this study were underwater approximately 52 days, our results demonstrate that recruitment was rapid during the brief flooding and that mussel growth rates were as high as 0.13 mm per day during this time in Lake Belton. Results from this study demonstrate that recruitment and growth is rapid, and the spatial distribution is variable.

036.238 N **Update on the Fishes of Texas Project**, *Adam Espelee Cohen, University of Texas; Dean A Hendrickson, University of Texas; Gary Garrett, University of Texas; Melissa Casarez, University of Texas; F Douglas Martin, University of Texas*
The Fishes of Texas project (www.fishesoftexas.org), originating in 2006, remains the most reliable (quality controlled) and data rich site for acquiring occurrence data for Texas fishes, holding over 124,000 records from 42 institutions. Among many discoveries, the project is responsible for detecting at least 3 freshwater species not previously known from Texas. We continue making improvements, but substantial updates so far have been onerous for our developers for various reasons. A recent major update reduces coding redundancies, points the website to a new massively restructured and more fully normalized PostgreSQL database (was MySQL), and places the code in a versioning environment. These changes have little immediate effect on user experience, but will greatly accelerate development. PostgreSQL allows for complex spatial queries and users will be able to quickly map occurrence data alongside many more political/environmental layers than currently possible. While our database/web designers have been implementing these changes and fixing bugs etc., we've been preparing resources for them to integrate into the website. Some highlights to expect: (1)new updates to the state Species of Greatest Concern list; (2)expert opinion-determined nativity spatial layers for all freshwater fishes displaying in our new mapping system; (3) dynamic statistical summaries; (4)new data types from the literature(>14500 records), citizen science(>4500), anglers(>32000), and agency databases(>800000); (5)new museum records, many derived from our gap sampling(17000, 4 museums); (6)more specimen examinations(>400) and photographs(1000); (7)document archive with smart text search tools (currently in beta testing using TPWD fisheries reports). So be patient and keep your eyes open for updates.

Science Education

Science Education Posters

Participants:

036.239 U **Innovating molecular art: Communicating the true cost of science through repurposed materials**, *Carissa Alexandra Bishop, Southwestern University; Sofia Campos, Southwestern University; Shannon M. Walsh, Southwestern University; Hugo A. Cepeda, Southwestern University; Romi L Burks, Southwestern University*
Is there an educational purpose for used molecular materials? Declining costs associated with molecular biology facilitate more and more opportunities for scientists to utilize these tools to ask interesting questions. However, techniques such as Polymerase Chain Reaction (PCR) and UV visualization of agarose gels still leave behind a significant amount of material. We repurposed these molecular materials into art pieces and calculated their value in two ways. First, we calculated the monetary cost of the physical components that make up the repurposed piece itself. Next, we estimated the amount of time and thought that went into the entire construction of the art piece, from the initial stages of research development to the execution of all molecular methods. With this data, we

concluded that repurposed molecular art has the potential to facilitate a greater understanding of the costs of science (i.e. monetary cost as well as time and thought). Together, science and art foster creativity, so our interdisciplinary presentation uses molecular art to examine the intersection between the disciplines of art and science. This experiment in science education will prompt others to think, connect, and hopefully create their own repurposed, scientific art in order to look at the costs of science in a innovative way.

036.240 N **Model Eliciting Activities: In-service teachers models of an incline plane**, *Cynthia Esperanza Lima, The University of Texas at San Antonio*
Model Eliciting Activities (MEAs) have been reported to be successful in supporting the development of mathematical knowledge and critical thinking. However, research is needed to understand the extent to which MEAs can be used to foster scientific inquiry. This research represents the first approach towards the exploration of the scientific inquiry that problem solvers can engage in while solving MEAs. This paper reports the findings of the implementation of a MEA with high school in-service teachers currently participating in a multi-year project based on a modelling perspective in STEM Education. The MEA reported here is intended to support the development of a model that relates the speed and acceleration of an object rolling down a ramp and the ramps' inclination in a context that facilitates the connections of physical concepts to the real world. The focus of the analysis presented here is twofold: (1) to identify the characteristic activities of the inquiry process that can be fostered through the Model Eliciting Activity Ready. Set. Go! and, (2) the role of teachers' prior knowledge in developing a model of the incline plane. The results of this analysis, show that the participants engaged in inquiry-related activities when solving the MEA Ready.Set.Go!, for instance design of a scientific investigation, data collection, use of diverse representations, and communication of results. Teachers' prior knowledge were often used as part of the model developed and guided the experimental design and interpretation.

036.241 N **Standards-Based Science Institutes: Effective Professional Development that Meets Teacher and District Needs**, *Bonnie D McCormick, University of the Incarnate Word; Alakananda Ray Chaudhuri, University of the Incarnate Word; Richard Lewis, University of Texas at San Antonio*
The purpose of the study is to investigate the outcomes of five standards-based science institutes funded by the Texas Higher Education Coordinating Board (THECB) Teacher Quality Grant Program (TQGP) to improve content knowledge, pedagogy, and pedagogical content knowledge in life sciences of in-service middle and high school science teachers in San Antonio, TX. The study explores how inquiry-based professional development impacted the implementation of inquiry instruction by secondary life science teachers in their classrooms. Program assessment was conducted between 2005 and 2016 with a total of 77 science teacher participants. Four approaches were used: 1) analysis of content knowledge gains, 2) participant assessment of the program, 3) analysis of redesigned lesson plans, and 4) classroom observations. Content knowledge gains were evaluated through pre-and post-tests of each science institute by using test score means, standard deviations, and comparison of differences between paired pre-test and post-test scores. Comparisons of participant perceptions were accomplished by analyzing differences in frequency distributions. Redesigned lesson plans were analyzed to evaluate the use of inquiry in the teachers' classrooms. Classroom observations provided evidence of implementation of inquiry activities in the classroom. The findings provide strong indications that the Teacher Quality Program goals of enhancing content knowledge, instructional practice, and developing communities of practice among the participants were achieved. The analysis of results clearly supports that the 5E learning and instructional model provided the teachers with the tools to alter their traditional teaching practices and to include the inquiry-based teaching practices specified by national and state standards.

038. Cell & Molecular Biology Oral Session II and Section Meeting
1:00 to 1:45 pm
Isabelle Rutherford Meyer Nursing Education Center, NEC 105
Cell and Molecular Biology
Cell & Molecular Biology Oral Session II and Section Meeting
Participants:

1:00 038.242 G **Does BPS induce lipid synthesis and ER stress in HepG2 cells?**, *David Lollar, Sam Houston State University*
Bisphenol A (BPA) was originally designed as a synthetic estrogen, but is now used as a monomer in the production of plastics. Recent studies have linked a number of health problems including diminished fertility, insulin resistance, and obesity to exposure to BPA doses below the reference dose. Due to the aforementioned issues with BPA, bisphenol S (BPS) is becoming used as an alternative in plastic production. However, emerging research has associated BPS with many of the same health problems as BPA. Of interest to this study, low doses of BPA have also been shown to increase triglycerides and endoplasmic reticulum (ER) stress in the liver, and consequentially, inducing non-alcoholic fatty liver disease. This study utilizes HepG2 cells, to better understand the effects of low

dose BPS exposure on liver cells. In order to monitor effect of low-dose BPS exposure, the study quantifies fatty acid and ER chaperone protein levels of HepG2 cells.

1:15 038.243 N **Translational Opportunities in Metabolic Engineering Plant Sterol Metabolome: Modifying Plant Sterol Profile to Control Insect Pests**, *Wenxu Zhou, Texas Tech University*
Phytosterols are considered one of the most important natural products; as universal membrane inserts and structure-specific signal molecules they control plant growth, resistant to abiotic and biotic stresses and produce desirable seed oils while as essential nutrients of insect pests they contribute to crop plant loss. Exciting recent new developments in the enzymology and molecular biology of phytosterols offer numerous opportunities to re-engineer the plant sterol metabolome to yield value-added traits. For example, successful targets of such modifications are soybean seeds genetically modified for increased sitosterol (24a-ethyl sterol) production- relevant to human health and Arabidopsis thaliana plants genetically modified for increased clerosterol (24□-ethyl sterol) production, and stigmasterol - relevant in resistance to insect attack. Herein, we summarize recent progress in sterol biosynthesis as a principle model to fashion transgenic plants with novel sterol characteristics and discuss the factors that control productivity, focusing on the structural similarities and differences in phytosterols, rate-limiting enzyme steps in phytosterol biosynthesis (plants) and metabolism (insects) and biotechnological approaches employing variant isoprenoid-sterol genes from green algae to animals.

039. Environmental Science Oral Session II and Section Meeting
1:00 to 1:45 pm
Wells Science Hall, WSH 341
Environmental Science
Environmental Science Oral Session II and Section Meeting
Participants:

1:00 039.245 G **Plant diversities in areas impacted by 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. Following a 2015 study which found increased insect biodiversity, this study served to compare the plant 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 biodiversity. From this, it was predicted that areas with controlled saltcedar populations would have an increased plant biodiversity, while the areas currently under management would still have reduced biodiversity due to a greater abundance of saltcedar in the area. It was found that areas with controlled saltcedar populations exhibited greater diversity and evenness than those currently under management.

1:15 039.246 G **Seasonal Variations in Wet and Dry Deposition at a Single Site in Houston, Texas**, *Allen Ladd White, Texas Southern University*
Trace metals are released from various industrial, commercial, and urban sources. These metals maintain an inability to degrade and thus they accumulate in the soil, water, and the human body which can lead to adverse health effects. In this study, we evaluated the average daily exposure of trace metals over a 12-month period to depict the trace metal content in dust by deposited via precipitation and gravimetric means; in addition we assess the relationships trace metals share with each other under meteorological conditions. The main objective of this study is to determine seasonal variations in exposure to select air pollutants, which was addressed by collecting wet and dry deposition from a single site in Houston, Texas. Samples were analyzed for As, Be, Cd, Co, Cr, Cu, Fe, Hg, Mo, Ni, Pb, Sb, V, and Zn using the inductively-coupled plasma mass spectrometry (ICP-MS) to determine the metal content of collected atmospheric deposition. After conducting a series of literature reviews we developed a series of techniques for monitoring trace metal contributions. Preliminary results display several metals that exceed the lowest observable adverse health effect levels which have led to reason for further investigation of air pollution sources in urban areas. We expect this study to show variations in the composition of outdoor air and the relationship that precipitation rates has with atmospheric deposition in the Houston area.

040. Geosciences Oral Session II and Section Meeting
1:00 to 2:00 pm
York Science Center, YSC 110
Geosciences
Geosciences Oral Session II and Section Meeting
Participants:

1:00 040.248 G **Sedimentology of the Riley Formation, Pontotoc,Texas**, *Jeff D Cullen, Stephen F Austin State University; Russell LaRell Nielson, Stephen F Austin State University*
The Upper Cambrian, Riley Formation consists of the

Hickory Sandstone, the Cap Mountain Limestone, and the Lion Mountain Sandstone. Deposition occurred on a passive margin of Laurentia during the Sauk cratonic sequence. This study provides a detailed analysis of the Riley Formation near Pontotoc, Texas using sedimentological and petrological methods. The Hickory Sandstone consists of a medium grained (mono 99%, poly 1%), quartz arenite deposited in a beach environment that is indicated by the presence of thalassinoides, and skoliothos trace fossils. Facies of the Hickory Sandstone include a thin bedded sandstone of the middle Hickory Sandstone; and ironstone, and laminated sandstones of the upper Hickory. The Cap Mountain Limestone consists of a fine- to medium-grained, cross-bedded quartz arenite to quartz wacke deposited in a beach environment. Facies of the Cap Mountain Limestone consist of simple cross-bedded sandstone, massive bedded limestone, and planar cross-bedded sandstone. The Lion Mountain Sandstone consists of a glauconitic, medium-grained, quartz arenite deposited in a beach environment. Sequence Stratigraphy for Riley Formation reveals TST for Hickory SS and Cap Mtn and FST for Lion Mtn SS. Paleocurrent analyses of the Riley Formation display a bimodal pattern. Eogenesis features consisted of collophane, iron oxide, gypsum, dolomite, glauconite and calcite cementation. Mesogenetic features consisted of compaction, grain deformation, dissolution of grains, and pressure dissolution. Telogenetic features consisted of broken brachiopod fagments. This study revealed transition from shorface-foreshore system to peritidal to shelf during transgression and then beach during regression.

1:15 040.249 N **Strike-slip motion transfer along a vertical-axis "corkscrew" structure; Ernst Canyon, Big Bend National Park, TX**, *Chris A. Barker, Stephen F Austin State University, Geology Department; Ryan R. Silberstrof, Stephen F. Austin State University*
East of Ernst Tinaja, Ernst Canyon bends ~90 degrees and runs ~N-S, on the east side of Cuesta Carlotta in Big Bend National Park. Recent mapping in the N-S strike canyon revealed abundant horizontal slicks on steep fault planes. Initial impressions were that the primary motion was left-lateral, though additional work has revealed more subtle chatter marks indicating possible dextral offset, as well as equally subtle and less abundant vertical slicks indicating some degree of normal slip. The vertical slicks, and a marked decline in the elevation of the east wall-ridge of the canyon (going north), suggests the possibility that the east ridge is a relay ramp. In the ~450m long strike canyon there is a right-stepping bend which offsets the east wall by about 8 to 10 meters. Sinistral offset would create a restraining bend and positive flower structure; dextral offset would result in a releasing bend and a negative flower structure. Also at the bend is a unique "corkscrew" structure that has twisted large, wedge-shaped slices of shattered Santa Elena limestone around a vertical axis of rotation. The main part of the visible corkscrew structure may be 8-10 meters high (the cliff is too steep to climb easily), and widens to about 6m at its base on the valley floor. The corkscrew apparently accommodated strike-slip motion transfer at the bend in the canyon. Unraveling the structural history of the canyon will aid in delineating the many stresses and events that affected this region.

1:30 040.250 N **Surface Morphology of Abode Undergoing Rain Degradation**, *Gerald Mulvey, University of the Incarnate Word*
Sundried mud brick (adobe) has been widely used as a building material for over 4000 years through a considerable portion of the ancient world. It continues to be used primarily in the semi-arid sub-tropical regions of the world. It has been used for a variety of buildings ranging from expansive palaces to multi-story homes. This brick however, is subject to a variety of erosion mechanisms including rain, ground water intrusion, moisture absorption / evaporation, bioturbation, sand ablation, rain splatted, and animal burrowing. This paper explores the surface morphology due to erosion in natural rain storms. Adobe samples created for this experiment were exposed to a series of summertime rainstorms during 2016. Before, during, and after each storm the sample was examined to determine the surface changes. Observations were made photographically, micro-photographically, and with needle probes for micro-crack depth estimation. The mechanisms observed included surface clay removal through sheet erosion, pitting, micro-cracking through soil expansion and contraction, micro-furrowing, and surface shielding by gravel and straw binder. The surface changes included the development of micro channels, and micro-pits during the rain. Brick absorption of rain water caused swelling and as the brick dried shrinking formed surface micro cracks. These micro cracks are the key to surface erosion during subsequent rain events. The surface erosion appears to be a function of the rainfall rate, duration, brick composition, and the number of wetting/drying cycles. Photographic evidence of the surface morphology will be presented along with a conceptual process for the surface change.

041. Graduate Student Competition II
1:00 to 2:15 pm
York Science Center, YSC 102 - Brindley
Graduate Student Paper Competition
Graduate Student Competition II
Participants:

1:00 041.252 G **Macroevolutionary patterns in North American mosasaurs: a study system for understanding evolution in a greenhouse world**, *Joshua Ryan Lively, The University of Texas at Austin*

I examine the evolutionary dynamics of mosasaurs, marine squamates that filled numerous niches within the marine ecosystems of the Late Cretaceous. The Late Cretaceous was a time of greenhouse climate, with higher temperatures and a reduced latitudinal thermal gradient. Recent authors demonstrated that some evolutionary responses to environmental shifts were different under greenhouse conditions than under modern icehouse conditions. Because of their high diversity and exceptional fossil record, mosasaurs are an ideal study system for understanding evolution during greenhouse conditions. To elucidate those patterns, I collected discrete osteological character data from over 250 mosasaur specimens, sampling the known taxonomic diversity from the Cretaceous of North America. In addition to traditional phylogenetic analyses, I performed a pair-wise dissimilarity analysis to understand disparity, or anatomical diversity, in mosasaurs through the Late Cretaceous. I found that basal mosasaurines, traditionally referred to Clidastes, exhibited higher intraspecific variation than taxa from other major mosasaur clades, such as tylosaurines or plioplatecarpines. Later mosasaurine taxa exhibited higher diversity and disparity compared to any other clade of mosasaurs. That increase in taxonomic and anatomical diversity occurred sometime prior to 81 million years ago, during the early Campanian. This was a time of sea level highstand and decreasing sea surface temperatures. It is unclear what selective pressures drove the taxonomic and anatomical diversification of mosasaurine mosasaurs. I hypothesize that the high taxonomic diversity and disparity observed in Campanian – Maastrichtian members of this clade resulted from selection acting upon the high variability expressed by basal mosasaurines.

1:15 041.253 G **Measuring the Effectiveness of Invasive Species Education Curricula on Student Knowledge of Invasive Species**, *Kathryn Parsley, Texas State University; Tina Marie Waliczek, Texas State University; Paula S Williamson, Texas State University; Florence M Oxley, Austin Community College*

There are approximately 4,300 invasive species in the U.S. and they cost the U.S. 137 billion dollars annually in the form of destroyed crops, fisheries, forests, and other resources. As such, it would seem logical to cover this topic in biology courses at the college level, which is why we chose to develop a curriculum to teach undergraduate students about invasive species. The curriculum consisted of a PowerPoint lecture, as well as a 3-part hands-on laboratory experience. In order to test the effectiveness of the curriculum, we also created an instrument that consisted of an identical pre- and post-test. There were three groups of student respondents: 1 group (n=50) received no lecture or laboratory curricula (control group), 1 group (n=105) received a lecture curriculum only (lecture-only treatment group) and 1 group (n=42) received both lecture and laboratory curricula (lecture and laboratory treatment group). We ran paired samples t-test analyses to compare scores for each individual group, as well as an ANOVA to compare scores between the three groups. The control group scores were not significantly different ($p=0.440$) between the pre- and post-test. However, both the lecture-only and the lecture and laboratory treatment groups had scores that were significantly different after receiving the curricula ($p<0.001$). When comparing all three groups, the control and lecture group significantly differed ($p<0.001$), as did the control and the lecture and laboratory treatment groups ($p<0.001$). The lecture-only and the lecture and laboratory treatment groups also differed significantly ($p=0.002$).

1:30 041.254 G **The relationship between blood hormone and lipid levels on the abundance of ectoparasites 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*

Neotoma micropus, the Southern Plains Woodrat, is host to a wide range of parasites, both external and internal. It is common knowledge that these parasites are potential vectors of zoonotic diseases, however little is known about internal host influencing factors of parasitic abundance and prevalence. This study will focus on determining if there is a relationship between a mammalian host's sex hormone and lipid levels and their external parasite load (such as ticks, mites, lice, and fleas). A sample size of sixty *N. micropus* were captured using live trapping at two locations in Midland County, Texas. Woodrats were anesthetized in the field with the use of isoflurane, allowing for ectoparasite collection via the brushing method and blood collection via cardiocentesis of the left ventricle. Collected ectoparasites were taxonomically identified to lowest level possible and the number present recorded. Blood serum hormone levels were obtained through ELISA testing and the lipid levels (specifically total cholesterol and triglycerides) were evaluated with the use of a HESKA Dry-Chem 4000. Data analysis includes the ectoparasite density, intensity, and prevalence on each host, and various statistical methods used toward evaluating a correlation between the blood serum hormone and lipid levels and ectoparasite abundance.

1:45 041.255 G **Utilizing a Channel Geomorphic Unit sampling scheme to discover habitat associations for freshwater mussels**, *Andrew Glen, University of Texas at Tyler; Lance Williams, University of Texas at Tyler; Neil Ford, University of Texas at Tyler*

North America is home to 302 unionoid species, with approximately 53 occurring in Texas, and are considered the second most imperiled group of organisms (Williams et al., 1993; Howells et al., 1996). Several hypotheses have been produced in an attempt to

explain the spatial distribution of mussels within a stream reach, but only certain hydraulic characteristics appear to be correlated (Layzer and Madison, 1995; Niraula et al., 2015). Emerging evidence indicates that freshwater mussels may utilize flow refugia in order to remain embedded during high flow events (Strayer, 1999). As the use of hydraulic variables to characterize mussel habitat becomes more widespread, it may be useful to implement sampling that captures these measures. One option may be a Basin Visual Estimation Technique (BVET) that utilizes classification by Channel Geomorphic Units (CGU's) which would incorporate these hydraulic variables. We sampled populations of freshwater mussels utilizing a CGU sampling scheme in order to investigate habitat associations. We sampled 31 sites along the upper Neches River in Texas through excavating 0.25m2 quadrats for mussels and the collection of site specific environmental data at the same location. Three-way log-linear contingency tables were developed and analyzed using a $\chi 2$ test to elucidate if associations between species, environmental characteristics, and CGU's were occurring. The results suggest that numerous species do associate with CGU's and are associated with certain environmental characteristics and areas of low shear stress.

2:00 041.256 G **A new hypothesis for burrowing as the main driver for reorganization of the circadian system in tetrapods**, *William Gelnaw, The University of Texas at Austin*
Long-standing hypotheses for reorganization of the circadian system in the brain, and loss of the pineal foramen, have attributed it to nocturnality and to low latitudes where selection to maintain the pineal eye is weaker. However, examining the fossil record reveals that loss of the pineal foramen occurs well before the supposed nocturnal bottleneck in the evolution of mammals. Furthermore, adding a phylogenetic context shows that the absence of a pineal foramen among low-latitude species of lizard represents only one or two losses of the pineal foramen, and not a statistically significant trend. I propose that shifts towards a burrowing lifestyle is a much better predictor of the loss of the pineal foramen and the associated reorganization of the circadian system. Examining fossils in a phylogenetic context reveals that the pineal foramen is independently lost four times in early amphibians, at least twice among synapsids, and as many as sixteen times among diapsids. Furthermore, the pineal foramen appears to have been regained at least five times throughout the history of tetrapods. The majority of lineages that lose the pineal foramen also show evidence of having been burrowers. While there are many osteological correlates of burrowing, there are only a few for nocturnality. Furthermore, the adaptations to low-light conditions that many have attributed to nocturnality can just as easily be attributed to fossoriality in lineages that lose the pineal foramen. Thus, a burrowing-driven hypothesis is the most parsimonious explanation for reorganization of the circadian system.

042. Marine Science Oral Session II and Section Meeting
1:00 to 2:15 pm
York Science Center, YSC 117
Marine Science
Marine Science Oral Session II and Section Meeting Participants:

1:00 042.257 N **The Influence of Freshwater Inflow on the Occurrence of Atlantic Rangia and Water Celery within Galveston Bay**, *George Guillen, Environmental Institute of Houston; Jenny Oakley, Environmental Institute of Houston; Mandi Gordon, Environmental Institute of Houston; Cory Scanes, Environmental Institute of Houston; Norman Johns, National Wildlife Federation*
The estuarine brackish water clam Rangia cuneata (Atlantic Rangia) and the oligohaline Vallisneria americana (water celery); have been recommended as potential indicator species to determine the effect of freshwater inflow in Texas estuaries. The lack of historical monitoring data has limited the ability of resource managers to develop recommended environmental inflow regimes based on quantitative relationships between freshwater inflow and population levels of these species. Our study attempted to develop functional relationships between these species and freshwater inflow within the Galveston Bay system using data from the Trinity River delta. The objectives of our study were to: 1) update and describe the geographic distribution data of Atlantic Rangia and water celery and 2) describe the relationship between freshwater inflow, salinity, and the distribution of these two species. Based on a review of historical data and new data collected during our study in 2016 we found that due to differences in sampling methodology it was difficult to discern statistically significant trends in Atlantic Rangia attributable to river discharge, however, it is clear that the meat index (% total weight) had increased from former levels historically reported during drought periods. Similarly the occurrence of water celery had also increased from historical drought (high salinity) periods. We conclude the increase in freshwater inflow and resulting lower salinities during 2015-16 reduced stressful conditions that existed during the drought years of 2011-14. The success of future attempts to conserve or restore these species will be strongly dependent on maintaining appropriate freshwater inflow regimes.

1:15 042.258 G **The reduction of dispersed oil toxicity through the synergistic application of hydrocarbon digesting microbial solutions**, *Michael Lewis, TAMU-CC, Center for Coastal Studies*
As long as we produce and transport petroleum, spills

due to human error or mechanical failure will be unavoidable. Current cleanup techniques for these spills are generally limited to mechanical and chemical dispersants. These dispersants may actually increase toxicity of the spill. However, the application of hydrocarbon digesting microbes has been shown to reduce the toxicity of dispersed oils. Using grass shrimp (*Palaemonetes pugio*), I will establish the most efficient ratios of dispersant and microbe application with the goals of reducing overall mortality and sub-lethal effects of oil and dispersants. The experiment will consist of exposing the organisms to various ratios of oil, dispersant, and microbes. The shrimp will be monitored for overall mortality and sub-lethal effects to include respiration, motility, and stress hormone production. This research will provide recommendations of synergistic application of microbes to reduce the toxicity time in the water column. The research is focused on reducing the longevity of oil toxicity, describing the proper procedure for applying the dispersants and microbes to an oil spill, and providing efficient and proven ratios of dispersant and microbes to be used in treating an oil spill. The information gathered through this research will improve oil spill management and recovery techniques. These improved techniques will allow key species to have a quicker recovery rate reducing the environmental impact of oil spills. The increased recovery coupled with lower initial impacts would improve fisheries and tourism, in turn benefiting the economy.

1:30 042.259 N **Why don't seagrasses grow in the Arroyo Colorado? Evidence from the water column and measurements of photosynthesis and respiration.**, *Joseph Lawrence Kowalski, The University of Texas Rio Grande Valley; Hudson DeYoe, The University of Texas Rio Grande Valley*
Halodule wrightii (shoal grass) can grow at salinities as low as 5 in controlled laboratory conditions for more than three months. However, when transplanted into the mesohaline Arroyo Colorado, an engineered agricultural and municipal drain in south Texas, it succumbed within one month at an Arroyo site within 2 km from the Laguna Madre donor site. Water column nitrogen concentrations were persistently high at the Laguna donor site and two Arroyo sites. Underwater light was highly variable by site and date but typically lowest at Arroyo sites. There was no difference in leaf production rates between sites, but photosynthetic rates were significantly greater and leaf respiration rates lowest at the Laguna Madre site. Respiration rates at the Arroyo site were more than three-fold that of the Laguna Madre site. There was no difference in photosynthetic efficiency (Fv/Fm) in June 2016, but efficiency dropped significantly at the Arroyo site in July 2016. The interplay of water column nutrients, underwater light, and hyposalinity likely explain the inability of seagrasses to grow in the eutrophic water of the Arroyo Colorado.

043. Science Education Oral Session III and Section Meeting
1:00 to 2:15 pm
Wells Science Hall, WSH 131
Science Education
Science Education Oral Session III and Section Meeting
Participants:

1:00 043.261 G **The Role of Museums in Addressing Student Misconceptions about Evolution**, *Sarah Harris, University of Texas at Austin*
People use prior knowledge when encountering situations or concepts that may be unfamiliar. This knowledge can conflict with the known science discipline; therefore, it is not surprising that many students have misconceptions (conflicting prior knowledge) about evolution. As an informal education setting, museums play an important role in researching how misconceptions are formed and resolved. While physical and chemical science museum exhibits have been researched, there is a lack of empirical misconception studies in the life sciences, particularly evolution. The purpose of this paper is to show that evolution museum exhibits are an untapped resource for misconception research. It will begin with a discussion of misconceptions about evolution and how they arise before considering the role museums play in addressing misconceptions. This paper will conclude with suggestions for educators who want to address student misconceptions regardless of setting as well as a call for further research on evolution misconceptions in museum exhibits.

1:15 043.262 N **The pchem projects: 10 years and going strong**, *Alyx Frantzen, Stephen F. Austin State University; Brian Barngrover, Stephen F. Austin State University*
For the last 10 years, students enrolled in the second semester of physical chemistry at SFASU are required to design and carry out a project of their own design. They receive guidance in the scope and breadth of their project and are required to write a project description, list of needed equipment and consumables, and a budget. They must also work within a prescribed time frame during the semester. At the end of the semester, students must present their work as well as a formal paper with their final results and conclusions. Throughout the years, there have been successful projects and some that have not worked as expected. In the curriculum at SFASU, research is a required aspect. Many of the students start on projects after they complete the second semester of general chemistry, but the PChem Project is their first opportunity to design and carry out their own research idea. They are encouraged to think of interdisciplinary projects with a physical chemistry flare. The design and results from several projects will be presented.

1:30 043.263 G **Understanding Teacher Leadership in Math and Science Integrated Quality Professional Development Programs**, *Ruby Hernandez, Student; Sandra S. West, Texas State University*
Mix It Up are Teacher Quality grant-funded professional development (PD) programs for grades 5-8 math and science teacher teams and their principals designed to integrate math and science instruction incorporating best practices and inquiry based learning. Research suggests teacher leaders must be able to collaborate with their peers, principal and the community in order make an impact. Quality instruction and increased student performance may motivate teachers to share their personal progress, which give teachers the confidence to lead their peers. My research will further investigate the impact of the PD on teacher leadership. Past participants have moved into leadership, for example, by presenting at state conferences and being selected for the science TEKS writing committees. Other research questions include whether they are reporting this information back to their departments as teacher leaders or discussing curriculum matters with their principals. Participants selected will be surveyed and interviewed to gather data on their teacher experience, degree of education, and their teacher roles at the beginning and the end of the program. The findings will enable a better understanding of how an intense PD such a Mix It Up program can build science teacher leadership capacity.

1:45 043.264 N **Using the "5E learning cycle" and "interleaving" to improve student retention of basic and complex genetics concepts**, *Joni Henrik Ylostalo, University of Mary Hardin-Baylor*
Teaching a lower level microbiology course primarily to non-majors can sometimes be a daunting task, especially in regards to complex multi-level topics such as genetics. Students often struggle in grasping even the most basic concepts like the "central dogma of genetics" leading into problems in comprehending the more complex topics. Furthermore, tendency to use "blocking" style of teaching that focuses on teaching skills/concepts one topic at the time results in inadequate skill-retention and incomplete integration of the new content into the pre-existing knowledge. Hence, I have been developing and improving the core of the genetics module in my microbiology course by introducing "interleaving" teaching techniques together with the "5E learning cycle". I start the module by going over the "central dogma of genetics" in an inquiry-based manner increasing the curiosity of the students while making links to their prior knowledge (1st E-Engage). This is followed by a genetics "puzzle" game I developed that engages students into their own learning through deciphering a puzzle, based on the central dogma of genetics, in small groups (2nd E-Exploration). After this stage we transition into a more challenging and a deeper concept, gene expression regulation in bacteria through operons, using movie clips and instructor modeling (3rd E-Explanation). In the next phase, students dive into the intricacies of a specific example of an inducible operon through think-pair-share and problem-based learning (4th E-Extend/Elaborate). I assess the student learning by conducting both formative and diagnostic assessments throughout the teaching module to complete the cycle (5th E-Evaluate).

044. Terrestrial Ecology and Management Oral Session II and Section Meeting
1:00 to 2:30 pm
Wells Science Hall, WSH 241
Terrestrial Ecology and Management
Terrestrial Ecology and Management Oral Session II and Section Meeting
Participants:

1:00 044.266 G **Chemosensory Signaling: Using Coyote Communication to Aid in the Deterrance of Livestock Predation**, *Hannah Stouffer, Hardin-Simmons University; Wendi Wolfram, Hardin Simmons University*
Coyote populations stretch across the United States creating an overlap between human and coyote territory boundaries and increasing negative interactions between predator and livestock. Coyote predation of livestock costs ranchers time, energy, and money. One method to aid in reducing these hardships on ranchers is to identify and use basic canid behaviors to elicit desired responses. Communication using chemosensory signals can play a vital role in the manipulation of an animal's behavior. Coyotes use scent marking as a means of communication to announce their presence and establish territory boundaries. Humans can reproduce these scent-marking signals for not only coyotes but a variety of other large carnivores to denote an occupied territory. Using predator urine samples, ranchers could convey boundary lines to coyotes, reduce costs, protect livestock, and preserve the biodiversity of the surrounding ecosystem. In this study, we utilized various large predator urine samples to identify behavioral responses of coyotes to determine if a single large predator urine source could be effectively used to deter coyote predation.

1:15 044.267 N **Use of landscape by endangered dama gazelles (*Nanger dama*) on Texas rangeland.**, *Susan Margaret Cooper, Texas A&M AgriLife Research; Elizabth Cary Mungall, Second Ark Foundation*
International projects to restore critically endangered dama gazelles (*Nanger dama*) to parts of their native range in the African Sahel are ongoing, but obtaining information on use of landscape by this species is extremely difficult due their scarcity in the wild. Approximately 1,000 dama gazelles are kept on exotic wildlife ranches in Texas. We took advantage of the availability of these gazelles, and the climatic similarity

between Texas and their African range, to obtain information on the habitat use of dama gazelles in both a large semi-desert pasture (8,996 ha.) and a more mesic pasture (202 ha) on the Edwards Plateau. We fitted Global Positioning System (GPS) collars on 5 gazelles in the large pasture and 13 in the smaller pasture, each for 1 year. Research sites consisted of rolling limestone hills of the Ector ecological site. Vegetation was mixed shrubland dominated by Acacia species. Both groups of gazelles showed strong avoidance of steep rocky slopes. This fits with the historical distribution of dama gazelles in Acacia savannas, rather than the rocky massifs were current remnant populations exist. The gazelles in the large pasture maintained extensive home ranges (KHR) of 1,783 ± 364 ha. The animals lived entirely off the natural resources in their pastures and neither group of gazelles showed any attraction to supplemental food and water sources, or to ranch roads which offer easy travel through the spiny vegetation. These animals raised on Texas rangelands could provide well-adapted stock for the reintroduction efforts in Africa.

1:30 044.268 N **Impacts of herbivores on riparian zones of rural and urban streams: BMPs for their recovery and protection**, *tom arsuffi, TTU Llano River Field Station; Tyson Broad, TTU Llano River Field Station*

Due to the pristine nature and constant flow of the springs, the Upper Llano River is currently a healthy ecosystem supporting a variety of aquatic and terrestrial ecosystems.. The watershed has seen an increase in the number of terrestrial exotic and invasive animal (especially axis deer, feral hogs) and plant (pockets of giant cane, elephant ear and china berry) species. Portions of the watershed are also affected by an overpopulation of white-tailed deer. The impacts from these population pressures are greatest in the riparian zones of the rivers, resulting in streambank erosion, periodic bacterial exceedances and lack of streamside forest canopy regeneration. In more urbanized areas of watershed, people are responsible for ravaging large swaths of riparian lands replacing native riparian plants with impervious cover or mowing to stream edges. Here, we describe implementation efforts and BMPs associated with the Upper Llano Watershed Protection Plan, an EPA Healthy Watershed initiative, to mitigate and restore riparian structure and function to the N & S Llano rivers. The WPP uses a stakeholder process for decision-making on wildlife concerns; economics of BMPs; landowner interest/cooperation; and types of treatment measures. BMPs include: decrease feral hog populations, increase number of ranches with wildlife management plans, enroll 250K acres of ranchlands in conservation plans, implement streambank restoration/maintenance measures, herbicide treatment of invasive riparian plants, improve urban water management and education. Proactive upstream watershed management is effective in addressing incipient watershed impairments before they become significant impacts to watershed health and ecosystem services.

1:45 044.269 G **Trace Metals in Suburban Roadside Surface Soil**, *Matthew Fiala, Texas Southern University; Hyun-Min Hwang, Texas Southern University*

Operation of motor vehicles is one of the major sources of environmental contamination, especially in urban environments. In many urban watersheds, tires and brake pads are significant sources of Zn and Cu, respectively. Houston road dust may be a significant source of trace metals to surrounding soil through atmospheric deposition and stormwater runoff. To better understand the fate and transport of trace metals in road dust, surface soil (2 cm) was collected 1 m from the edge of Highway 6 approaching a traffic signal in Sugarland, Texas at 200, 160, 100, 50, 25, 15, and 5 m from the intersection. Upon arrival at the laboratory, samples were dried, and sieved to <63 μm. Relative anthropogenic input, or enrichment factor, is calculated using surface soil (< 63μm) collected on campus of Texas Southern University. Enrichment Factors (EF) for these samples are Cu (1.7), Zn (1.5), and Cr (1.2). Due to limited uncertainty, EF values > 1 indicate moderate anthropogenic input. Coefficient of variation are low for Cu (0.05) and Zn (0.003), and moderate for Cd (0.51), Ni (0.48), and Cr (0.53), indicating even distribution of Cu and Zn alongside the study area in comparison to other trace metals. It is suspected that vehicular and environmental forces homogenize brake and tire wear in the immediate environment. Soil core, road dust, and stormwater samples were collected and will be analyzed for trace metals to gain a better understanding of Cd, Ni, and Cr variation in surface soil.

2:15 044.271 N **An algae mediated shell disease of yellow mud turtles; Implications for other species**, *James Learned Christiansen, University of Texas, Collections Section*

Recent histological work and ongoing longitudinal studies of a population of Kinosternon flavescens in Presidio and Jeff Davis counties in West Texas has confirmed an algae mediated shell disease. Light microscopy revealed the common filamentous algae Basicladia chelonium in all stages of development of the shell lesions. The algae had invaded and disrupted the lamellae of the keratinized portion of the shell with erosion leading to complete loss of the scute and exposure of underlying bone. Four stages of progression of the shell lesion were identified and are easily recognized in the field. We provide data on prevalence of this shell disease among the marked population, association of the algal infection with aquatic tendency of individual turtles, progression of

the disease in individual turtles, and typical ages of turtles with onset of the disease and more advanced stages. Our data are consistent with the concept that the most arid-adapted populations of this species may have lost defenses against this common turtle epiphyte. Examination of preserved specimens of Kinosternon sonoriense and Terrapene coahuila suggest that these species may be vulnerable to this condition and that the disease may be restricted to turtle populations that have an evolutionary history of adaptation to aridity.

Sunday, March 5

051. Field Trip - Waco Mammoth National Monument (If you wish to attend please contact Dr. Chris Barker at cbarker@sfasu.edu)

8:00 am to 1:00 pm

Off Campus - Waco Mammoth National Monument, Waco Mammoth National Monument

Texas Academy of Science Annual Meeting

Field Trip - Waco Mammoth National Monument (If you wish to attend please contact Dr. Chris Barker at cbarker@sfasu.edu)

Join us for a TAS Student geology field trip to the ***Waco Mammoth National Monument***, one of the newest units of the U. S. Park System. The site has fossils of adult and juvenile mammoths, plus other animals. This glimpse into Pleistocene life is a great opportunity to see an important mammoth site. Special guest speaker: Don Esker, former director of the site and an expert on mammoths!

Time permitting, there may also be stops at the following locations:

- A prolific Cretaceous Comanche Peak Formation fossil collecting area
- High cliffs in Cameron Park to discuss the Balcones fault zone

The field trip starts on:
Sunday morning, March 5, 2017; departs at 8 am; breakfast not provided; location at Mary Hardin Baylor to be announced.

The field trip ends: In Waco about noon or 1 pm.

Participants will provide their own transportation from Belton to the Waco area. There will be a small fee for the Mammoth Park (probably less than $5). Enrollment may be limited.

If you wish to attend please send name(s), details and contact information to:
Dr. Chris Barker (cbarker@sfasu.edu), 936-468-2340.

Field trip leaders: Dr. Barker and Dr. Larell Nielson from Stephen F. Austin State University.

Index of Session Participants

E

F

G

H

J

K

L

M

N

O

P

Q

R

S

T

V

W

Y

Z