



TAS

Texas Academy of Science

Official Program

126th Annual Meeting
3-4 March 2023
Angelo State University

#TAS126



Our 126th Annual Meeting is dedicated to the memory of Dr. Jim Westgate, dedicated father, professor, paleontologist, and member of the Texas Academy of Science.

Schedule at a Glance

Friday, March 3

8:00 – 12:00	Board of Directors Meeting	<i>Vincent 241</i>
9:30 – 11:00	Student Welcome Breakfast & Reception	<i>Mayer Museum</i>
11:00 – 5:00	Meeting Registration & Presenter Check-in	<i>Houston Harte University Center</i>
11:00 – 12:00	Section Chairs Pre-Session Meeting	<i>Vincent 241</i>
12:30 – 2:30	Oral Session I	<i>Vincent Building</i>
2:30 – 3:00	Coffee Break I	<i>Vincent Building</i>
3:00 – 5:00	Oral Session II	<i>Vincent Building</i>
3:00 – 5:30	Symposium: Current status and research updates on the zebra mussel invasion in Texas	<i>Math & Computer Science Building 100</i>
5:00 – 5:30	Coffee Break II	<i>Vincent Building</i>
5:15 – 7:00	Poster Session, Vendor & Graduate School Fair	<i>Ben Kelley Center for Human Performance</i>

Saturday, March 4

8:00 – 1:00	Meeting Registration & Presenter Check-in	<i>Houston Harte University Center</i>
8:00 – 9:00	Past Presidents' Breakfast (invitation only)	<i>Rassman 100</i>
8:45 – 11:00	Oral Session III	<i>Vincent Building</i>
11:00 – 11:30	Coffee Break III	<i>Houston Harte University Center</i>
11:30 – 12:30	TAS Award Lectures	<i>Houston Harte University Center</i>
12:30 – 1:00	TAS Business Meeting	<i>Houston Harte University Center</i>
1:00 – 1:30	Section Chairs Post-Session Meeting	<i>Vincent 241</i>
1:00 – 3:00	Lunch	<i>Box Lunch Distribution: Houston Harte University Center</i>
3:00 – 4:15	Graduate Student Competition	<i>Houston Harte University Center</i>
4:30 – 5:00	Coffee Break IV	<i>Houston Harte University Center</i>
5:00 – 6:30	Science Jeopardy	<i>Houston Harte University Center</i>
7:00 – 10:00	Reception & Awards Banquet	<i>Houston Harte University Center</i>

Sunday, March 5

7:30 – 1:00	Geology Field Trip (see page 35 for details)	<i>Meet at Vincent Building parking lot</i>
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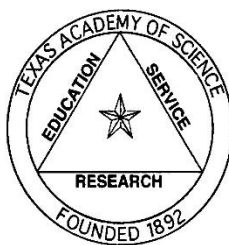
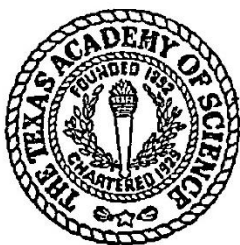
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About The Texas Academy of Science

As Texas' oldest scientific society, the history of today's Texas Academy of Science (TAS) is complex and occasionally obscure, but its mission of **promoting scientific research and education in Texas** has remained true for over a century.

A complete history of TAS compiled by Academy Historian and Past President Raymond Mathews is available at <https://www.texasacademyofscience.org/history-of-tas>. Briefly, the predecessor of TAS, the Academy of Science of Texas, was founded in 1880 by university science and math teachers and elected Texas Governor Oran M. Roberts as President. After a series of dissolutions and reconstitutions, the organization we know it today emerged around 1929 including founding members Charles Adkisson (physicist, Texas State College for Women), W. Joseph McConnell (mathematician, North Texas State College), Harris Parks (botanist/entomologist, Texas A&M Experimental Station at San Antonio), Clyde Reed (biologist, Texas College of Arts and Industries at Kingsville), and John Kern Strecker (biologist, Baylor Museum). TAS became affiliated with the American Association for the Advancement of Science (AAAS) around 1931 and remains a proud affiliate to the present day. TAS began publishing a peer-reviewed journal, *The Texas Journal of Science*, in 1949. The *Journal* recently became open access as it aims to provide a clearinghouse for original research by authors at Texas institutions and for work conducted in Texas or adjacent areas in any field of science, technology, or science education.

Today, TAS counts hundreds of scientists from across the state as members, including public and private university faculty, graduate and undergraduate students, and scientists in government and the private sector. TAS conducts an annual meeting to highlight research across 15 sections: Anthropology, Biomedical Sciences, Cell & Molecular Biology, Chemistry & Biochemistry, Conservation Ecology, Freshwater Science, Geosciences, Marine Science, Mathematics & Computer Science, Neuroscience, Plant Biology, Physics & Engineering, STEM Education, Systematics and Evolutionary Biology, and Terrestrial Ecology & Management. TAS provides substantial funding opportunities for students (~\$25,000 awarded annually) and facilitates expert testimony on policy issues related to STEM or science education, especially those issues most relevant to Texas. Building on over 100 years of success, TAS is more committed than ever to promoting scientific research and education in Texas.



Official TAS Seals from 1952 (left), circa 1990 (center), and today (right)

The Texas Journal of Science

About the *Texas Journal of Science*

Since 1949, *The Texas Journal of Science* has served as a clearinghouse for original research results in all fields of science, technology, and science education originating in Texas. More specifically, the geographic scope of manuscripts published in *The Texas Journal of Science* is generally limited to work conducted in Texas and adjacent areas (i.e., surrounding states and Mexico), but the *Journal* also welcomes work conducted by authors at Texas institutions with relevance to Texas natural history. Papers outside of this scope in subject areas which are not generally limited by geographic context may also be submitted by members of the Texas Academy of Science in good standing and are considered on a case-by-case basis (and should somehow relate to content previously published in *The Texas Journal of Science*).

The *Texas Journal of Science* is an open access publication of The Texas Academy of Science, and accepted papers are published online immediately. Older issues (1949-2010) are available online for free at www.texasjournalofscience.org.

We are actively seeking quality manuscripts!
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Welcome and Acknowledgments from the President



Welcome to the 126th meeting of the **Texas Academy of Science!**

It is with great enthusiasm that we have brought the Academy to the beautiful Angelo State University campus in San Angelo. Highlights of this meeting will include lectures from our Distinguished Texas Scientist Dr. Robert McMahon and Outstanding Texas Educator Niki Davis, a keynote lecture in Physics & Engineering by Dr. Timothy Head, and a special symposium, “Current status and research updates on the zebra mussel invasion in Texas” featuring academic and management leaders from across Texas and beyond. We will also enjoy the first ever Vendor and Graduate School Fair concurrent with our poster session to connect our student members—the future of science in Texas—with the next steps in their bright young careers. And of course, we look forward to excellent presentations in the Graduate Student Oral Presentation Competition, the popular Science Jeopardy Competition, as well as Saturday evening’s Awards Banquet. We look forward to these exciting events, learning about the current scientific research being conducted throughout Texas, and socializing with new and old colleagues, collaborators, and friends.

We would not be able to hold this meeting without the exemplary voluntary service of numerous colleagues. Please join me in thanking the local hosts, Drs. Ben Skipper and Ralph Zehnder, and other members of Angelo State University for graciously hosting our event and for all their dedicated efforts to make this meeting a success. Many thanks to Dr. Matthew A. Barnes, our current TAS President-elect, who put together this great program. At the end of the Awards Banquet on Saturday night, he will step into the position of TAS President. Many thanks to Dr. Kathy Wood, our current treasurer, who greatly helped everyone with the preparations. The TAS Board of Directors, Section Chairs, and Vice Chairs have done an amazing job of reviewing award nominations and submitted abstracts and working with our many authors to produce exciting and informative oral presentations and poster sessions. I thank our colleagues who will be leaving the Board of Directors at the end of this conference, and their service will be formally recognized in our Awards Banquet. I thank Dr. Chris Vitek, TAS coordinator of information technology, whose expertise and dedication were an essential part of preparing this meeting. A special thanks to Dr. Douglas Barrett, our TAS corresponding secretary, who worked alongside me in the preparation of the board meeting agendas. Finally, we dedicate this meeting to the memory of Dr. James Westgate, who was on the Board and organized the field trips in our conferences for many years.

It has been an honor to lead this important organization as TAS President this year. I look forward to my continued association with TAS as Past President and to contributing to its mission of promoting science in Texas.

Sincerely,

A handwritten signature in black ink that reads "Francisco Gonzalez-Lima". The signature is written in a cursive, flowing style.

Francisco Gonzalez-Lima, PhD

President, Texas Academy of Science

George I. Sanchez Centennial Professorship, The University of Texas at Austin



About Angelo State University

Founded as San Angelo College in 1928, Angelo State University, now a member of the Texas Tech University System, sits on a picturesque, 268-acre campus in the heart of San Angelo, Texas. The vibrant campus community of over 10,500 students is known as the Ram Fam and includes students from 224 counties across Texas, 25 states and 15 countries, as well as nearly 1,000 faculty and staff members. Campus operations are supported by an annual operating budget of \$127.3 million.

Known for its diversity, Angelo State has been designated a Hispanic Serving Institution by the U.S. Department of Education since 2010. ASU has also been named a 2019-20 College of Distinction and has been listed by The Princeton Review as one of the nation's "Best Colleges" and by G.I. Jobs magazine as a "Military Friendly School" every year since 2010. The Chronicle of Higher Education has also annually named ASU a "Great College to Work For" since 2015.

Angelo State offers over 100 majors and concentrations through six academic colleges:

- Archer College of Health and Human Services
- College of Arts and Humanities
- College of Education
- College of Graduate Studies and Research
- College of Science and Engineering
- Norris-Vincent College of Business

Diverse academic programs provide educational opportunities that prepare students for successful careers or entry into graduate and professional schools. ASU also boasts an unparalleled Honors Program and Center for International Studies, giving students further opportunities to expand their education through research and study abroad. With a 19:1 student-to-faculty ratio, ASU students also have ultimate access to award-winning faculty. A Multicultural Center, Freshman College and VETS Center support first-generation, first-year and military/veteran students as they transition to college life.

Another major attraction for many students is Angelo State's financial aid offerings, which have been ranked the best at a Texas public university. That financial aid is highlighted by the Carr Academic Scholarship Program that boasts one of the largest endowments at a U.S. regional university and provides annual awards of \$1,000 to \$18,000 to nearly 40% of ASU students. Overall, about 85% of ASU students receive some form of financial aid.

In addition to excellent academics, Angelo State offers students a multitude of opportunities for individual growth and social engagement. Student organizations, fraternities and sororities, intramural/club sports, and numerous campus events and activities ensure that students can pursue their personal interests, enhance their social and cultural understanding, and enjoy their time as part of the Ram Fam. On-campus students live in award-winning modern residence halls, and all ASU students enjoy a state-of-the-art library, nationally recognized university center, student fitness center, intramurals complex and lake house recreation facility.

Angelo State student-athletes compete for the Rams and Rambelles in 15 intercollegiate sports. ASU teams compete in NCAA Division II and the Lone Star Conference, and ASU boasts some of the finest athletic facilities in all of Division II. Angelo State athletic teams have won four total national championships and have claimed 18 Lone Star Conference titles since 2016-17.



Angelo State University campus photo and text courtesy of <https://www.angelo.edu/asu-presidential-search/about-asu.php>

RESTAURANTS

in San Angelo

...just a few

Angry Cactus

1006 Almond Circle
San Angelo, TX.
325.939.9011

Nacho's Restaurant

2502 W 306 Loop
San Angelo, TX.
325.949.6570

Twisted Root

333 S Chadbourne St.
San Angelo, TX.
325.653.7668

Cielo TX

4132 Sunset Dr.
San Angelo, TX.
325.617.2809

Napoli's Italian

1901 Knickerbocker Rd.
San Angelo, TX.
325.617.4216

The Wharf

2302 W 306 Loop
San Angelo, TX.
325.276.3671

Cork & Pig

1407 Knickerbocker Rd.
San Angelo, TX.
325.227.6988

Old Central Firehouse Pizzeria & Taproom

200a S Magdalen St.
San Angelo, TX.
325.227.6710

Zero One Ale House

20 W Beauregard Ave.
San Angelo, TX.
325.653.5123

Fuentes Downtown

101 S Chadbourne St.
San Angelo, TX.
325.658.2430

Texas Burger

1502 Knickerbocker Rd.
San Angelo, TX.
325.387.8118

The Original Henry's

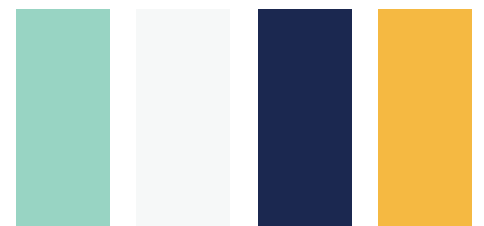
3015 Sherwood Way
San Angelo, TX.
325.223.0171

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Graduate Student Oral Paper Competition

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2023 Election Results

Vice President: Dr. Maria Burns



Dr. Burns is the Academic Director of the Technology Leadership & Innovation Management Program of the University of Houston, Director of the Leadership & Finance Training Program, and Director of Education and Workforce at the Borders, Trade, and Immigration Program of the University of Houston, a U.S. Department of Homeland Security Center of Excellence (Emeritus). Her research grants as PI and Co-PI exceed \$1,800,000. Her academic studies entail Political Science, Data Science, and International Trade and Transport. Before joining academia she held leadership positions in global maritime corporations, conducting negotiations with global energy and industrial partners. A prolific author and course developer, in the past 10 years she authored 4 security books, 19 academic & 24 training courses with the Department of Homeland Security, and 10 training manuals with the U.S. Coast Guard. For her contribution in the Transport Security field, she has won awards and prestigious memberships by the U.S. Coast Guard Aux. (2012), the Department of Public Safety (2016), the Private Sector Advisory Council under the Governor of Texas (2017), and the Emergency Management Association (2017). At a University of Houston level, she received the BTI Institute Thrust Lead for Education Certificate of Excellence (2017), the UH Provost's Excellence in Research Certificate (2016), and Provost's Excellence in Research Letters (2015 & 2021). A respected public speaker, she was featured in Reuters News, NASDAQ Stock Exchange, Finance Yahoo, etc.

Dr. Burns is a servant leader, with strong teamwork and leadership skills. She is dedicated to faculty research and professional development, and enjoys supporting faculty and student goals, knowing that eventually, our research legacy will pass on to the younger generation of scholars. She is goal-oriented, loyal to the TAS mission and academic principles, hard-working, and well-organized.

2023-2026 Non-Academic Director: Megan Bean



Megan Bean is the Native Fish Conservation Coordinator for Texas Parks and Wildlife Department's Inland Fisheries Division. She works on the conservation, management, and research of native fish and aquatic habitats. Bean has experience working with private landowners on the planning, design, and implementation of habitat restoration, enhancement, and preservation projects in priority rivers and associated watersheds. She manages Inland Fisheries' State Wildlife Grant Program and works collaboratively with university and other research partners. Bean also provides technical guidance on conservation best management practices to landowners and local community partners to support healthy rivers, natural habitat conditions, sustainable native fish populations, and high-quality conservation-oriented recreational activities in Texas rivers. Bean is currently Past President for the Desert Fishes Council and has experience serving on other boards and committees.

2023-2026 Academic Director: Dr. Shawana Tabassum

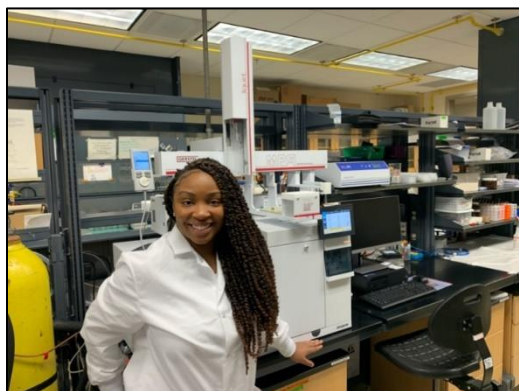


Dr. Shawana Tabassum is an Assistant Professor of Electrical Engineering at the University of Texas at Tyler, where she directs the Biosensors and Bioinformatics Laboratory. Her research focuses on flexible and soft sensors and electronics; micro/nano-optics; microfluidics and their applications in biomedicine and precision agriculture. She received her B.Sc. degree in electrical and electronic engineering from Bangladesh University of Engineering and Technology, Bangladesh, and her Ph.D. degree in electrical and computer engineering from Iowa State University. Dr. Tabassum is a recipient of several prestigious awards including the Dean's Award for Excellence in Research and Scholarship from UT Tyler (2022), the Best

Paper Award at IEEE NEMS conference (2022), the Best Poster Award at IEEE R5 (2022), mHealth scholarship from the National Institute of Health (2022), Best Paper Awards at Louis Stokes Midwest Regional Center of Excellence (LSMRCE) Conference (2021), the Science breakthrough of the Year: Emerging Talent from Falling Walls (2020), Robert J. Menges award for outstanding research in educational development (2020), Postdoctoral Scholar Excellence award for teaching and mentoring students (2020), Best global impact innovation prize from ISU's Pappajohn Center for Entrepreneurship (2020, 2019), Biomedical Engineering Society's career development award (2019), Research Excellence Award (2018), and the Best paper award finalist at IEEE Sensors conference (2016).

Dr. Tabassum is dedicated to training the next generation of scientists. She currently serves on the Science Advisory Board of Plant the Moon/Mars Challenge, a global science experiment, citizen-science project, and research competition for students of all ages—elementary school, middle school, high school, and undergraduate/professional. She is also committed to doing whatever she can to encourage more women into STEM. She is currently serving as the diversity co-chair at the IEEE International Conference on Flexible, Printable Sensors and Systems to be held in July 2023 and as student competition co-chair at the IEEE Dallas Circuits and Systems Conference to be held in April 2023.

2023-2025 Student Director: Kiana L. Holbrook



Kiana received her B.Sc. degree in Biochemistry with a double minor in Forensic Psychology and Anthropology from Texas State University and a Master of Science in Forensic Science from Texas Tech University. She was accepted into the University of Texas at El Paso (UTEP) Chemistry PhD program Fall 2019 and was appointed as a RISE doctoral fellow in Spring 2020. Kiana's dissertation research focuses on evaluating biomarkers found in biological specimens (urine, blood, tissue/biopsy) collected over a two-year period from healthy volunteers and renal cancer patients using thermo-desorption extraction in

combination with gas chromatography mass spectrometry (TD-GC/MS). Kiana's desires to implement her experience and professionalism if given the opportunity to enhance the knowledge science, bring TAS awareness to like-minded scientist, pave the way for the upcoming scientists, and ultimately increase the TAS community.

2023 Outstanding Texas Educator: Ms. Niki Davis



Niki Davis graduated from Frostburg State University in 2010 with a Bachelor's degree in Music: Vocal Performance. She returned to school in 2012 and attended the University of Maryland: College Park where she received her master's degree in Curriculum and Instruction and gained teaching certification. Davis has taught for 10 years and is currently a sixth-grade math and science teacher at Pioneer Crossing Elementary in Manor, Texas. From 2019-2020, Niki acted as an Instructional Coach on a campus, where she assisted teachers with their data-driven instruction. She has overseen extracurricular programs at her school, such as UIL and campus Math and Science Nights. She has also been a supportive role on her campus, acting as Team Lead, mentoring colleagues, and currently is hosting a Resident Teacher from Texas State University. Davis has presented her ideas for improving instructional practices to District leaders, including the Superintendent. In March 2022, she was named as one of three state finalists in the Mathematics Category for the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). This award is the highest honor bestowed by the United States government specifically for K-12 science and math teachers. She considers herself a life-long learner and is passionate about using data to grow students.

2023 Texas Distinguished Scientist: Dr. Robert McMahon



Dr. McMahon joined the Department of Biology at the University of Texas at Arlington as an Assistant Professor in 1972 after receiving a BA in Zoology from Cornell University and a PhD in Zoology from Syracuse University. He was promoted to Associate Professor in 1977 and Full Professor in 1984. At UT Arlington, he also served as Director of the Graduate Program in Environmental and Earth Sciences (1999-2003), Associate Dean of the College of Science (2000-2003), and Dean of the Honors College (2003-2008), before retiring as Professor Emeritus in 2009. Dr. McMahon has become internationally known for his work on the physiological ecology of freshwater gastropods and bivalves, physiological adaptation in intertidal gastropods, and the biology and control of invasive, macrofouling freshwater and marine bivalves.

Dr. McMahon supervised the theses of 24 master's students, the dissertations of 11 doctoral students and the theses of two undergraduate Honors students. His students have gone on to successful careers in academia, industry, and local, state, and federal agencies. Dr. McMahon has 139 publications in reviewed scientific journals, symposium proceedings, and scientific treatises. His work has been funded by the National Science Foundation, US Army Corps of Engineers, US Fish and Wildlife Service, the Electric Power Research Institute, National Sea Grant, Luminant Power, Buckman Laboratories, Texas Commission on Environmental Quality, and Texas Parks and Wildlife Department, among others. Recognitions of his research accomplishments include a Fulbright-Hayes Research Fellowship at Trinity College, Dublin, Ireland, the UT Arlington Distinguished Record of Research Award, appointment to the US National Invasive Species Advisory Committee, and the Federal National Invasive Species Awareness Week Committee's "Lifetime Invasive Species Award."

Graduate Student Competition - Abstracts

Characterization of natural flavonoid kaempferol in duplex and quadruplex DNA matrices

Justin Lovett¹, Bidisha Sengupta¹ (1. Stephen F. Austin State University)

Therapeutic potentials of phytochemicals have attracted much attention in medicinal chemistry. Kaempferol (KMP) is a naturally occurring plant flavonoid found in leafy greens such as watercress, kale, and broccoli. Interestingly, KMP has been shown to exhibit anticancer properties by interfering with various cell signaling pathways. KMP has derivatives such as Kaempferol-3-O-glucoside (KMP-3-O-glucoside, KMPG) and Kaempferol-3-O-rutinoside (KMP-3-O-rutinoside, KMPR) exhibiting similar properties. It is known single and double stranded nucleic acid structures can serve as receptors for flavonoids. Unusual DNA motifs (C_4 and G_4 tetraplexes) are commonly found in human telomeres and protooncogenes, which serve as potential targets to treat cancer. We exploited dual luminescence properties of KMP and derivatives to examine their efficacy of binding and compare their interactions with DNA, which is one of the macromolecular targets of flavonoids in physiological systems. Following the sequence of the human telomeric DNA 5'-d(CCCTAA)_n/(-TTAGGG)_n-3', two single stranded DNA oligonucleotides, 5'-d(C₃TA₂)₃C₃-3' and 5'-d(T₂AG₃)₄-3', and their duplex were used as receptors to study binding with the KMP ligands. Circular dichroism (CD) studies indicated the formation of C_4 and G_4 structures for both the C and G rich single stranded DNAs respectively. Upon binding to DNA, dramatic changes were observed in the intrinsic fluorescence behavior of KMP. Molecular docking studies were performed to describe the likely binding sites for the ligands. The spectroscopic studies on flavonoid-DNA interactions described demonstrate powerful approaches for examining their DNA binding through exploiting highly sensitive intrinsic fluorescence properties of KMP as their own "reporter" for their interactions with macromolecular targets.

Hsp60's C-terminal tail is an important sensor to initiate protein refolding

Daniel von Salzen¹, Ricardo Bernal¹ (1. University of Texas El Paso)

Molecular chaperonins are large protein complexes responsible for the refolding of misfolded substrate in an ATP dependent manner. In humans, heat shock protein 60 (Hsp60) along with its co-chaperonin Hsp10 is involved with maintaining protein homeostasis within the mitochondrial matrix. Structural analysis has identified the major functions of each domain within the Hsp60 monomer. However, very little is known about Hsp60's intrinsically disordered C-terminal tail other than it is playing a significant role in the chaperonin's refolding ability. It is speculated that the function of the C-terminal tail is to shuttle protein into the chaperonin's inner cavity. However, we hypothesize that the C-terminal tail has a secondary role where it acts as a key sensor signaling the presence of substrate within the inner chamber to initiate ATP hydrolysis and protein refolding. We have investigated the effects that truncations of the C-terminus have on Hsp60's ability to refold denatured malate dehydrogenase in protein refolding assays performed in-vitro. We found that removal of 26 residues from the C-terminal tail results in loss of Hsp60's refolding ability and ATP hydrolysis activity without disrupting complex formation in vitro. Importantly, Cryo-electron microscopy of CTD26 in the presence of denatured malate dehydrogenase shows the formation of the ATP football complex. The presence of this complex is only seen when denatured substrate is present and suggests that the substrate can still be encapsulated but cannot be refolded due to inhibited ATP hydrolysis that results from the removal of the C-terminal tail.

Infiltration berms as a land management practice: seasonal impacts on soil microbial community composition and potential respiration activity

David Roberts¹, Allison Veach¹ (1. University of Texas San Antonio, Department of Integrated Biology)

Soil microorganisms mediate the carbon cycle with their ability to mineralize and immobilize carbon. Microbial carbon processing is influenced by soil water content which can significantly vary based on land-management practices. Infiltration berms are one such practice that is used to increase groundwater recharge by slowing runoff. The increased infiltration potentially alters the soil habitat by increasing soil water content. In this study, we investigated the impact of infiltration berms on soil microbial activity, biomass, and bacterial/archaeal and fungal community composition compared to an undeveloped area. We sampled mineral soils (top 10-cm cores) from spring 2021 to spring 2022 for a total of 5 sampling events. Soils were sieved at a 2-mm mesh size. Soil microbial activity was measured via targeting soil dehydrogenase activity (DHA) by the TTC method. Microbial biomass carbon (MBC) was measured after chloroform fumigation was carried out and non-purgeable organic carbon was measured in extractants. We also determined bacterial/archaeal and fungal microbiomes via high throughput 16S rRNA and ITS2 gene sequencing. The undeveloped landscape had greater DHA ($p < 0.001$) than the infiltration berm landscape across all seasons ($p < 0.001$). Additionally, BMC was found to be equivalent across sites ($p = 0.74$) and seasons ($p = 0.32$). Preliminary community analysis found all sites were dominated by the same phyla with equivalent alpha diversity ($p = 0.43$), yet exploratory analysis of beta diversity suggests there are distinct differences in lower taxonomic composition. Difference in microbial activity and biomass suggests a difference in carbon use by microorganisms within the undeveloped and bermed site.

LRP1 loss in adult neural stem cells causes benefit in stroke recovery, but detriment during brain aging

Kristi Dietert¹, Swetha Mahesula¹, John Verschelde¹, Natalia Kuhn¹, Pamela Reed¹, Shane Sprague¹, Erzsebet Kokovay¹, Naomi Sayre¹ (1. UT Health San Antonio)

Neurodegenerative disease causes the death of 1/3 of senior citizens, with a prevalence projected to triple by 2050. In addition to aging, brain injury also increases risk for neurodegeneration, but the mechanisms driving this are unknown. Adult neurogenesis plays a vital role in mediating both recovery after injury and neurodegenerative disease. Despite being amply expressed in adult neural stem cells (NSCs), the role low-density lipoprotein receptor related protein 1 (LRP1) plays in adult neurogenesis is understudied. LRP1 is involved in trafficking ApoE4, amyloid beta, and tau – all of which play a role in AD pathogenesis. Using a Nestin-Cre inducible mouse model to knockout LRP1 in NSCs of adult mice, we are investigating how LRP1 loss affects recovery after stroke and during naïve brain aging. We found that LRP1 knockout caused a loss of CXCR4 expression and deficits in ischemia-stimulated migration from the subventricular zone. However, these mice displayed improvements in functional recovery and lesion size 2 weeks post-stroke. Despite this apparent benefit in short term recovery after injury, we have also found that mice lacking NSC LRP1 display a variety of behavioral deficits at 9 months of age (6 months after knockout) that suggest dysregulated hippocampal function. Specifically, mice lacking NSC LRP1 exhibit hippocampal-dependent memory deficits with a suggestion of a loss of pattern separation – a behavior explicitly dependent on hippocampal neurogenesis. Ongoing research is being conducted to elucidate the mechanistic underpinnings of these changes and their relation to cognitive decline and recovery after injury.

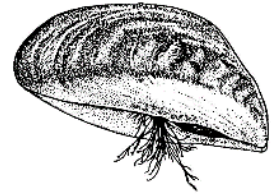
Metabolic mapping of rat brain activity after transcranial infrared laser stimulation

Zachary Wade¹, Roger Davis¹, Adrian Nguyen¹, Sindhu Venkat¹, Douglas Barrett¹, Francisco Gonzalez-Lima¹ (1. The University of Texas Austin)

Photobiomodulation via transcranial infrared laser stimulation (TILS) is a novel intervention that non-invasively simulates mitochondrial enzyme cytochrome c oxidase (CCO). The terminal enzyme in the mitochondrial electron transport chain, CCO catalyzes oxygen reduction for the metabolism of energy. The photoactivation of this enzyme is associated with improved cerebral oxygenation and cognition. This experiment aimed to measure the duration of TILS effects in rat brains up to 4 weeks after a single stimulation session. The rat brains were collected 1 day, 2 weeks, or 4 weeks post-stimulation. Untreated brains were collected 1 day after the sham procedure. Brains were coronally sectioned, stained using cytochrome oxidase histochemistry, and then digitally imaged. Optical density readings of 28 regions of interest were captured using ImageJ, which were then converted to cytochrome C activity units for analysis. ANCOVAs compared each active laser condition to sham, with whole brain average as a covariate. The infralimbic cortex showed significant mean differences from 1-day to sham ($p = 0.04$) and 2-weeks to sham ($p = 0.023$). Other significant differences from 2-weeks to sham included lateral septum ($p = 0.015$), accumbens core ($p = 0.017$), CA3 of the hippocampus ($p = 0.02$), and the molecular layer of the hippocampus ($p=0.009$). Medial amygdala showed a significant difference between 4-weeks and sham ($p = 0.036$). Overall, whole-brain CCO activity trended downward from sham to the 1-day group, followed by an increase in 2-weeks and 4-weeks groups. Supported by the Oskar Fischer Project and the Elhapa Foundation.

Symposium

Approaching 15 years with invasive zebra mussels: Current status and research updates on the zebra mussel invasion in Texas



Welcome
Jason Locklin, Temple College
3:00 – 3:05



Current Status of Zebra Mussels in Texas with Lake-Specific Invasion Risk Assessments
Monica McGarrity, Texas Parks & Wildlife Department
3:05 – 3:25

Zebra mussels (*Dreissena polymorpha*) were first detected in Texas in 2009 and have since spread to many reservoirs around the state; in 2021, quagga mussels (*D. bugensis*) were also detected in one reservoir. Invasive mussels pose the risk of significant economic and ecological impacts to Texas reservoirs, and early detection is key to mitigating economic impacts on water infrastructure. Monitoring for early detection of these species requires significant effort, and therefore it is critical to better understand the risks posed to Texas reservoirs to aid in prioritizing these efforts. This presentation will provide an introduction to dreissenid mussels along with an update on monitoring and current status and an overview of national and recent state-specific risk assessments seeking to identify reservoirs in Texas at risk of zebra mussel establishment.



Zebra Mussel Larval Distributions: What Discrete Depth Sampling at Two Infested Texas Reservoirs Reveals
CeJay Petersen, United State Geological Survey
3:25 – 3:45

The U.S. Geological Survey (USGS) Zebra Mussel Monitoring Program monitors for the early detection of zebra mussels in reservoirs where they have not yet been identified and the population dynamics of infested reservoirs. Early detection is necessary to help combat and address the spread of this invasive species. Understanding zebra mussel population dynamics in Texas reservoirs can also assist water resource managers in management strategies and decisions. Two infested reservoirs, Ray Roberts Lake and Lake Lewisville, have been monitored by the USGS for more than a decade. Near the intake structures of both reservoirs, samples were collected at discrete depths and analyzed for densities of veligers (the larval stage of zebra mussels). Physicochemical water-quality properties were also measured. This presentation explores possible correlations between veliger density, corresponding water-quality properties, and what those relations reveal about zebra mussel larval distributions within the water column.



Population Dynamics and Physiological Condition Assessments of Texas Zebra Mussels

Jason Locklin, Temple College
3:45 – 4:05

Since their initial introduction to North America (Great Lakes) in 1986, zebra mussels have spread southward into aquatic habitats previously thought thermally resistant to their long-term establishment. However, by 2022, they have invaded at least 30 Texas reservoirs in the lowest latitudes of their North American and European range. Thus, studies of Texas zebra mussel population biology could provide a better understanding of their ecology on their southern North American expansion edge, allowing development/implementation of effective management/control strategies for mussels in southern United States water bodies. Texas populations have two distinct annual cohorts and the fastest shell length growth rates globally documented for this species. Relative to the 2-7 year life spans of mussels at higher latitudes, Texas mussels have attenuated one-year life spans associated with large-scale summer die-offs resulting in extensive year-to-year larval and adult density fluctuations. In addition, the densities and shell growth rates of Texas populations tend to decline through time following initial invasion. Exposure to increased temperatures increases mussel metabolic demand. When temperatures increase from 20 to 32°C, zebra mussel oxygen consumption rates can quadruple and their metabolic rates increase by up to 265% while feeding efficiency declines. Our recent study reveals that the physiological condition of adult mussels of the previous year's generation increases through spring followed by rapid decline during warm summer months. This result suggests that increased temperatures in Texas waterbodies and the associated feeding inefficiencies lead to lethal summer starvation driving Texas mussel's observed one-year life spans.



Zebra Mussels in Warm Southwestern Water Bodies: Adaptation and Impacts on Population Dynamics

Robert McMahon, University of Texas at Arlington
4:10 – 4:30

Zebra mussels from Europe and the northeastern United States have long-term upper thermal limits of 28-30°C initially thought to prevent invasion of southwestern US water bodies where summer water temperatures are routinely >30°C. However, mussels invaded the Arkansas River in Eastern Oklahoma in 1993, thereafter spreading through Oklahoma and Missouri. They first invaded Texas in Lake Texoma in 2008, spreading south to the DFW area by 2011, to Belton Lake by 2013, thereafter invading lakes as far south as San Antonio and Houston by 2017. Their successful invasion of Texas water bodies with summer water temperatures $\geq 30^\circ\text{C}$, suggested increased thermal tolerance. Testing indicated that when subjected to lethal thermal stress, post-test surviving mussels had elevated thermal tolerance levels compared to pre-stress mussels allowing selection for thermal tolerance. Further testing indicated that mussels from a southern Missouri water body had a long-term upper limit of 32°C relative to 30°C for New York mussels indicative of thermal adaptation. Elevated summer water temperatures impact Texas mussel population dynamics. Texas populations have the most rapid shell growth rates reported for this species. Suppression of mussel veliger larvae development to settlement competent pediveligers during summer months leads to distinct spring and fall settlement cohorts. Texas mussels have attenuated, \leq one-year lifespans as a result of summer temperatures inducing lethal starvation in the previous year's older-larger individuals. Further studies of mussel thermal tolerance in Texas water bodies are required to determine the extent of their thermal adaptation and potential for further southern spread.



Dreissenid Reproduction as a Tool for Assessing Mussel Survival and Control

Michael Misamore, Texas Christian University

4:30 – 4:50

An important factor aiding in the successful infestation of dreissenid mussels is their reproductive biology. Dreissenid mussels (zebra mussel, quagga mussel) are broadcast spawners releasing eggs and sperm directly into the water column where fertilization and subsequent larval development occurs. This reproductive strategy differs from most North American bivalves and is more like marine bivalves. Their reproductive biology can be used to aid in the prediction and control measures as they continue their spread into Texas waters. The gametes of zebra and quagga mussels differ in morphology and can be used to identify individuals by species. Fertilization, early embryonic development, and larval (veliger) development are some of the most sensitive stages of the lifecycle. The effects of various external factors such as temperature and calcium concentration on these stages can aid in determining limits of infestation based on reproductive success. Additionally, the effectiveness of control agents, such as copper, not only negatively impact adult survival but can also disrupt early developmental stages essentially acting as contraceptives preventing reproductive success.



Advances in Environmental DNA (eDNA) Detection of Zebra Mussels in Texas

Matthew A. Barnes, Texas Tech University

4:50 – 5:10

Development of novel species detection methods improves management of biological invasions by promoting early detection and rapid response. One such method is environmental DNA (eDNA) analysis, which refers to the collection and identification of genetic traces that organisms shed into their surroundings (e.g., sloughed skin cells, wastes, and other debris and bodily fluids) to provide clues about species presence, abundance, and more. Even though eDNA analysis is already routinely applied to the study and management of invasive zebra mussels (*Dreissena polymorpha*), there is still much to learn about the ecology of eDNA (i.e., its origin, state, transport, and fate after it has been shed into the environment but before it is collected for analysis) that can inform sample collection and data interpretation. We therefore collected and analyzed zebra mussel eDNA from invaded reservoirs and their outlet rivers in central Texas to characterize particle size distribution (i.e., identify the size distribution of zebra mussel eDNA-bearing particles) and downstream transport. Specifically, to determine eDNA particle size distribution, we filtered replicate water samples through sequential filter sizes (12, 8, 5, 3, 1, and 0.2 μm) followed by ethanol precipitation and quantified zebra mussel eDNA within each fraction. We also filtered water samples from below the outlet dam and at five sites downstream from each of seven central Texas reservoirs to examine downstream transport. For each project, we used a species-specific quantitative PCR assay to quantify zebra mussel eDNA. Understanding eDNA dynamics will improve collection efficiency and enable more accurate location and analysis of source populations.



Sniffing Out Zebra Mussels in Texas Water Bodies Using Detection Dogs: A Comparison Between Canine Scent Detection and environmental DNA (eDNA)

Debi DeShon, Mussel Dogs

5:10 – 5:30

Early detection and rapid response represent cornerstones of effective management of biological invasions, and development of methods that increase the sensitivity and efficiency of species detection directly benefit such efforts. In this study, we compared environmental DNA (eDNA) analysis and canine scent detection for detection of zebra mussels (*Dreissena polymorpha* [Pallas, 1771]) in lakes of central Texas, USA. Environmental DNA analysis has become routinely incorporated as a component of *D. polymorpha* management programs; however, canine scent detection has typically been limited to inspection for adult mussels on watercraft. Thus, our work represents the first attempt to compare detection of *D. polymorpha* veligers (i.e., free-swimming larval stages) and other microscopic traces in environmental samples with canine scent detection.

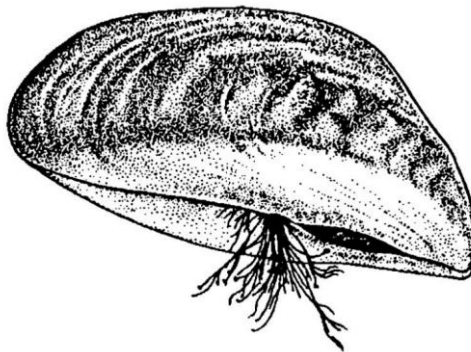


Image courtesy of United States Great Lakes Environmental Research Laboratory

Physics & Engineering Plenary Abstract

Molten salt research reactor development for electricity, clean water, and medical isotopes

Timothy L. Head¹ (1. Abilene Christian University)

Molten Salt Reactors (MSRs) show promise as safe, reliable, scalable technology that can be used to produce electricity, industrial heat, water desalination, and medical isotopes. MSRs were first developed successfully in the late 1960's but were shelved for largely political reasons. Using molten salt as a coolant allows the system to run more efficiently at higher temperatures than today's water-cooled reactors. Mixing fuel in the salt allows access to fission products not currently available that can be useful in medical diagnostics and therapies, and facilitates a high fuel usage rate. The Nuclear Energy eXperimental Testing (NEXT) lab at Abilene Christian University is leading the NEXT Research Alliance (NEXTRA) that includes the Georgia Institute of Technology, Texas A&M University, and University of Texas and is funded by Natura Resources. NEXTRA is developing and deploying a molten salt research reactor to advance a better understanding of the technology and move it toward commercialization where the benefits will be realized.

Freshwater Science I

Math and Computer Science 100

- 12:30 #321 Neurotoxicity of nitrite pollution on freshwater invertebrates Justus Hyde¹, Mary Johnston¹, Zaid Harris¹, Alexander Estrada¹, Janeth Mendoza¹ (1. Concordia University Texas)
- 12:45 #94 Examining growth rates and survivorship in two zebra mussel populations: effects of thermal and hypoxia-induced stress Josiah Moore², Samantha Pentico¹, Aiden Valdez³, Jason Locklin³ (1. Texas A&M University-Central Texas, 2. Temple College)
- 1:00 #243 Microplastics analysis of surficial sediments along the Brazos and Bosque Rivers, McLennan County, Texas Annie Mowry¹, Ethan Villa¹, Cambria Blanton¹, Rebecca Barboza¹, Caden Helona¹, Morena Flores Mejia¹, Sara Victoria¹, Stephanie Lockwood³, Stephanie Randell¹ (1. McLennan Community College, 2. Texas Tech University)
- 1:15 #222 Survey of parasite component community in snails from Sunset Pond Tyler Arnwine¹, Nicholas Negovetich¹ (1. Angelo State University)
- 1:30 #197 Now you see them, now you don't? Using eDNA to confirm removal of invasive snails by local agency Cynthia Bashara¹, Lillian Dolapchiev¹, Christopher Vaughn³, Steven Bittner³, Matthew A. Barnes⁵, Romi Burks¹ (1. Southwestern University, 2. San Antonio River Authority, 3. Texas Tech University)
- 1:45 #154 The identification of *Chlorococcum* microalgae via DNA barcoding Rachel Flores¹, Kathleen Wood¹ (1. University of Mary Hardin-Baylor)
- 2:00 #278 Land use effects on stream ecosystem structure Danielle Grabert¹, Amber Ulseth¹ (1. Sam Houston State University)
- 2:15 #166 Performance of a bioretention basin on the University of Texas at San Antonio campus Melissa Ann Garcia¹, Lani May², Brian Laub¹ (1. University of Texas at San Antonio, Department of Integrated Biology, 2. University of Texas at San Antonio)

Chemistry & Biochemistry I

Vincent Building 139

- 12:30 #5 Electronic and structural properties of C24 fullerene derivatives: Metallohetero-, endohedral, and exohedral derivatives Seokwoo Jang¹, Kyle Beran¹ (1. Angelo State University)
- 12:45 #30 Electrochemical investigation of human liver S9 sub-cellular fractions Bhavana omanakuttan¹, Charuksha Walgama¹, Ricky Nguyen¹ (1. Department of Physical & Applied Sciences, University of Houston-Clear Lake)
- 1:00 #33 Fabrication of disposable screen-printed electrodes for the detection of metallo-immunoassays Marco Cardenas¹, Charuksha Walgama², Daniel Adrian¹ (1. Department of Physical & Applied Sciences, University of Houston-Clear Lake, 2. Department of Physical & Applied Sciences, University of Houston-Clear Lake)
- 1:15 #37 An exposition into AgNP based metalloimmunoassays: Optimizing the galvanic exchange detection on carbon-printed polyester electrodes Daniel Adrian¹, Marco Cardenas¹, Charuksha Walgama³ (1. Department of Physical & Applied Sciences, University of Houston-Clear Lake, 2. Department of Physical & Applied Sciences, University of Houston-Clear Lake)
- 1:30 #92 Spectroscopic (UV-vis and fluorescence) and chromatographic (HPLC) studies of pharmaceuticals in Nacogdoches wastewater treatment plant Gary Lopez¹, Anthony Broom¹, Kefa Onchoke¹ (1. Stephen F. Austin State University)
- 1:45 #110 f-Element coordination polymers with 2-bromoterephthalate and glutarate spacers Ralph Zehnder¹ (1. Angelo State University)
- 2:00 #158 To beer or "nitro" beer: A comparison of various nitro beers Holly Gibson¹, Alyx Frantzen¹ (1. Stephen F. Austin State University)
- 2:15 #169 Bomb calorimetry as a method for determining the cation-exchange capacity (CEC) of clays Allison Swaim¹, Alyx Frantzen¹ (1. Stephen F. Austin State University)

Math & Computer Science

Vincent Building 146

- 12:30 #51 Using Bayesian methods to infer parameters for ODE models of disease spread Derek Hopkins¹, Joseph Douglas¹, Dashon Mitchell¹, Vianey Rangel¹, Christopher Mitchell¹, Scott Cook¹ (1. Tarleton State University)
- 12:45 #61 Predicting voting behavior of minority groups from publicly available census data Vianey Rangel¹, Cody Drolet¹, Erin Davis¹ (1. Tarleton State University)
- 1:00 #153 Does genre mean anything: Classifying music with artificial intelligence Ilan Joffe¹ (1. Wayland Baptist University)
- 1:15 #183 The dynamics of non-fungible tokens (NFTs): An exploratory study Erdogan Dogdu¹, Ruben Ceballos¹, Roya Choupani¹, Cameron Ley¹, Diego Sanchez¹ (1. Angelo State University)
- 1:30 #224 Arctic weather forecasting using deep learning Trevor Satori¹, Dipak Singh¹ (1. Stephen F. Austin State University)
- 1:45 #241 The development of an API for cross integration of ML models between Python and Matlab George Sikazwe¹, Michael Frye¹ (1. University of the Incarnate Word)
- 2:00 **Math & Computer Science Section Meeting**

Anthropology

Vincent Building 158

- 12:30 #29 Testing the Respiratory-Energetics Hypothesis: An investigation of metabolic demands and nasal size across human populations Alexa Kelly¹, Scott Maddux¹ (1. University of North Texas Health Science Center)
- 12:45 #337 Supracondylar process in modern populations Stephanie Baker¹, Timothy Campbell² (1. Department of Anthropology, Texas State University, 2. Department of Anatomy, Midwestern University)
- 1:00 **Anthropology Section Meeting**

Geosciences

Vincent Building 158

- 1:15 #57 Spatial delineation and speleogenetic evolution of Devil's River Strata in Central Real County, Texas Kevin Stafford¹ (1. Stephen F. Austin State University)
- 1:30 #160 The fossil record in Phillips Paleo Cave, Crockett County, Texas Stacie Skwarcan¹ (1. The University of Texas at Austin)
- 1:45 #229 Distribution and significance of ripple marks on the beach face of Follett's Island Beach, Texas R. LaRel Nielson¹, Taylor Carranza-Watson² (1. Stephen F. Austin State University, 2. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources)
- 2:00 #267 New data on the age and taxonomic diversity of the late Pleistocene vertebrate fauna from Inner Space Cavern, Williamson County, Texas. John Moretti¹ (1. The University of Texas at Austin)
- 2:15 Geosciences Section Meeting

Cell & Molecular Biology

Vincent Building 160

- 12:30 #38 Arylidene-hydrazinyl-thiazole analogs induce apoptosis in cancer cell lines and exhibit the potential to be novel anti-cancer agents Jude Campbell¹, Rachna Sadana¹, Robert Lwanga¹, Sarah Robinson¹ (1. University of Houston-Downtown)
- 12:45 #237 Discovering novel inhibitors for *Yersinia pestis* ketoacyl-acyl carrier protein reductase (YpFabG) Catalina Colling¹, Gabriela Conde¹, Josh Beckham¹ (1. The University of Texas at Austin)
- 1:00 #266 Effects of Omalizumab on transcriptome of immune cells responsible for allergic responses Emma Johnson¹, Joni Ylostalo¹ (1. University of Mary Hardin-Baylor)
- 1:15 #323 RT-qPCR studies of targeted genes in multidrug resistant clinical isolates of *Pseudomonas aeruginosa* Justin Wright¹, Ali Azghani¹ (1. University of Texas at Tyler)
- 1:30 #324 Development of a SYBR green-based RT-qPCR for the detection and quantification of Lone Star virus Megan Burch¹, Jeremy Bechelli¹ (1. Sam Houston State University)
- 1:45 #325 Paying the toll: Cancer and innate immunity in a *Drosophila* tumor model Adheeta Dongre¹, Mardelle Atkins¹ (1. Sam Houston State University)
- 2:00 #326 A *Drosophila* larval tumor drives fat body changes through peripheral Jak-STAT activation Cheyenne Evesson¹, Mardelle Atkins¹, Brooke Birks³, Timothy Mok³, Niven Wang³ (1. Sam Houston State University, 2. Sam Houston State University COM)
- 2:15 Cell & Molecular Biology Section Meeting

Terrestrial Ecology & Management I

Vincent Building 162

- 12:30 #14 Predictive distribution modeling of *Chrysodeixis chalcites* (Tomato Looper) Nicholas Galle¹, Chris Randle¹ (1. Sam Houston State University)
- 12:45 #128 Assessing the impacts of Winter Storm Uri on Texas birds Francisco Fuentes¹, Ben Skipper¹ (1. Angelo State University)
- 1:00 #249 A summer point-count survey of songbirds in Plains Baptist Assembly, Floyd County, TX Alexa Hinojos¹, Corin Olivas¹ (1. Wayland Baptist University)
- 1:15 #328 Diet of Jerusalem crickets (*Ammopelmatus monahansensis*) in West Texas Kristin Kabat¹, Scott Longing¹, Matt Barnes¹ (1. Texas Tech University)
- 1:30 #180 Understanding population dynamics of sugarcane aphid (*Melanaphis sacchari*) through the study of ecological and feeding behavior in South Texas region. Neetu Khanal¹, Christopher Vitek², Rupesh Kariyat³ (1. Department of Biology, University of Texas Rio Grande Valley, 2. University of Texas Rio Grande Valley, 3. Department of Entomology and Plant Pathology, University of Arkansas)
- 1:45 #206 Characteristics of vegetation at artificial escape dens and natural dens of swift foxes Colton Laws¹, Philip Gipson¹, Souparno Ghosh³ (1. Texas Tech University, 2. University of Nebraska)
- 2:00 #210 Are Scats an unbiased indicator of coyote diets? Melody Harrington¹, Philip Gipson¹ (1. Texas Tech University)

Friday, March 3 | 3:00 – 5:15

Oral Session II

Chemistry & Biochemistry II

Vincent Building 139

- 3:00 #171 Synthesis of two hydrogels for antibacterial treatment Reagan Hudson¹, Milka Montes¹ (1. University of Texas Permian Basin)
- 3:15 #199 Recycling of carbon dioxide: Is it even possible? John Beatty¹, Alice McNeill¹ (1. Texas Woman's University)
- 3:30 #220 Identification and characterization of affibody molecules that target crotalid snake venoms Edith Osborne¹ (1. Angelo State University)
- 3:45 #221 Investigation of the protein adsorption potential of mixed self-assembled monolayers with PM-IRRAS John Godino¹, Rebecca Thompson¹ (1. St. Edward's University)
- 4:00 #273 Discovery of potential inhibitors of New Delhi metallo-beta-lactamase 1 in *Klebsiella pneumoniae* by high-throughput virtual screening Jose Martinez III¹, Josh T. Beckham¹ (1. The University of Texas at Austin)
- 4:15 #304 Does storage condition affect the use of urine metabolomics in cancer diagnosis? Kiana Holbrook¹, Wen-Yee Lee¹ (1. The University of Texas at El Paso)
- 4:30 #316 None the "Weiser": A study of the effects of temperature, time, and storage on beer Sadie Atkins¹, Alyx Frantzen¹ (1. Stephen F. Austin State University)
- 4:45 #333 Identifying potential novel inhibitors of 6-phosphogluconate dehydrogenase in *Trypanosoma brucei* Lorena Sandoval-Mejia¹, Josh T. Beckham² (1. University of Texas Austin, 2. The University of Texas at Austin)
- 5:00 Chemistry & Biochemistry Section Meeting

Physics & Engineering I

Vincent Building 146

- 3:00 #264 Modeling, constructing, and testing an electromagnetic rail gun with Python Nicholas Swartz¹ (1. Angelo State University)
- 3:15 #270 Optimized YBCO pinning Tyler Dutchover¹ (1. Angelo State University)
- 3:30 #272 Magnetic levitation created with rotating magnetic fields Christian Cannon¹, Trey Holik¹ (1. Angelo State University)
- 3:45 #208 Dipole transition calculations between hydrogen quantum states. Emily Maxey¹, Trey Holik¹ (1. Angelo State University)
- 4:00 #225 Engineering an ultra low-cost open-source 3D bioprinter from a Creality Ender 3 FDM 3D Printer Angel Rodriguez¹, Domenic Cordova¹, Cody Crosby¹ (1. Southwestern University)
- 4:15 #133 Atomic force microscopy of DNA-AgNC on mica substrates Robert Friedfeld¹ (1. Stephen F. Austin State University)
- 4:30 #215 Simulating spin-stabilized magnetic levitation Eddie Holik III¹, Christian Cannon¹ (1. Angelo State University)
- 4:45 #250 Capturing the dynamics of mechanical-feedback-driven apical constrictions in the *Drosophila* embryo using a Markov chain Monte Carlo model Michael C. Holcomb¹, Guo-Jie J. Gao², Jeffrey H. Thomas³, Jerzy Blawdziewicz⁴ (1. Angelo State University, 2. Shizuoka University, 3. Texas Tech University Health Sciences Center, 4. Texas Tech University)

Systematics & Evolutionary Biology

Vincent Building 158

- 3:00 #279 Patterns of variation and arrangement in the osteoderm armor of the nine-banded armadillo, *Dasypus novemcinctus* Mara Asmis¹, John Moretti¹, Stacie Skwarcan¹, Christopher Bell¹ (1. The University of Texas at Austin)
- 3:15 #127 A molecular reevaluation subspecies within the Bewick's wren (*Thryomanes bewickii*) Jeff Roth¹, Ben Skipper¹ (1. Angelo State University)
- 3:30 #132 Molecular ecology of non-native spectacled caimans in Florida Andrew Parks¹, Brandon Gross¹, Sergio Balaguera-Reina³, Sidney Godfrey³, Frank Mazzotti³, Nick Smith¹, Llewellyn Densmore¹ (1. Texas Tech University, 2. University of Florida)
- 3:45 #312 Molecular systematics of *Sauromys* and *Platymops* within *Molossidae* Will McCoy¹, Loren Ammerman¹ (1. Angelo State University)
- 4:00 Systematics & Evolutionary Biology Section Meeting

Neuroscience

Vincent Building 160

- 3:00 #167 Investigating the difference of locomotive behaviors in *D. simulans*, *D. sechellia*, and their interspecies lines Huda Alchikh Omar¹, Michelle Martinez¹, Tomas Osoreo¹, Kyle Smith¹, Yuan Yuan Kang¹ (1. University of Houston-Downtown)
- 3:15 #62 Larval expression of dopaminergic neurons markers for a Parkinson's disease-like state in Zebrafish. Adrian Romero¹, Kristel Ledesma¹, Ayman Hamouda¹, Brent Bill¹ (1. The University of Texas at Tyler)
- 3:30 #172 Effects of transcranial infrared laser stimulation on brain rhythmic electrical activity in younger and older adults Laura Gamboa¹, Dariella Fernandez¹, Sarah Diaz¹, Emily Tran¹, Douglas Barrett¹, Francisco Gonzalez-Lima¹ (1. The University of Texas at Austin)
- 3:45 #186 Effects of transcranial infrared laser stimulation (TILS) on sustained attention in adults with attention-deficit/hyperactivity disorder (ADHD) Farzad Salehpour¹, Roger Davis¹, Vikas Burugu¹, Nisarg Shah¹, Laura Gamboa¹, Zachary Wade¹, Douglas Barrett¹, Francisco Gonzalez-Lima¹ (1. The University of Texas at Austin)
- 4:00 Neuroscience Section Meeting

Biomedical Sciences I

Vincent Building 160

- 4:15 #217 Printability of biomaterial inks to mimic the blood brain barrier Kristie Cheng¹, Noah Pyles¹, Rana Ajeeb³, John Clegg³, Cody Crosby¹ (1. Southwestern University, 2. The University of Oklahoma)
- 4:30 #60 A mathematical model of onchocerciasis resistance and treatment Dashon Mitchell¹, Derek Hopkins¹, Christopher Mitchell¹, kaylee terrell¹ (1. Tarleton State University)
- 4:45 #17 Modeling supraventricular tachycardia using dynamic computer-generated left atrium Gavin McIntosh¹, Avery Campbell¹, Melanie Little¹, Bryant Wyatt¹ (1. Tarleton State University)

Plant Biology

Vincent Building 162

- 3:00 #131 The identification of bacteria nodulating *Sesbania herbacea* Karlie Kalischko¹ (1. University of Mary Hardin-Baylor)
- 3:15 #251 Biogeography of *Mentzelia thompsonii* (Loasaceae) Gracie Granados¹, Logan Browning¹, Rebecca Hunter¹, Joshua Brokaw¹ (1. Abilene Christian University)
- 3:30 #257 Genetic diversity and evolutionary potential of rare plant species: *Mentzelia mollis* and *M. packardiae* (Loasaceae). Joshua Brokaw¹, Brianna Douglas¹, Megan Howard¹ (1. Abilene Christian University)
- 3:45 #301 The botanical contributions of S. W. Stanfield David Lemke¹ (1. Department of Biology, Texas State University)
- 4:00 Plant Biology Section Meeting

Anthropology

- #46 Estimation of post-mortem interval in human cadavers using two different quantitative methodologies Molly Sarles¹, Sibyl Bucheli¹
(1. Sam Houston State University)

Biomedical Sciences

- #34 Development of low-cost fatigue machine to simulate whole body vibration on intervertebral fusion devices Ariful Bhuiyan¹, Felipe Trujillo-Wheeler², Kristian Torres² (1. University of Houston-Clear Lake, 2. Research Assistant)
- #35 Artificially made material to match anterior cruciate ligament response within linear zone Sascha Henderson¹, Kristian Torres¹, Ariful Bhuiyan³, William Amonette³ (1. Research Assistant, 2. University of Houston-Clear Lake)
- #69 Does availability impact immune function in speckled cockroaches (*Nauphoeta cinerea*)? Sami Badwan¹, James Harper¹ (1. Sam Houston State University)
- #70 Are speckled cockroaches obesity resistant? Lauren Angus¹, Kelsey Hu¹, James Harper¹ (1. Sam Houston State University)
- #71 Effects of chronic ethanol ingestion on metabolic function in speckled cockroaches (*Nauphoeta cinerea*) Kathryn Willy¹, Kelsey Hu¹, James Harper¹ (1. Sam Houston State University)
- #79 Are Brita filters able to eliminate microplastics from tap water? Taylor Jefferis¹ (1. Howard Payne University)
- #95 Do cell culture conditions or bisphenol A (BPA) treatment affect the wound healing response *in vitro*? Emily Hays¹, James Harper¹ (1. Sam Houston State University)
- #103 Examining the quantity of Delta-8 THC and Delta-9-THC in gummies through NMR Kailyn Duffey¹ (1. Howard Payne University)
- #121 Regulation of locomotor behavior by the novel gene, impaired mobility Natalie De La Cerda¹, Swati Banerjee¹, Manzoor Bhat¹ (1. UT Health San Antonio)
- #126 The *in vitro* and *in vivo* effects of polydiacetylene on different eukaryotic models Rhiannon Champagne¹, Danielle Goodspeed¹, James Harper¹ (1. Sam Houston State University)
- #130 The role of continued glucose monitors in the management of Type 2 diabetes mellitus Megan Bradley¹, Brittany Miles¹ (1. University of Texas Medical Branch)
- #135 DNA scaffolded silver nanoclusters against bacterial biofilm Ravyn Solis¹, Angel Torres¹, Bidisha Sengupta¹ (1. Stephen F. Austin State University)
- #138 Effects of microgravity on formation of *Serratia marcescens* biofilm Kedaijah Evans¹, Paula Gutierrez¹, JoAnna Hernandez¹, Swetha Kesavan⁴ (1. University of Texas Permian Basin, 2. Rice University)
- #141 Extraction of phytochemicals from watercress leaves: A solvent dependent study Allyssa Fisher¹, James Villanueva¹, Bidisha Sengupta¹ (1. Stephen F. Austin State University)
- #144 Effect of antioxidant foods on oxidative stress and Alzheimer's related proteins in *Drosophila* Deja Hardy¹ (1. Angelo State University)
- #145 Plasticizers, climate change, and the heat stress response in speckled cockroaches Elizabeth Bailey¹, James Harper¹ (1. Sam Houston State University)
- #176 Investigation into the leaching of microplastics from food containers Yesenia Brunette¹, Aishwarya Nigalye¹ (1. Howard Payne University)
- #240 Isolation of compounds in *Larrea tridentate* and *Pterocarpus santalinus* that demonstrate cytotoxic effects on the prostate cancer cell line PC3 Araceli Torres¹, Tristan Galbreath¹, Gary Gray¹, Adam Reinhart¹ (1. Wayland Baptist University)
- #247 Expressing the recombinant C-terminus fragment of PilA from *Myxococcus xanthus* Omar Khan¹, Ha Do¹, Gabriela Bowden¹, Kayla Wleczyk¹, Jennifer Nguyen¹, Leonardo Tenorio¹ (1. University of Houston-Downtown)

Cell & Molecular Biology

- #13 3D structural analyses of bifunctional protein MDTa for target site identification Muhammad Zeeshan Ahmad¹ (1. University of Okara)
- #58 Generation of zebrafish biliverdin reductase mutants using CRISPR-Cas technology in an undergraduate research lab Macee Valtr¹, Ashley Price¹, Youngseo Choi¹, Andrew Holowiecki¹ (1. Abilene Christian University)
- #118 Environmental determinants of caudal regression syndrome and/or sirenomelia in early embryonic *Danio rerio* Karter Morris¹, Laurel Fohn¹ (1. Angelo State University)
- #124 Knockdown of the *jph-1* gene produces altered nervous system structure and impaired muscle endurance phenotypes in *C. elegans* Jose Abril¹, Rhiannon Champagne², Anne Gaillard² (1. University of Texas Medical Branch, 2. Sam Houston State University)
- #139 Vitamins and the defense of mutagenesis Ethan Straach¹ (1. Howard Payne University)
- #148 The molecular mechanisms underlying microtubule nucleation Muhammad Zeeshan Ahmad¹, Hadia Sarfraz¹ (1. University of Okara)
- #151 Host pathogen interactions: Determining the function of Cbu0513, a *Coxiella burnetii* virulence protein Anna Rodriguez¹ (1. Angelo State University)
- #161 How the innate immune system impacts intracellular bacterial growth Karen Soto Castro¹, Emerson Crabill¹ (1. Angelo State University)
- #187 The effect of fructose-1,6-bisphosphatases in autophagy upregulation James Bautista¹, Emerson Crabill¹ (1. Angelo State University)
- #192 The removal of RIG-I in HeLa cells to screen for *Coxiella burnetii* targets of innate immunity suppression Jocelyn Bent¹, Emerson Crabill¹ (1. Angelo State University)
- #205 The importance of ring separation in the ϕ EL chaperonin refolding activity Laura Ronquillo Silva¹, Samantha Garcia¹, Daniel von Salzen¹, Ricardo Bernal¹ (1. University of Texas El Paso)

- #234 **JAK3 Y841 autophosphorylation is critical for kinase domain stability and dimer formation** Omar Rodriguez Moncivais¹ (1. The University of Texas at El Paso)
- #235 **Investigating the role of CRISPR-Cas9 editing on the expression of PA28γ and its effect on p21 in cancer cells** Riley Cregg¹, Danya Van Vuuren¹, Shaina Banh¹, Jessica Hoffman¹, Lance Barton¹ (1. Austin College)
- #248 **Timing of soil microbial activity differs based on land-types after rewet** Kendall Esparrago¹, Allison Veach² (1. University of Texas at San Antonio, 2. University of Texas at San Antonio, Department of Integrated Biology)
- #287 **Expression of alpha 4 and beta 2 nicotinic subunits in zebrafish** Marcos Bermudez¹, Ayman Hamouda¹, Brent Bill¹ (1. The University of Texas at Tyler)
- #294 **The effect of PA28γ expression in 4T1 cancer cells** Natalia Bowman¹, Dalton Cole Reese¹, Lance Barton¹ (1. Austin College)
- #311 **Refining assay specificity for X-chromosome copy number variation detection in the THL** Sadie Argueta¹ (1. Wayland Baptist University)
- #317 **Knockdown of arginine kinase gene in *Drosophila melanogaster* eyes yields abnormal eye phenotypes** Emily Fritsche¹, Melissa Maldonado¹, Kennedi Landry¹, Karina Romero¹, Merna Khalil¹, Angela Galvan¹, Adriana Visbal¹, Mardelle Atkins⁸ (1. University of Houston-Downtown, 2. Sam Houston State University)
- #330 **Abnormalities in *D. Melanogaster* eye development observed through the down regulation of the Dor gene under the Gal4-UAS system** Jennifer Rodriguez¹, Sara Alba¹, Michelle Guillen¹, Victor Leyja¹, Mardelle Atkins⁵, Adriana Visbal¹ (1. University of Houston-Downtown, 2. Sam Houston State University)

Chemistry & Biochemistry

- #11 **Efficacy and reusability of magnetized TiO₂ nanoparticles in water purification** Christian Bell¹, Saravanan Ramasamy¹ (1. Angelo State University)
- #23 **Spectroscopic and chromatographic studies of pottery sherds from Guatemala** Madison McFarland¹, Kefa Onchoke¹ (1. Stephen F. Austin State University)
- #31 **Electrochemical investigation of human liver microsomes (HLM) For drug sensing assays** Ricky Nguyen¹, Charuksha Walgama¹, Bhavana Omanakuttan¹ (1. Department of Physical & Applied Sciences, University of Houston-Clear Lake)
- #48 **Spectroscopic and electrochemical heterogeneous rate constants of dibenz[a,h]anthracene (DBaA): an environmental mutagen** Karl Vedan¹, Kefa Onchoke¹ (1. Stephen F. Austin State University)
- #53 **Optimization of the measurement parameters and validation of the ICP-OES method for the multi-elemental determination of metals in water** Matthew White¹, Stephanie Chong-Macias¹, Alakananda Chaudhuri¹ (1. University of the Incarnate Word)
- #91 **Quantitative middle-down proteomics reveals histone H3 acetylation hierarchy after HDAC inhibition** Karl Poncha¹, Nicolas Young¹ (1. Baylor College of Medicine)
- #96 **Identification of affibody molecules that target phospholipase A2** Doyeon Kwon¹, Jiyun Jeong¹, Edith Osborne¹ (1. Angelo State University)
- #108 **Attempts to characterize a mysterious plutonium compound** Jackson Turner¹, Daniel Rios¹, Braeden Myers¹, Emma Rust¹, William Best¹, Ralph Zehnder¹ (1. Angelo State University)
- #109 **Improvement of synthetic pathways for the creation of f-Element 2-bromoterephthalate glutarates** Emma Rust¹, Braeden Myers¹, Daniel Rios¹, Jackson Turner¹, William Best¹, Emily Latzke¹, Ralph Zehnder¹ (1. Angelo State University)
- #113 **Developing surface modified TiO₂ nanoparticles for photocatalytic water treatment** Weston Wilber¹, Saravanan Ramasamy¹ (1. Angelo State University)
- #119 **Synthesis of functionalized metal nanoparticles and quantum dots for fluorescence enhancement** Frank Trevino¹, Byeongchan Jeong¹, Saravanan Ramasamy¹ (1. Angelo State University)
- #123 **Structural study of small heat shock protein 27** Zhaobo Li¹, Ricardo Bernal² (1. The University of Texas at El Paso, 2. University of Texas El Paso)
- #134 **Characterization of fluorescent silver nanoclusters on single stranded DNA scaffolds** Brock Gascon¹, Bidisha Sengupta¹, Angel Robledo-Torres¹, Ravyn Solis¹ (1. Stephen F. Austin State University)
- #152 **Engineering an expression cell line for *Mycobacterium tuberculosis*** Joshua Smedema¹, Robert Moore¹, Matthew Dyson¹ (1. Wayland Baptist University)
- #155 **Addition of ATP step creates avenue for chemiluminescent RecA strand exchange assay** Tierra Lozano¹, Paxton Patterson¹, Robert Moore¹ (1. Wayland Baptist University)
- #157 **The cultivation and quality assurance analysis of lion's mane mushrooms** Darrell Fry¹, Zachary Smith¹ (1. Stephen F. Austin State University)
- #178 **Determining the MIC50 for VOCs that inhibit *Neolentinus lepideus* growth** Arianna Hall¹, Mary Kopecki¹ (1. St. Edward's University)
- #181 **The effect of volatile organic compounds (VOCs) on *Neolentinus lepideus* growth** Leandra Georgina Contreras¹, Mary Kopecki¹ (1. St. Edward's University)
- #209 **Evaluation of *Eustigmatus vischeri* and *Picochlorum oklahomensis* as biostimulants in early tomato seedling development** Kayla Brown¹, Lauren Bomer¹, Genevieve Toureilles¹, Gisselle Espinoza Perez¹, Betsy Leverett¹ (1. University of the Incarnate Word)
- #214 **Effects of cooling techniques on polyvinyl alcohol hydrogels** Kenadie Gordon¹, Milka Montes¹, Reagan Hudson¹ (1. University of Texas Permian Basin)
- #231 **Discovering novel inhibitors for *Pseudomonas aeruginosa* 1-deoxy-D-xylulose-5-phosphate using computational methods** Maximo Alvarez¹, Josh Beckham¹ (1. The University of Texas at Austin)
- #238 **Molecular docking of bioactive components of *Lycium Ruthenicum* (Black goji beery) with xanthine oxidase** Rylyn Reyes¹, Chao Dong¹ (1. University of Texas Permian Basin)
- #283 **Discovery of JAK-STAT signaling pathway inhibitors for rheumatoid arthritis** Krithika Gilari¹, Josh T. Beckham¹ (1. The University of Texas at Austin)
- #298 **Fatty acid biomarkers in urine for prostate cancer diagnosis** Elizabeth Noriega Landa¹, Kiana Holbrook², Sabur Badmos¹, George Quaye¹, Xiaogang Su¹, Wen-Yee Lee¹ (1. The University of Texas at El Paso, 2. University of Texas El Paso)
- #314 **The modification and biological effects of modified carbon nanotubes on *Escherichia coli*** Brandon Diaz¹ (1. Howard Payne University)
- #315 **Formation of silicon-carbon hybrid anode material for lithium-ion batteries** Sara Stepanek¹, Diego Sanchez¹, Gregory Smith¹ (1. Angelo State University)

Conservation Ecology

- #44 **Effects of intermittent noise on wildlife activity in east Texas** Gabrielle Hammerbach¹, Troy Ladine¹ (1. East Texas Baptist University)
- #66 **Impact of gas supersaturation on the development of gas bubble trauma in paedomorphic Eurycea salamanders** Trent Furr¹, Ryan Shartau¹ (1. University of Texas at Tyler)
- #77 **Effects of clearing huisache on plant diversity in central Texas** Andre Villegas¹, Mark Gustafson¹, Alan Lievens¹ (1. Texas Lutheran University)
- #125 **A survey of the parasites of freshwater turtles in the Concho Valley** Makayla Easley¹ (1. Angelo State University)
- #193 **Monitoring the effects of unregulated poultry waste on fishes and macroinvertebrates in the Sabine River** Karley Parker¹, Lance Williams¹ (1. The University of Texas at Tyler)
- #201 **Effect of summer temperatures on mammalian activity** Maddison Willis-Rosa¹, Troy Ladine¹ (1. East Texas Baptist University)
- #207 **Status survey of nine rare aquatic macroinvertebrates in east Texas** Alexandra Beemer¹, Lance Williams² (1. University of Texas at Tyler, 2. The University of Texas at Tyler)
- #218 **Digitizing the UTPB herbarium** Jaqueline Barrera¹, Analiza Rayos¹, Irene Perry¹ (1. University of Texas Permian Basin)
- #289 **Artificial cavity nesting behavior on an east Texas university campus** Amanda Odom¹, Jessica Coleman¹, Matthew Greenwold³ (1. The University of Texas at Tyler, 2. University of Texas at Tyler)

Freshwater Science

- #84 **Intraspecific genetic variation in the mitochondrial cytochrome oxidase subunit 1 gene of the zebra mussel (*Dreissena polymorpha*) in two central Texas lakes** Rachel Conner¹, Kimberley Clawson¹ (1. Temple College)
- #85 **Assessing effects of the invasive plant *Hydrilla* and water depth on zebra mussel survival and body condition** Carla Garcia Guerrero¹, Alicia Miranda¹, Aiden Valdez¹, Samantha Pentico⁴, Josiah Moore⁴, Jeff Troy¹, Jason Locklin¹ (1. Temple College, 2. Texas A&M University-Central Texas)
- #87 **Investigating the impacts of an aquatic invasive plant on zebra mussel growth in a central Texas reservoir** Alicia Miranda¹, Carla Garcia Guerrero¹, Aiden Valdez¹, Samantha Pentico⁴, Josiah Moore⁴, Jason Locklin¹, Jeff Troy¹ (1. Temple College, 2. Texas A&M University-Central Texas)
- #88 **Assessing the potential effects of the invasive aquatic plant, *Hydrilla*, on lake turbidity and dissolved oxygen** Richard Simpson¹, Eduardo Salazar¹, Jason Locklin¹, Mark Leech¹ (1. Temple College)
- #89 **Assessing glycogen reserves in two central Texas zebra mussel populations to evaluate post-invasion summer starvation** Aiden Valdez¹, Jason Locklin¹, Lance English¹ (1. Temple College)
- #162 **Size matters: freshwater mussel gill morphology and food resource acquisition** Suzannah Bozarth¹, Marissa Netti¹, Matthew Greenwold¹ (1. University of Texas at Tyler)
- #163 **Spatiotemporal characterization of microplastic pollution in an IRES system** Andre Felton¹, Jeff Hutchinson² (1. University of Texas at San Antonio, Department of Integrated Biology, 2. University of Texas at San Antonio)
- #174 **Large snails & small DNA: Relating *Pomacea maculata* biomass & environmental DNA concentration** Cassidy Reynolds¹, Esmeralda Rosas¹, Matthew A. Barnes³, Romi Burks¹ (1. Southwestern University, 2. Texas Tech University)
- #182 **Sheath-producing *Leptothrix ochracea* (Betaproteobacteria) impacts ecosystem properties and may affect animal activity** Jennie Polus¹, Natalie Cardenas¹, Stephanie Quezada¹, Mary Johnston¹ (1. Concordia University Texas)
- #202 **Investigating the cellular mechanism of intracellular pH regulation during exposure to high CO₂** Dillon Flowers¹, Ryan Shartau² (1. The University of Texas at Tyler, 2. University of Texas at Tyler)
- #223 **Impacts of hypoxia on zebra mussel shell thickness in a central Texas lake** Samantha Pentico¹, Jason Locklin², Robert McMahon³ (1. Texas A&M University-Central Texas, 2. Temple College, 3. University of Texas Arlington)
- #253 **Prevalence of microplastics in the Twin Buttes Reservoir in comparison to well-water, tap water, and reverse osmosis treated water in San Angelo, TX** Alanna Blackstock¹, Elizabeth Koeman-Shields¹ (1. Angelo State University)
- #282 **Hydrological variability drives dissolved organic carbon concentrations and bioavailability in a forested headwater stream** Marlyn Hernandez¹, Danielle Grabert¹, Cinthia Lopez¹, Christian Lewis¹, Max Lannom¹, Amber Ulseth¹ (1. Sam Houston State University)
- #292 **Zebra mussel invasion risk: Estimating the likelihood of spread and establishment of an aquatic invasive species** David Creamer¹, Jane Rogosch¹, Reynaldo Patino¹ (1. Texas Tech University)
- #306 **Associations of the carbonate system and nutrient levels on growth of *Prymnesium parvum*** Samantha Lehker¹, Reynaldo Patino² (1. Texas Tech University, 2. U.S. Geological Survey, Texas Cooperative Fish & Wildlife Research Unit)
- #318 **Seasonal changes of zebra mussel body condition in two central Texas populations** Christina Culp¹, Samantha Pentico², Josiah Moore², Jason Locklin¹, Robert McMahon⁵ (1. Temple College, 2. Texas A&M University-Central Texas, 3. University of Texas Arlington)

Geosciences

- #99 **Comparative analysis of geophysical methods in delineation of a drainage culvert** Joseph Amell¹, Christopher Holmes¹, Kaitlyn Levasar¹, Seyram Nyamasekor¹, Sarah Walton¹, Wesley Brown¹ (1. Stephen F. Austin State University)
- #114 **Preliminary investigation of critical elements in bauxite stock piles, Saline County, Arkansas** Melanie Ertons¹, Mindy Faulkner¹ (1. Stephen F. Austin State University)
- #136 **Landscape evolution in western Fort Hood Military Installation, Coryell County, Texas** Mindy Faulkner¹, Heather J. Dailey¹, Annie P. Winkelmann¹, Colby B. Reece¹ (1. Stephen F. Austin State University)
- #143 **Geologic face mapping methodology utilizing global positioning systems and drone technology** Luke Whitenburg¹, Mindy Faulkner² (1. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources, 2. Stephen F. Austin State University)
- #177 **Carbonate microfacies of the Middle to Upper Pennsylvanian Cache Creek Group at Meadow Lake, British Columbia, Canada** Brennen Leidy¹, Michael Read¹, Merlynd Nestell³ (1. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources, 2. University of Texas at Arlington - Department of Earth & Environmental Sciences)

- #227 **Analysis of beach sand and ripple marks on the beach at the east end of Follett's Island along San Louis Pass, Texas** Taylor Carranza-Watson¹, R. LaReil Nielson² (1. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources, 2. Stephen F. Austin State University)
- #268 **Igneous petrography tests Pre-Cenozoic Movement Hypothesis for active Great Basin Fault Zone, Nevada** Joe Satterfield¹, Ashton Dirner¹, Kyle Jones¹, Matthew Hernandez¹, Elizabeth Koeman-Shields¹ (1. Angelo State University)
- #269 **Detailed mapping of the geologic controls on karst development in the Central Edwards Plateau** Cassidy Hill¹, Stephen Shields¹ (1. Angelo State University)
- #274 **Best Permian – Quaternary exposures of the San Angelo area** Joe Satterfield¹, Stephen Shields¹ (1. Angelo State University)
- #284 **Geochemistry of the Claiborne Group ironstone deposits in East Texas** Jared Diehl¹, Rick Shaw¹, Mindy Faulkner³ (1. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources, 2. Stephen F. Austin State University)
- #290 **LiDAR-Based delineation of karst features in the Castile Formation, Eddy County, New Mexico and Culberson County, Texas** Kaitlyn Levassar¹, Kevin Stafford² (1. Stephen F. Austin State University - Department of Earth Sciences and Geologic Resources, 2. Stephen F. Austin State University)

Marine Science

- #122 **Identification of biomarkers of sub-lethal algal toxin exposure in Atlantic Salmon (*Salmo salar*) and Chinook Salmon (*Oncorhynchus tshawytscha*) using differential gene expression analysis** Brandon Ellingson¹, Ryan Shartau¹ (1. University of Texas at Tyler)
- #265 **Analysis of the use of four phytoplankton species as a carbon sink** Robert Funderburg¹, Samuel Molyneaux¹, Jose Collazo¹, Aldo Silva¹, Athenia Oldham¹, Milka Montes¹ (1. University of Texas Permian Basin)

Mathematics & Computer Science

- #32 **Optimizing grape harvest timing and yield using linear programming** Arden Neff¹, Barbara Anthony¹ (1. Southwestern University)

Neuroscience

- #100 **In vivo expression analysis of Parkinson's disease-related genes in zebrafish** Kristel Ledesma¹, Adrian Romero², Ayman Hamouda¹, Brent Bill¹ (1. The University of Texas at Tyler, 2. University of Texas at Tyler)
- #116 **The use of tryptophan CQDs for the treatment of degenerative diseases** Laisha Ramirez¹ (1. University of Texas El Paso)
- #188 **Effects of transcranial infrared laser stimulation (TILS) on cognition and prefrontal cortical functional connectivity in individuals with bipolar disorder** Roger Davis¹, Farzad Salehpour¹, Laura Gamboa¹, Douglas Barrett¹, Patrick O'Connor¹, Francisco Gonzalez-Lima¹ (1. The University of Texas at Austin)
- #212 **Evaluating the temporal effect of TILS on functional connectivity of the prefrontal cortex** Patrick O'Connor¹, Turner Lime¹, Douglas Barrett¹, Francisco Gonzalez-Lima¹ (1. The University of Texas at Austin)
- #252 **Sleep and Alcohol Sensitivity/Rapid tolerance in *Drosophila melanogaster*** Joel Osegueda Delgado¹, Evelyn Martinez¹, Yuan Yuan Kang¹ (1. University of Houston-Downtown)

Physics & Engineering

- #26 **Computation Fluid Dynamic (CFD) simulation study on oil-water separation** Victor Guevara¹, William Amonette¹, Ariful Bhuiyan¹, Anders Anne¹, Chunlong Zhang¹ (1. University of Houston-Clear Lake)
- #36 **Investigating the influence of a new technology based 316L stainless steel printing process parameters** Ariful Bhuiyan¹, Sascha Henderson², Kristian Torres² (1. University of Houston-Clear Lake, 2. Research Assistant)
- #65 **Floating in ex situ lab testing for lake water** Christopher Garcia¹, Ariful Bhuiyan¹, Felipe Trujillo-Wheeler¹, Kristian Torres¹, George Guillen¹ (1. University of Houston-Clear Lake)
- #72 **Real-time particle swarm optimization using ground robots** Travis Holmgreen¹, Jovany Avila¹, Michael Frye¹ (1. University of the Incarnate Word)
- #73 **Constructing and testing a large-scale diffusion cloud chamber** Garath Vettors¹, Andrew Tom¹, Kenneth Carrell¹ (1. Angelo State University)
- #78 **Detecting cosmic rays on Earth's surface and above** Garath Vettors¹, Alexandra Vishnevskaya¹, Eric Youngsang Ji³, Kenneth Carrell¹ (1. Angelo State University, 2. Texas Tech University)
- #173 **Optimizing of Voronoi diagram algorithms through parallelization** William Hennig¹, Michael C. Holcomb¹ (1. Angelo State University)
- #213 **Ti:Sapphire crystal laser** Andrew Long¹, David Bixler¹ (1. Angelo State University)
- #226 **Optimizing the flow of granular particles through a 3D hopper** Noel Marichalar¹, Eric Youngsang Ji¹, Michael C. Holcomb¹ (1. Angelo State University)
- #232 **Robotic arm driven 3D printed knee joint to study combined intrinsic and extrinsic risk factors on anterior cruciate ligament strain** Victor Guevara¹, Ariful Bhuiyan², William Amonette², David Sanmiguel¹, Kristian Torres¹ (1. Research Assistant, 2. University of Houston-Clear Lake)
- #254 **Elemental abundance characteristics of distinct stellar populations in NGC3201** Jill Taylor¹, Seungjun Ryu¹, Kenneth Carrell¹, Rachael Beaton⁴ (1. Angelo State University, 2. Space Telescope Science Institute)
- #261 **RR Lyrae in local group dwarf galaxies** Yoojin Choi¹, Kenneth Carrell¹, Vittorio Braga³, Massimo Dall'Ora³, Marcella Di Criscienzo³ (1. Angelo State University, 2. Istituto Nazionale Di Astrofisica)
- #335 **Transient changes in TESS lightcurves of RR Lyrae** Jaylon Lockett¹, Kenneth Carrell¹, Ron Wilhelm³, Yoojin Choi¹, Jill Taylor¹, Stasha Youngquist¹ (1. Angelo State University, 2. University of Kentucky)

Plant Biology

- #129 **Functional leaf traits associated with minimum leaf conductance in multiple grass species** Carlina Schubert¹, Michael Tobin¹ (1. University of Houston-Downtown)
- #198 **Molecular identification using DNA barcoding of *Carex* specimens collected from South Central Texas** Leila Martinez¹, Mark Gustafson¹, Alan Lievens¹, Danielle Grove¹, Stephanie Perez¹ (1. Texas Lutheran University)
- #228 **Variability of traits conferring drought tolerance in prairie grasses along a precipitation gradient** Hatoon Badawi¹, Ragad Abu Alteen¹, Rachel Colorado¹, Huda Alchikh Omar¹, Alannah Barrera¹, Arnold Villatoro¹, Carlina Schubert¹, Michael Tobin¹ (1. University of Houston-Downtown)
- #242 **Molecular identification of *Paspalum* specimens collected from Guadalupe and Comal Counties** Mariluz Gonzalez¹, Mark Gustafson¹, Alan Lievens¹, Danielle Grove¹, Stephanie Perez¹ (1. Texas Lutheran University)
- #255 **Development of microsatellite markers for population genetics in *Mentzelia* section *Trachyphytum*** Elizabeth Crawford¹, Adam Thomas¹, Jiyeon Kim¹, Joshua Brokaw¹ (1. Abilene Christian University)
- #256 **Diversity and abundance of arbuscular mycorrhizal fungi in plants found in gypseous soils in the Chihuahuan Desert region of Texas** Asia Cornelius¹ (1. Sul Ross State University)
- #259 **DNA barcoding using atpB to differentiate between plant specimens in the genus *Oxalis* from Guadalupe County, Texas** Jasmine Sierra¹, Mark Gustafson¹, Alan Lievens¹, Danielle Grove¹, Stephanie Perez¹ (1. Texas Lutheran University)
- #275 **Investigating dry-heat sensitivity in seeds using *Arabidopsis thaliana*** Jadon Sitton¹, Andrew Woodward¹ (1. University of Mary Hardin-Baylor)
- #281 **Analyses of second-site suppressor mutants of *Arabidopsis thaliana* pex4-1** Dat Nguyen¹, Andrew Woodward¹ (1. University of Mary Hardin-Baylor)
- #286 **Examination of the role of biochar on pupation and eclosion success of two insect herbivores** Nischal Wagle¹, Engil Pereira¹, Rupesh Kariyat³ (1. University of Texas Rio Grande Valley, 2. Department of Entomology and Plant Pathology, University of Arkansas)
- #299 **The effects of chemical conditions on *Eruca sativa* and its tryptophan levels** Cynthia Montalvo¹ (1. Howard Payne University)
- #320 **Factors affecting the germination success of *Callirhoe scabriuscula*** Clara Dorman¹, Bonnie Amos¹, Ben Skipper¹ (1. Angelo State University)

STEM Education

- #319 **Peer Leading: A review of how the implementation of small groups has resulted in big change** Samuel Mota¹, Reagan Hudson¹, Milka Montes¹ (1. University of Texas Permian Basin)

Systematics & Evolutionary Biology

- #55 **Building a molecular phylogeny of cave snails of central Texas to better understand their diversity** Natalia Salazar-Lozano¹, Roel Castaneda¹, Jonathan Dominguez¹, Mariana Tiscareño Gonzalez¹, Elisa Saenz¹, Vanessa Saenz¹, Megan Solis¹, Kathryn Perez¹ (1. University of Texas Rio Grande Valley)
- #74 **Identification of unknown phreatic snail populations (Mollusca: Gastropoda: Cochliopidae) from central Texas** Roel Castaneda¹, Mary Serrano¹, Kathryn Perez¹ (1. University of Texas Rio Grande Valley)
- #107 **Is *Pyrgulopsis* "Lineage C" a distinct species?** Shiza Khan¹, Kathryn Perez² (1. Department of Biology, University of Texas Rio Grande Valley, 2. University of Texas Rio Grande Valley)
- #120 **DNA identification of a small wolfsnail population (*Euglandina* sp.) in downtown San Antonio.** Jonathan Dominguez¹, Benjamin Schwartz², Kathryn Perez¹ (1. University of Texas Rio Grande Valley, 2. Texas State University)
- #271 **New species of *Stylops* (Strepsiptera: Stylopidae) from the United States with new host and distribution records** Wyatt Zabinski¹, Jerry Cook¹ (1. Sam Houston State University)
- #291 **Review of *Toxomerus macquart*, 1855 in Texas (Diptera: Syrphidae)** Jewel Coffey¹, Jerry Cook¹ (1. Sam Houston State University)
- #313 **Recent collections of buck moths (Lepidoptera: Saturniidae: Hemileuca) from Central and West Texas** Ned Strenth¹, Gracielle Velasco¹, Logan Miers¹ (1. Angelo State University)

Terrestrial Ecology & Management

- #76 **How do environmental factors influence the activity patterns of Mississippi kites?** Conner Green¹, Audrey Crawford¹, Billy Huynh¹, Brent Bibles⁴, Clint Boal¹ (1. Texas Tech University, 2. Unity College)
- #80 **Biodiversity study of the Texas hill country** Jessica Moody¹, Kylie L. Mayfield², Joshua Henderson², Tristan R. Laughlin², Wendi K. Wolfram, Ph.D.⁵ (1. Author, 2. Co-Author, 3. Hardin-Simmons University Research Director)
- #170 **A multi-century fire history for a mixed-conifer forest near Cloudcroft, New Mexico** Bruna Moureira¹, Matthew Allen¹ (1. Wayland Baptist University)
- #185 **Green Heron (*Butorides virescens*) nesting along the Brazos River at Baylor University, McLennan County, Texas: 2020 season** Timothy Campbell¹, Stephanie Baker² (1. Department of Anatomy, Midwestern University, 2. Department of Anthropology, Texas State University)
- #191 **Shelter dogs as sentinels for Chagas Disease in Corpus Christi, Texas** Tara Hansler¹, Melissa Draper², Richard Wilson Patrock¹ (1. Texas A&M University-Kingsville, 2. Corpus Christi Animal Care Services, 2626 Holly Road, Corpus Christi, Texas 78415)
- #219 **The effects of urban stimuli on the exploratory behavior of *Acheta domesticus*** Benjamin Crowley¹, Ben Skipper¹ (1. Angelo State University)
- #230 **Evaluation of specialized nose pad structures used in foraging by the American hog-nosed skunk, (*Conepatus leuconotus*)** Rodrigo Andrade Luna¹, Robert Dowler¹ (1. Angelo State University)
- #246 **Enhancing urban tree canopy estimation from remote sensing using LiDAR and texture metrics** Billy Huynh¹, Carlos Portillo¹ (1. Texas Tech University)

- #263 Continuous mowing differentially affects floral defenses in the noxious and invasive weed *Solanum elaeagnifolium* in its native range Alejandro Vasquez¹ (1. University of Texas Rio Grande Valley)
- #300 Road fatalities of butterflies in Crockett County, Texas. Andrea Burt¹, Ben Skipper¹ (1. Angelo State University)
- #307 Reference Plant Available Water for Semi-Arid Cover Cropping and Restoration Studies Odile Umuhoza¹ (1. Student)

Saturday, March 4 | 8:45 – 11:00
Oral Session III

Freshwater Science II

Math and Computer Science Building 100

- 9:00 #159 Benthic microbial diversity of a wastewater effluent dependent stream ecosystem Fabiola Estrada¹, Allison Veach² (1. University of Texas at San Antonio, 2. University of Texas at San Antonio, Department of Integrated Biology)
- 9:15 #190 Effects of a highly altered flow regime on the fish assemblage of a mid-sized river Aaron Gray¹, Scott Collins¹ (1. Texas Tech University)
- 9:30 #285 Outcompete or overeat?: Bottom-up and top-down effects of invasive Brown trout on fishes of conservation concern Owen George¹, Scott Collins¹ (1. Texas Tech University)
- 9:45 #175 Population ecology of East Texas salamanders across a heterogenous landscape in Smith County, Texas Justin Hunt¹, Lance Williams¹, Brent Bill¹ (1. The University of Texas at Tyler)
- 10:00 #168 Effects of invasive giant reed on the stream food web of San Felipe Creek, Texas. Lauren Soliz¹, Sarah Roberston², Scott Collins¹ (1. Texas Tech University, 2. Texas Parks and Wildlife)
- 10:15 #101 Seasonal patterns of spring discharge at Silver Falls, Crosby County, Texas John Stout¹ (1. USDA-Agricultural Research Service)
- 10:30 #21 Analysis of oil and grease concentrations in sediment samples from roadway runoff in the Edwards Aquifer recharge zone of Central Texas Jeff Hutchinson¹, Jason Kent¹, Vikram Kapoor¹, Samer Dessouky¹ (1. University of Texas at San Antonio)
- 10:45 **Freshwater Science Section Meeting**

Physics & Engineering II

Vincent Building 139

- 9:00 Plenary: Molten salt research reactor development for electricity, clean water, and medical isotopes Timothy L. Head¹ (1. Abilene Christian University)
- 10:00 **Physics & Engineering Section Meeting**

Marine Science

Vincent Building 139

- 10:30 #258 *Phaeodactylum tricornutum* as a food source for Texas oysters Elena Barrada¹ (1. Student)
- 10:45 **Marine Science Section Meeting**

STEM Education

Vincent Building 146

- 8:45 #83 Social-emotional learning & culturally responsive teaching: Do preservice teachers have the skill, knowledge, & awareness to support student achievement? An exploratory study in science methods course! Margo Eugenio¹, Mamta Singh¹ (1. Lamar University)
- 9:00 #86 Genetic technology and the use of an oral debate method on questioning ethics in the classroom Chaley Cleckley¹, Mamta Singh¹ (1. Lamar University)
- 9:15 #90 Assessing climate change knowledge & awareness among elementary preservice teachers Itzanami Madrid¹ (1. Lamar University)
- 9:30 #27 EcoJEDI summer research program in agricultural sciences Jeff Hutchinson¹, Vikram Kapoor¹, Briana Salas³, Laura Perry⁴, Gwen Young¹, Sue Hum¹, Jamie Crosswhite³ (1. University of Texas at San Antonio, 2. Our Lady of the Lake University, 3. Northeast Lakeview College)
- 9:45 #43 Validation and utility of an anatomy & physiology readiness assessment tool Phillip Greco¹ (1. Temple College)
- 10:00 #111 The logistics of turning a dream into reality Ralph Zehnder¹ (1. Angelo State University)
- 10:15 #140 Atmospheric noise and assessments: promoting a positive learning environment in the science classroom Joni Ylostalo¹ (1. University of Mary Hardin-Baylor)
- 10:30 #211 An active introduction to biology Seena Mathew¹, Andrew Woodward¹ (1. University of Mary Hardin-Baylor)
- 10:45 **STEM Education Section Meeting**

Conservation Ecology

Vincent Building 158

- 9:00 #105 Developmental toxicity of organophosphate flame retardants on the *Gallus gallus* embryo Linden Williamson¹, Kevin Tate¹ (1. Texas Lutheran University)
- 9:15 #156 Correlation between snake fungal disease and predation by raptors and other birds Lezley Hart¹, R. Michele Wright², Jessica Coleman¹, Jeff R. Troy⁴, Joseph S. Glay¹, Alan Lizarraga¹ (1. The University of Texas at Tyler, 2. University of Texas at Tyler, 3. Temple College)
- 9:30 #165 Cover-cash crop rotations mediate plant-insect interactions with a possible implication on pest management. A collaborative study with local growers in the Lower Rio Grande Valley Adegboyega Fajemisin¹, Satinderpal Kaur², Alexis Racelis², Rupesh Kariyat⁴ (1. School of Earth, Environmental and Marine Sciences, University of Texas Rio Grande Valley, 2. Department of Biology, University of Texas Rio Grande Valley, 3. Department of Entomology and Plant Pathology, University of Arkansas)
- 9:45 #296 DNA barcoding of *Peromyscus* from the Davis Mountains in Texas Halle Summers¹, Loren Ammerman¹, Rebecca Scott¹, Robert Dowler¹ (1. Angelo State University)
- 10:00 #40 DNA barcoding of spring snails (Mollusca: Caenogastropoda) endemic to springs of the Trans-Pecos region of Texas Kathryn Perez¹, Benjamin Hutchins², Benjamin Schwartz² (1. University of Texas Rio Grande Valley, 2. Texas State University)
- 10:15 #329 Phylogenetic analysis of four closely related Species of crayfish in central Texas Schi-Lee Smith¹, Joshua Banta¹, Katrin Kellner¹ (1. University of Texas at Tyler)
- 10:30 #277 How to work successfully in conservation collaborative projects Martin Terry¹ (1. Sul Ross State University)
- 10:45 Conservation Ecology Section Meeting

Biomedical Sciences II

Vincent Building 160

- 9:00 #28 Determining effects of given rest periods on stress levels of full-time undergraduate students at The University of Mary Hardin-Baylor Abriella Loya¹, Seena Mathew¹ (1. University of Mary Hardin-Baylor)
- 9:15 #45 A biodegradable study on BioMed and surgical guide resin Edgar Castillo¹, Ariful Bhuiyan¹, Roberto Dugnani³, Roman Sustaita¹ (1. University of Houston-Clear Lake, 2. Rice University)
- 9:30 #68 Plasticizers and stress resistance in speckled cockroaches (*Nauphoeta cinerea*) Tyler McAdams¹, Brian Williams¹, James Harper¹ (1. Sam Houston State University)
- 9:45 #236 Chlorhexidine breakdown: Understanding its environmental and health impacts Stacy Huynh¹, Damon Brown¹, John Beatty¹ (1. Texas Woman's University)
- 10:00 #245 Arginine kinase is necessary for normal *Drosophila melanogaster* eye development Josceline Romanielle Tenido¹, Kaycee Torres¹, Courtney Farrington¹, Mardelle Atkins¹ (1. Sam Houston State University)
- 10:15 #302 Curcumin regulates extracellular matrix production in trabecular meshwork cells Thanh Le¹, Jose Ramirez¹, Morgen Glenn¹, Humberto Hernandez¹ (1. University of Houston-Victoria)
- 10:30 #308 Elucidating the role of a microbiota by-product, butyrate, on the fibrotic trabecular meshwork Jose Ramirez¹, Thanh Le¹, Humberto Hernandez¹ (1. University of Houston-Victoria)
- 10:45 Biomedical Sciences Section Meeting

Terrestrial Ecology & Management II

Vincent Building 162

- 9:00 #297 Effectiveness simulated water as a lure for bats in the Big Bend Region Alex Buckel¹, Loren Ammerman¹ (1. Angelo State University)
- 9:15 #303 Cover cropping systems in semi-arid South Texas: Coupled root and soil moisture dynamics Manish Gautam¹, Alexis Racelis², Bradley Christoffersen³ (1. Department of Biology, The University of Texas Rio Grande Valley, 2. School of Earth, Environmental and Marine Sciences, The University of Texas Rio Grande Valley, 3. Department of Biology, The University of Texas Rio Grande Valley)
- 9:30 #322 Varying management practices and their effect on edaphic properties in Texas dryland farming systems Daphne Zapsas¹, Pushpa Soti¹, Alexis Racelis³ (1. Department of Biology, The University of Texas Rio Grande Valley, 2. Department of Biology, University of Texas Rio Grande Valley)
- 9:45 #64 Three-toed box turtle (*Terrapene carolina*) spatial ecology at multiple scales in north Texas Sara Joseph¹, Andrew Gregory¹, Jaime Jimenez¹ (1. University of North Texas)
- 10:00 Terrestrial Ecology & Management Section Meeting

TAS Awards Banquet Agenda

7:00 – 10:00 pm Saturday, March 4, 2023

Houston Harte University Center

Welcome from TAS	<i>Dr. Francisco Gonzalez-Lima, President</i>
Welcome from Angelo State University	<i>Dr. Paul Swets, Dean of the College of Science and Engineering, Angelo State University</i>
Outstanding Texas Educator Award Distinguished Texas Scientist Award Recognition of new TAS Fellows	<i>Dr. Robert Kane, Vice President</i>
Undergraduate Poster Awards Undergraduate Oral Presentation Awards	<i>Dr. Milka Motes, Collegiate Academy Counselor</i>
Sammy Ray Marine Science Award	<i>Madelyn Knauss, Marine Science Section Chair</i>
Amir-Moez Award for Excellence in Mathematics	<i>Dr. Angela Brown, Mathematics & Computer Science Section Chair</i>
Graduate Student Presentation Competition Awards Student Research Grants	<i>Dr. Travis LaDuc, Graduate Academy Counselor</i>
Recognition of Outgoing Board Members Recognition of New Board Members Introduction of New TAS President	<i>Dr. Francisco Gonzalez-Lima, TAS President</i>
Closing Remarks	<i>Dr. Matthew A. Barnes, New TAS President</i>

Geology Field Trip

Classic Eastern Shelf Permian Basin and Northwestern Edwards Plateau Exposures

Sunday, March 5, 2023, 7:30am* – 1:00pm

Leaders: Dr. Joe Satterfield (joseph.satterfield@angelo.edu),
Stephen Shields (stephen.shields@angelo.edu), Steve Shaw

Five geology stops in the San Angelo area give insights into little-studied West Texas geology. San Angelo and the Concho River Valley are on the southwestern margin of the platform of the North American craton, within the eastern shelf of the Permian basin. The Edwards plateau on the San Angelo skyline contains Cretaceous exposures. ASU geology students and faculty conduct undergraduate research projects in this area. **Stop 1**, Spillway Hill adjacent to Lake Nasworthy and Twin Buttes Reservoir, exposes a 15 m section of the Permian San Angelo - Blaine Formation fluvial redbeds described in Henderson (1928). **Stop 2**, within San Angelo State Park, exposes synapsid and amphibian trackways in the Blaine Formation and two sets of systematic fractures that correlate sets described in the Palo Duro basin. **Stop 3**, Mount Margaret, 40 km N of San Angelo, exposes the most complete single section of the Permian through Cretaceous section: Choza Formation in Clearfork Group, conglomerate-rich San Angelo Formation, Blaine Formation, and overlying Cretaceous Antlers Sandstone and Fort Terrett Formations. Mount Margaret was a Butterfield Overland Mail Stage Line stop before the Civil War. Legends say the site is haunted. At **Stop 4**, Divide roadcuts between Water Valley and Robert Lee expose well the Cretaceous Fort Terrett and Segovia Formations, which contain rudistid mounds, ooid grainstones, and calcite filled vuggy intervals well described by Rose (1972) and Stoudt (2016). In San Angelo, beside the Concho River at **Stop 5**, Pleistocene Leona Formation lithic arenite and conglomerate suggest braided stream origins.

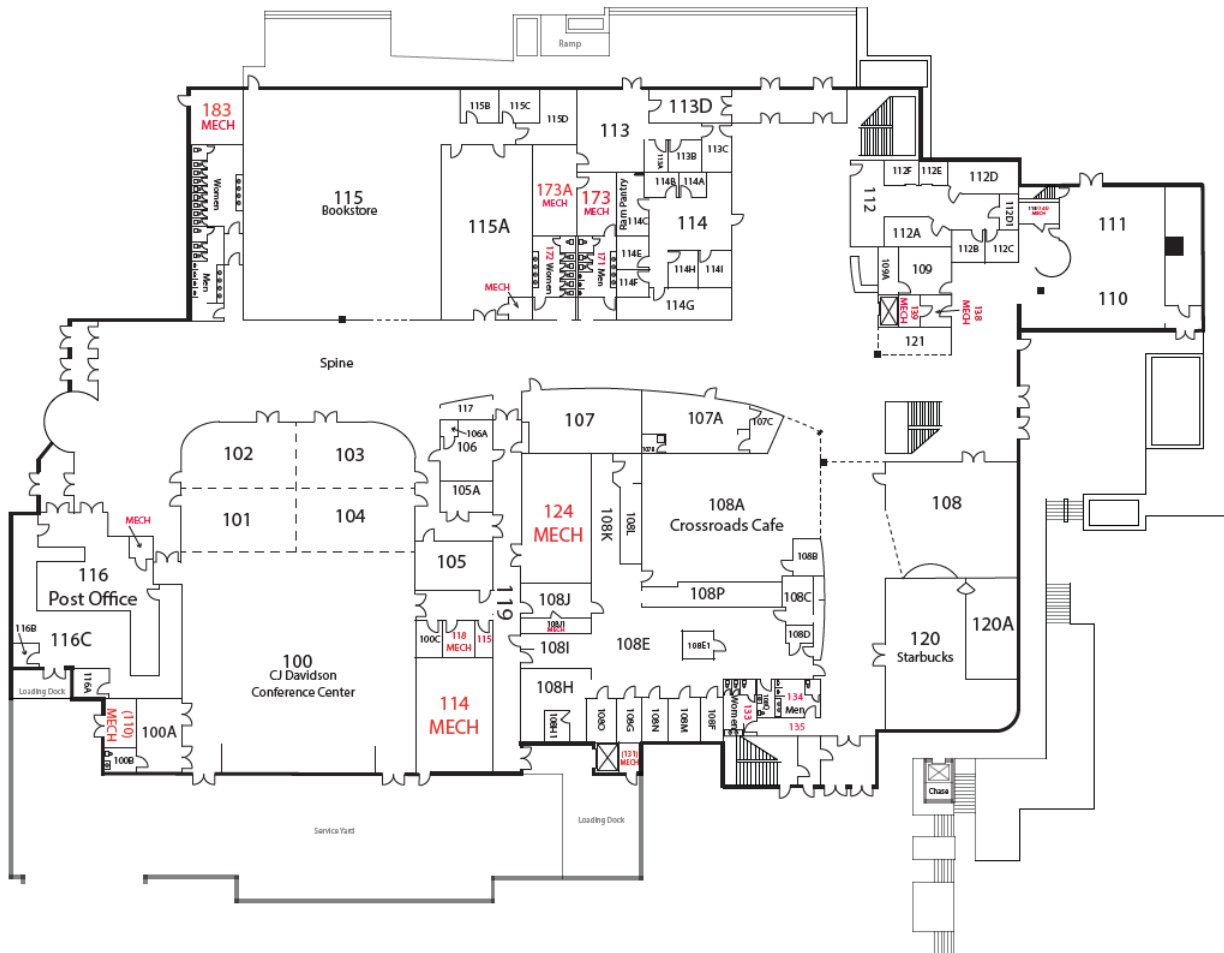
REQUIRED clothing and equipment: clothes suitable for the weather including long pants, a hat, boots or shoes with sturdy, thick soles, stiff notebook for notes and sketches, small daypack for collecting fossils or samples, rock hammer, hand lens, and at least 1 liter water. Limited seats will be available in an Angelo State van.

* We will depart from the Vincent Building parking lot, 2333 Vanderventer, at 8:00am sharp. Breakfast burritos, donuts, and fruit will be provided around 7:30am.

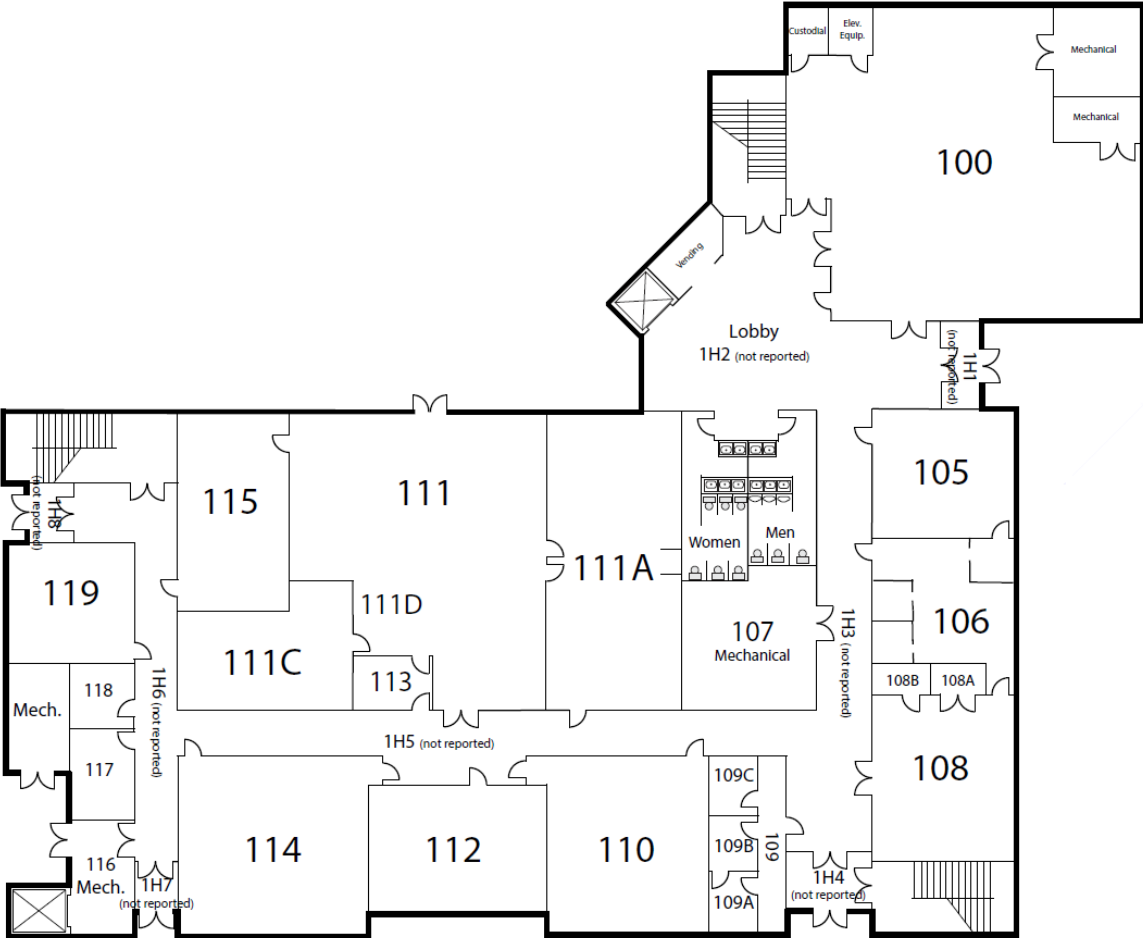
Map: Angelo State University



Map: Houston Harte University Center



Map: Math & Computer Science Building



Map: Vincent Building

