



GEOSCIENCES
NEWSLETTER 2023

Geosciences

 | Baylor University®



TABLE OF CONTENTS

—
MESSAGE FROM THE CHAIR
Dr. Joe Yelderman | 4

—
STAY CONNECTED | 6
2023 FIELD CAMP | 8

—
FACULTY UPDATES
Dr. Stacy Atchley | 10
Dr. Steve Dworkin | 12
Dr. Steve Forman | 14
Dr. James Fulton | 16
Dr. Bill Hockaday | 18
Dr. Peter James | 20
Dr. Dan Peppe | 22
Dr. Elizabeth Petsios | 24
Dr. Jay Pulliam | 26
Dr. Joe Yelderman | 28

—
STAFF UPDATES
Sharon Browning | 30
Wayne Hamilton | 31
Liliana Marin | 32
Tim Meredith | 33
Gabriela Velasco Fernandez | 34
Dr. Ren Zhang | 35

—
BAYLOR ASSOCIATION FOR WOMEN GEOSCIENTISTS | 36

STAFF UPDATES | 37

BAYLOR GEOSCIENCES HOSTS AEG | 38

BAYLOR GEOLOGICAL SOCIETY | 39

INTERNS, AMBASSADOR, AND SAFETY | 40-41

GEO GRADUATE PROGRAM | 42

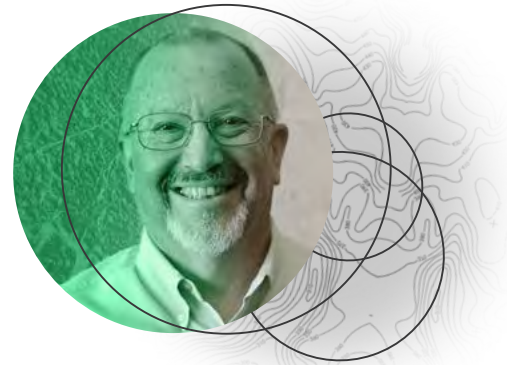
AWARDS | 43

GRADUATES | 44

FAMILY CIRCLE | 46



MESSAGE FROM THE CHAIR



WHAT DOES GEOSCIENCES EDUCATION LOOK LIKE IN 2023?

THE ANSWER IS . . . **DIFFERENT!**

Geoscientists know that what is commonly referred to as “Terra Firma” is just a temporary status in our everchanging planet. The basic definition of geology as the “study of the Earth” has evolved to include the study of other planets, more subdisciplines, and broader applications of our earthly knowledge. Recently, the global pandemic compelled many geoscience departments to teach classes on-line or virtually. Even field courses were taught remotely. I personally agree with the adage “the best geologist is the one who has seen the most geology.” However, we also need to accommodate students who want to pursue geoscience but may not be able to experience geoscience education in the traditional format. As climate changes while resources for materials and energy remain in demand, geoscientists are needed on all fronts and have bountiful opportunities along with formidable challenges.

Geoscience education must prepare the next generation with the knowledge and skills required to meet all challenges. Baylor Geosciences is positioning our department to provide a variety of educational options to a more diverse group of geoscientists seeking exciting careers as we take advantage of the many new opportunities and future societal needs.

Here are the recent additions to our department.



NEW PERSONNEL

An approved search for a tenure-track position in solid earth geoscience is underway.

NEW EQUIPMENT

Diesel truck - to pull our Geoprobe rig and take students and equipment safely into the field.
Elemental analyzer - a peripheral for Dr. James Fulton’s stable isotope mass spectrometer. It will be used by Dr. Ren Zhang primarily to measure carbon and nitrogen isotope ratios in organic matter. This addition to the stable isotope lab will help Dr. Zhang with his heavy workload and allow us to increase the number of samples being analyzed in the lab.

NEW COURSES

“Climate Change” and “Water Today and Tomorrow” have been approved and will be taught this year as “Grand Challenge” courses at the freshman level. We hope these courses will attract students and recruit new majors.

Serving as Chair of Baylor Geosciences is challenging but the joy of educating future geoscientists, mentoring the next generation of research geoscientists, and observing the success of our alumni certainly make the challenges worth the effort. You can find evidence of these joys throughout this newsletter.

We hope you will read this newsletter with a pride associated with Baylor Geosciences but most of all we hope you come visit the department. You are always welcome and especially at Homecoming, Oct 27th.

Dr. Joe C. Yelderman, Jr.

— BAYLOR GEOSCIENCES CHAIR

HOMECOMING 2023




PLEASE JOIN US!
FRIDAY, OCTOBER 27TH

GEOLOGY DEPARTMENT
2023 HOMECOMING OPEN HOUSE
6-8 PM, BAYLOR SCIENCES BUILDING
E401 CLOCK TOWER

STAY CONNECTED

FOR OUR MOST RECENT NEWS PLEASE VISIT OUR DEPARTMENTAL WEBPAGE AND FOLLOW US ON SOCIAL MEDIA.

SOCIAL MEDIA LINKS

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FIELD CAMP 2023



DESCRIBING CROSS BEDS IN THE NAVAJO SANDSTONE IN ZION NATIONAL PARK.



FIELD CAMP WITH THE TETONS IN THE BACKGROUND.



MAPPING THE KEYSTONE THRUST FAULT IN RED ROCK CANYON, NEVADA.



MEASURING SECTION NEAR ALAMOGORDO, NM.



FIELD CAMP STUDENTS DRAFTING UP THEIR PACE AND COMPASS MAPS IN CLOUDCROFT, NM.



DR. STACY ATCHLEY

PROFESSOR OF PETROLEUM & STRATIGRAPHY

Another year, another newsletter journal entry. I can confirm that time truly is elastic, as the longer I live the faster time flies by. It seems I just recruited Bart Yeates as a PhD student (back in 2017), but low-and-behold Bart graduated in May of 2023 and is now gainfully employed by ExxonMobil in Houston. So ends the final chapter of the Late Devonian Duvernay team which also included Anna Thorson (M.S. 2019), Marilyn Wisler (M.S. 2020), and Dr. Elisabeth Rau (PhD, 2022). My current PhD students still include Stephanie White (B.S., Univ. of Alabama) and Tyler Dowdy (B.S., Univ. of Tennessee), and beginning Fall 2023 will also include new graduate students Anna Alberti (B.S. PennWest Univ., Edinboro Pennsylvania) and Angelina Rodriguez (B.S. Baylor Univ.). Stephanie continues to work persistently on her dissertation project that is reconstructing the environmental and climatic conditions during the Pennsylvanian-Permian transition in southeastern Utah. Stephanie has her final dissertation field excursion to Raplee Anticline (near the tiny town of Mexican Hat, Utah) planned with myself and dissertation committee member Gary Stinchcomb (Assoc. Prof. at Univ. of Memphis) for perhaps early December, 2023. Tyler has made significant progress on his dissertation study of the Early Jurassic Gordondale Member of central Alberta. Tyler has completely compiled all of the borehole data for his project (588 wells.....no small task) and has completed the stratigraphic correlations across his study area. Tyler worked as a summer intern for OXY during Summer 2023. Incoming PhD student Anna Alberti will be working closely with Tyler as her dissertation project will focus on the Early Jurassic Nordegg Member karsted carbonate platform complex that is contemporaneous with and adjoins the basinal mudrocks of the Gordondale Member. Incoming M.S. student Angelina Rodriguez's thesis project will be a stratigraphic and reservoir quality study of the Early Triassic Montney Formation within the Kaybob South region of central Alberta.

On the personal front, oldest daughter Dallas moved to Tyler, Texas where she now works for Merrill Lynch (Bank of America), and youngest daughter Audra is in her final year of law school and will hopefully graduate in December of 2023. Moh, our cat, is still well fed and cuddled by Janelle.

Best wishes to you all.



1. Stephanie chomping at the bit to do fieldwork at Raplee Anticline, southeast Utah. 2. Tyler prepared to describe core on a wintry day in Calgary, Alberta. 3. Tyler and Stacy Atchley with the friendly staff at Pizza Bob's, Calgary. 4. Anna Alberti: Incoming student Anna Alberti in the mountains near Boulder, Colorado.

FACULTY UPDATES



DR. STEVE DWORKIN

PROFESSOR OF GEOCHEMISTRY & SEDIMENTARY PETROLOGY

This year field camp had the most rain I've experienced in the last 32 years. None-the-less, the thirteen students didn't complain much, and we dealt with wet tents and cooking in the rain. The north rim of the Grand Canyon was closed this year because the snow had not yet melted, so we did a project in the Grand Staircase-Escalante National Monument mapping the East Kaibab monocline. Little did we know that the Pariah River was flowing, and we had to map with wet boots - the students loved it.

My graduate student, Anna Lesko, proposed a paleosol session to the Goldschmidt Conference and we convened the session along with Gary Stinchcomb in Lyon, France in early July. The Burgundy and Beaujolais were outstanding. Both Anna and I presented talks on using paleosol mineral assemblages to reconstruct paleoclimates. I also traveled with my other graduate student, Jordan Walker, on a core sampling trip to Calgary over spring break and we sampled and described 1000 feet of black shale. Stacy Atchley and his graduate student Tyler Dawson worked hard along side us to get that much core looked at. We also went to a Flames hockey game and ate the disgusting poutine that is a local favorite.

It appears that our undergrad numbers are increasing as I notice that my Mineralogy class next semester has twenty students registered. I will also be teaching an Aqueous Geochemistry course that is now available to both undergrads and grads. I had an interesting time teaching structural geology last semester. We will be conducting a search for a new professor next semester and hopefully this year will be the last that I teach structure.

Sandy and I are doing well, as always. We spent the summer in Pagosa Springs, Colorado with our RV family, Last Thanksgiving, several of our RV friends came for a visit and it was a very enjoyable holiday.



1



1. Posing with Bohai Ruan at the East Kaibab monocline in Utah. 2. Chilling with a Sinclair dinosaur in Ogden, Utah while the field camp vans are getting their oil changed.

FACULTY UPDATES



DR. STEVE FORMAN

PROFESSOR OF PALEOCLIMATE & GEOHYDROLOGY TECTONICS

A significant actively this year is the development a of curriculum within the Department that highlights human-caused climate change and profound effects to Earth systems now and into the future that challenges planetary sustainability. I taught for the first time in the Spring 2023 semester a 4000/5000 level course entitled "Climate Change and Society" to an over full class and with the Fall 2023 roster already full. It is salient, that we arm students with the best unbiased science and ideas on the effects and challenges of greenhouse-gas-induced climate change including, sea level rise, increased variability and duration of droughts, floods, and tropical storms. There is a global push to decarbonize energy sources, as indicated by Telsa's headquarters now in Texas, and to offer society through contemporary education the means to understand, adapt and mitigate to the multitudes of human-induced detrimental challenges, known and unknown, to lessen human suffering.

It is a honor to welcome Dr. Sowmya Revenna in to our research group 2023, who has a PhD in Remote Sensing from the Department of Computer Science and Engineering, College of Engineering, Bangalore University, Bengaluru, India. Dr. Revenna brings impressive knowledge and experience in geospatial data science, particularly time-series analysis of image sets and automated approaches for image classification, change detection, generation of digital elevation models from stereoscopic satellite imagery. Her previous research has focused on flood prediction for large rivers in India

using machine learning models and using convolution of neural network funded by Amazon Web Services. Dr. Revenna will bring her expertise in flood evaluation to landscape and fluvial system response in Dust Bowl Drought areas in SW Kansas, with an image data base spanning from 1938 to 2022.

Alix Fournier a third year PhD candidate remains captivated by a persistent environmental paradox; that 20-30 m tall dune fields in west Texas are nearly filled with groundwater whereas, the water table in the surrounding and much lower sand sheet plain is > 50 m below the surface. Alex has installed three groundwater monitoring wells for the Kermit dune field with new data over the past year. Groundwater has been analyzed for hydrogen and oxygen isotopes, radiocarbon content, and other chemical analyses to differentiate this "younger" water resource from the regional older Pecos Valley Aquifer. In turn, in the past 9 months Alix has assembled a remotely sensed data base spanning the past decade that documents the expansion of proppant mining operations across the Permian Basin, which unearth new sources of fugitive dust, that impact human health. Also, this spatial time-series is an effective tool for monitoring the formation of natural and mining lakes as windows into the groundwater system. Alix's research is truly novel in this human-altered aeolian system. A grant from Atlas Energy in Austin, TX supports Alix's PhD research; our seventh year of student support (with overhead) from this industrial partner.

Ashley Gonzalez, a seasoned graduate student, who spent her undergraduate years in the Geoluminescence Dating Research Lab, has embarked on MSc. research in 2022/23 to reevaluate the luminescence age structure at the Waco Mammoth National Monument. She is applying new dating approaches including thermal-transfer techniques and violet-light stimulation and accessing new samples from prepared jacketed-material to evaluate the age span of the site. This research is in collaboration with Dr. Lindsey Yann, the much-valued Monument paleontologist. Ashley is now part of the "Mammoth" group in the Department and making significant strides with her research.

Maree Yard is a 2nd year MSc student, co-advised with Dr. Lindsey Yann, has focused on developing new metrics for exposed mammoth bones at the Monument and in Mayborn Museum collections. This quantitative data-set on bone morphometrics will be the basis to better understand the age and sex distribution of 20+ individuals for this death assemblage. Maree has a seasoned eye for mammoth osteology with an internship at the Hot Springs Mammoth Site, SD, extensive coursework, excavation experiences and educational presentations at the Monument. She brings a clear focus and tenacity to this needed research.

A notable opportunity is the funding of two NSF AGeS³ (Advancing Geochronology Science, Spaces, and Systems) proposals for two visiting graduate students, one from University of Texas-Austin (V. Todd), and the other from Western Michigan University (A.Ibrahim) to utilize the expertise in Geoluminescence Dating Research Laboratory to forward chronologic control for their respective research. This NSF program matchup top-flight graduate students with compelling geochronologic questions to cutting edge laboratories, to train the next generation of scientists and forward basic research. We continue to evaluate OSL ages within a clear stratigraphic framework for the Monahans, Kermit and Red River aeolian and fluvial systems, and now with added and insightful statistical analysis from Ashley Gonzalez on elemental composition of sands, which is providing new insights on the potential changing sources of sand and erosional processes in the past 500,000 years.



2022-23 PUBLICATIONS

1. Vilanova, I., Tripaldi, A., Schitteck, K., Rojoe, L., Pivonof, E. L., Forman, S. L., Jobbágy E. G., Heideri, G. Chiesa, J., 2022. Late Holocene environmental and hydro-climatic variability inferred from a shallow lake record, blowout dunes, Argentinian western Pampas, South America. *J. of South American Earth Sciences*. 116, 103826, <https://doi.org/10.1016/j.jsames.2022.103826>.
2. Dalton, A. S., Pico, T., Gowan, E. J., Clague, J. J., Forman, S. L., McMartin, I., Roy, M., Sarala, P., Helmens, K. F., 2022. The marine $\delta^{18}\text{O}$ record overestimates continental ice volume during Marine Isotope Stage 3. *Global and Planetary Change* 212, 103814.
3. Cox, R. T., Hatcher, R.D., Jr, Forman, S. L., Counts, R., Vaughn, J., Gamble, E., Glasbrenner, J., Warrell, K., Adhikari, N., Pinardi, S., 2022. Synthesis of recent paleoseismic research on Quaternary faulting in the Eastern Tennessee Seismic Zone, Eastern North America: Implications for seismic hazard and intraplate Seismicity. *Bull. Seismol. Soc. Amer.* DOI: <https://doi.org/10.1785/0120210209>.
4. Sweeney, M. Forman, S. L., McDonald, E. V., 2022. Contemporary and future dust emission processes and sources from gypsum- and quartz-dominant aeolian systems, New Mexico and Texas, USA. *Geology* 50 (3), 356-360.
5. Forman, S. L., Tew-Todd, V. Mayhack, C. Marin, L. Wiest, L. Money, G., 2022. Late Quaternary aeolian environments, luminescence chronology and climate change for the Monahans dune field, Winkler County, West Texas, USA *Aeolian Research* 58, 100828.
6. Forman, S. L., Wu, Z., Wiest, L., Marin, L., Mayhack, C., 2023. Late Quaternary fluvial and aeolian depositional environments for the western Red River, Southern Great Plains, USA. *Quaternary Research* (Published online, May 16, 2023).
7. Tripaldi, A., Ivana L. Ozán I. L., Heider G., Orgeira, M.J., Forman, S. L., (In review) Where did the water come from? Wetlands and shallow lakes in semiarid dunefields from South America during the Pleistocene-Holocene transition. *Paleogeography, Paleoclimatology, Paleoecology*.
8. Ramírez-Herrera, T-M., Cerny, J., Corona, N., Gaidzik, K., Sugawara, D., Forman, S. L., Machain-Castillo, L., Gogichaishvili, A. (In review) Do slow slip earthquakes inhibit catastrophes? Geologic evidence from the Guerrero segment, Mexican subduction zone. *Nature Communications*.
9. Estay, J., Easton, G., De Pascale, G., Troncoso, M., Carretier, S., Active thrust tectonics along the western slope of the Central Andes southernmost Pampean flat-slab segment (~33°S, Chile): the Cariño Botado fault system. *Geomorphology*.
10. Herrera-Ossandón, M., Easton, G., Antinao, J. L., Forman, S. L., (In review). Late Quaternary glacier advances in the Andes of Santiago, central Chile, and paleoclimatic implications. *Frontiers in the Earth Sciences*.

1. Alix Fournier and a hard won groundwater monitoring well in the Kermit Dune Field, w. Texas. 2. Ashley Gonzalez skillfully using the Dept. Geoprobe with Jasmine Kidwell offer sage advice

FACULTY UPDATES



DR. JAMES FULTON

ASSISTANT PROFESSOR OF GEOMICROBIOLOGY

The 2022–2023 year has been an active one for the Microbial Biogeochemistry Lab. Conference travel was on a normal schedule following more than two years of cancellations, online formats, and uncertainty. Dr. Fulton started out summer 2022 with a trip to the El Paso, TX and Las Cruces, NM area meeting with collaborators from the NSF Drylands Critical Zone Thematic Cluster. Here the team evaluated several field sites and started a new research project that includes the analysis of lipid biomarkers at Baylor to track nutrient limitation of biological productivity in desert ecosystems. A new Ph.D. student, Tabinda Athar, will be joining the Microbial Biogeochemistry Lab at the end of the summer to continue this project, which will include a new field site in Balcones Canyonlands National Wildlife Refuge near Marble Falls, TX.

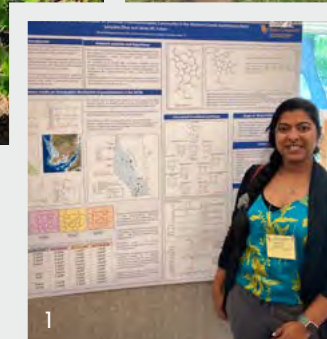
Dr. Fulton returned to Italy in summer 2022 contributing to the Baylor in Italy San Giuliano Archaeology Research Project. He instructed students in geochemical analysis using portable XRF and contributed to two peer-reviewed publications. Beyond research and teaching, Dr. Fulton represents the Department of Geosciences on the College of Arts & Sciences Mass Spectrometry User Group. He contributes to undergraduate student recruiting as part of the Invitation to Excellence program and serves on the University Bookstore Committee. In spring 2023 he teamed with fellow faculty and staff to evaluate applications for Geoscience Departmental Scholarships and Awards for the 2023–2024 year. This was his first year on the Awards Committee, and it was eye-opening to see the number of awards financed by the generosity of our alumni and friends. Thank you for all the support you provide for our students!

TEACHING:

In Fall 2022 Dr. Fulton team-taught Global Biogeochemical Cycles with Dr. Hockaday. This was their second time collaborating to teach this class, and once again it was a great experience for the faculty and students. The two professors bring different backgrounds in marine and terrestrial biogeochemistry to the classroom. The class was populated completely with graduate students, but with the popularity of new undergraduate concentrations in Biogeoscience & Paleontology, Climate Change & Society, and Geochemistry, there will likely be upper-level undergrads in the class when it is taught in Fall 2024. Dr. Fulton also continued teaching World Oceans both semesters in 2022–2023, sharing the importance of geosciences with undergraduates from many different academic majors.

MICROBIAL BIOGEOCHEMISTRY LAB:

In June 2023, Doctoral students Sanjukta Dhar and Josh Ford both attended Isocamp, an annual workshop for graduate students using stable isotope analysis in the research.



It is hosted at the University of New Mexico, and students collaborate to complete research projects with applications in biogeochemical, ecological, and climate research. The workshop lasts for two weeks and has students working with scientists from across the country learning field and laboratory methods.

Sanjukta Dhar continued making steady progress toward her degree during her fifth year in the Microbial Biogeochemistry research group. She will soon have a manuscript under review with Global Biogeochemical Cycles. Recent work has focused on quantitative methods for analyzing porphyrins, the preserved degradation products of pigments that she has detected in Devonian black shales. Her work on nitrogen cycling and biomarker analysis has been well received at national conferences over the past few years, including at the Gordon Research Conference on Organic Geochemistry in 2022. She most recently presented research on geoporphyrins in sediments from the Hangenberg biotic crisis at the Devonian–Carboniferous boundary.

Josh Ford defended his dissertation proposal during his third year in the Ph.D. program and has started his project analyzing the impact of sea level rise on the burial and preservation of organic matter derived from coastal microbial mats. His field sites are around Corpus Christi Bay, and the Baylor team is collaborating with researchers at Texas A&M Corpus Christi on field sampling and geochemical analysis on site. Josh has established new protocols in the lab for quantifying pigments in environmental samples and completed training to use the department's Geoprobe drilling rig for taking core samples for his project.



1. Ph.D. Student Sanjukta Dhar presenting a poster at the Gordon Conference on Organic Geochemistry. 2, 3, 4. Graduate Students in the Field. 5. Collaborators receiving training on biological soil crust identification at the Jornada Range.

FACULTY UPDATES



DR. BILL HOCKADAY

ASSOCIATE PROFESSOR OF ORGANIC GEOCHEMISTRY & BIOGEOCHEMISTRY

TEACHING & SERVICE

The 2022–2023 academic year was my twelfth year of teaching at Baylor. I had the privilege of team-teaching, with Dr. Jamey Fulton, *Biogeochemistry* (GEO 4322) to a talented group of new graduate students. I always learn something new when team teaching, but especially so with Dr. Fulton as we have complementary expertise in terrestrial and marine processes. In the spring, the *Grant Writing* course was full, with 10 graduate students, all from the department of geosciences. The thesis and dissertation research being proposed by our students is getting stronger each year. In the spirit of strengthening doctoral programs and resources, I have just completed my first year of service as a part-time, associate dean with the Baylor Graduate school. The work is focused on developing and growing resources for graduate students the sciences, mathematics, and engineering. The first year has been a year of learning and growing. With any luck, next year will be more productive.

RESEARCH

This summer I traveled with doctoral students Vino Sivapalan and Manyiel Mel to the Santa Fe National Forest in New Mexico (Photo 1), where the Hermit Peak and Calf Canyon wildfires devastated 341,735 acres of forest in the summer of 2022. Vino will use the approximately 200 samples we collected to test/validate a new geochemical proxy for wildfire intensity/severity. The goal is to develop tools for reconstructing fire severity in the geological record. This fall, our research group will welcome a new graduate student, Meredith Johnson, from Texas A&M University. Meredith will dive right into a collaborative research project funded by National Science Foundation (NSF) and National Ecological Observatory Network (NEON) with the goal of develop functional models of soil organic matter at continental scale.

STUDENT ACCOMPLISHMENTS

Zhao Wang and Burke Leonce both defended outstanding dissertations this year (Photos 2 and 3). Burke's dissertation won the Outstanding Dissertation Award from the Baylor Graduate School. Burke submitted the final chapter of his dissertation examining the photochemical reactivity of dissolved organic matter to the journal, *Environmental Science & Technology*. Burke started this summer as a postdoctoral research scientist and lecturer at Texas Christian University (TCU). Zhao Wang will publish the second chapter of her dissertation in the journal *Organic Geochemistry*. Zhao will start a postdoc position at University of Connecticut (UConn) this fall to continue her work on molecular and isotopic analyses of leaf lipids. First year doctoral student Manyiel Mel picked up an ongoing project on the adsorption of perfluorinated contaminants (PFAS) in paper mill wastewater and has leveraged it into a year of research sponsorship by the paper industry consortium, National Council for Air and Stream

Improvement (NCASI). Manyiel will present his research results this fall at the NCASI meeting in Atlanta, and the American Chemical Society (ACS) national meeting. Vino Sivapalan presented his wildfire proxy research at the national meetings of the American Geophysical Union (AGU) and the Ecological Society of America (ESA). Earlier this year, first year student, Jordan Chapman had the honor of earning a 2022 Jackson Wild Media Lab fellowship for which he participated an immersive science film making workshop that brought scientists and media professionals to Austria ten days of hands-on training.

ALUMNI NEWS

I am proud of the many successes of our current and former students, and it is impossible to list them all here. Some of our Alumni have some big news to share, that I will list here. Dr. Todd Longbottom (PhD, 2017) became a father for the first time with the birth of his son, Jesse in February. After 4 years in the environmental consulting industry, Owen Craven (MS, 2018) has moved to the US Environmental Protection Agency (EPA) Region 6 office in Dallas. Creighton Meyers (BS, 2014) recently published in the journal *Geomorphology*, work on river bedload sheets that he performed during MS thesis research UT, San Antonio. Creighton is currently writing a PhD dissertation at Texas A&M, even while serving full-time as a physical scientist with US Naval Research Lab in Biloxi, Mississippi. Please follow and stay in touch with us at https://sites.baylor.edu/william_hockaday/

HOCKADAY FAMILY NEWS

The Hockaday children, Abby and Will, begin the fifth and third grades this fall in Robinson. They are both involved in academy soccer, which means we spend our weekends in fall and spring, driving to Dallas for matches. With "little dribblers" basketball occupying the winter, there is no off-season Hockaday taxi service. We still try to enjoy as much family time as possible between practices and games. The big family adventure we began this year was the purchase of a retired 75-acre ranch on Hog Creek near Clifton, TX (photo 4). We have already created so many memories there and can't wait for some cooler fall weather.

RECENT PUBLICATIONS

David W. Yeates, William C. Hockaday, Stacy C. Atchley, Elizabeth G. Rau, Anna M. Thorson, Duvernay maturity trends and identification of the Willesden-Green Maturity High, *Marine and Petroleum Geology*, September 6, 2022, 1205894. DOI: 10.1016/j.marpetgeo.2022.105894

Burke C. Leonce, Structure-Reactivity Mechanisms of Organic Mater Sorption and Photochemical Transformation in Aqueous Environments, PhD Dissertation. May 2023

Zhao Wang, Leaf-Level Molecular Markers of Temperature, Light, and Water Stress, PhD Dissertation. August 2023.

STUDENT PAPERS SUBMITTED

Burke C. Leonce, William C. Hockaday, Jose Chavez, Zygmunt Gryczynski, Omar Harvey, Component-Specific Photobleaching controls Mineral Preservation of Pyrogenic Dissolved Organic Matter, *Environmental Science & Technology* (submitted)

Zhao Wang, Joseph D. White, William C. Hockaday, The molecular composition of leaf lipids changes with seasonal gradients in temperature and light among deciduous and evergreen trees in a sub-humid ecosystem. *Organic Geochemistry* (submitted)



1. Vino Sivapalan (left) and Manyiel Mel (right) in Santa Fe National Forest, New Mexico, during field work at sites of the Hermit peak – Calf Canyon wildfires. 2. Wildfire research in Santa Fe National Forest 3. Dr. Zhao Wang, PhD, at Summer Commencement



DR. PETER JAMES

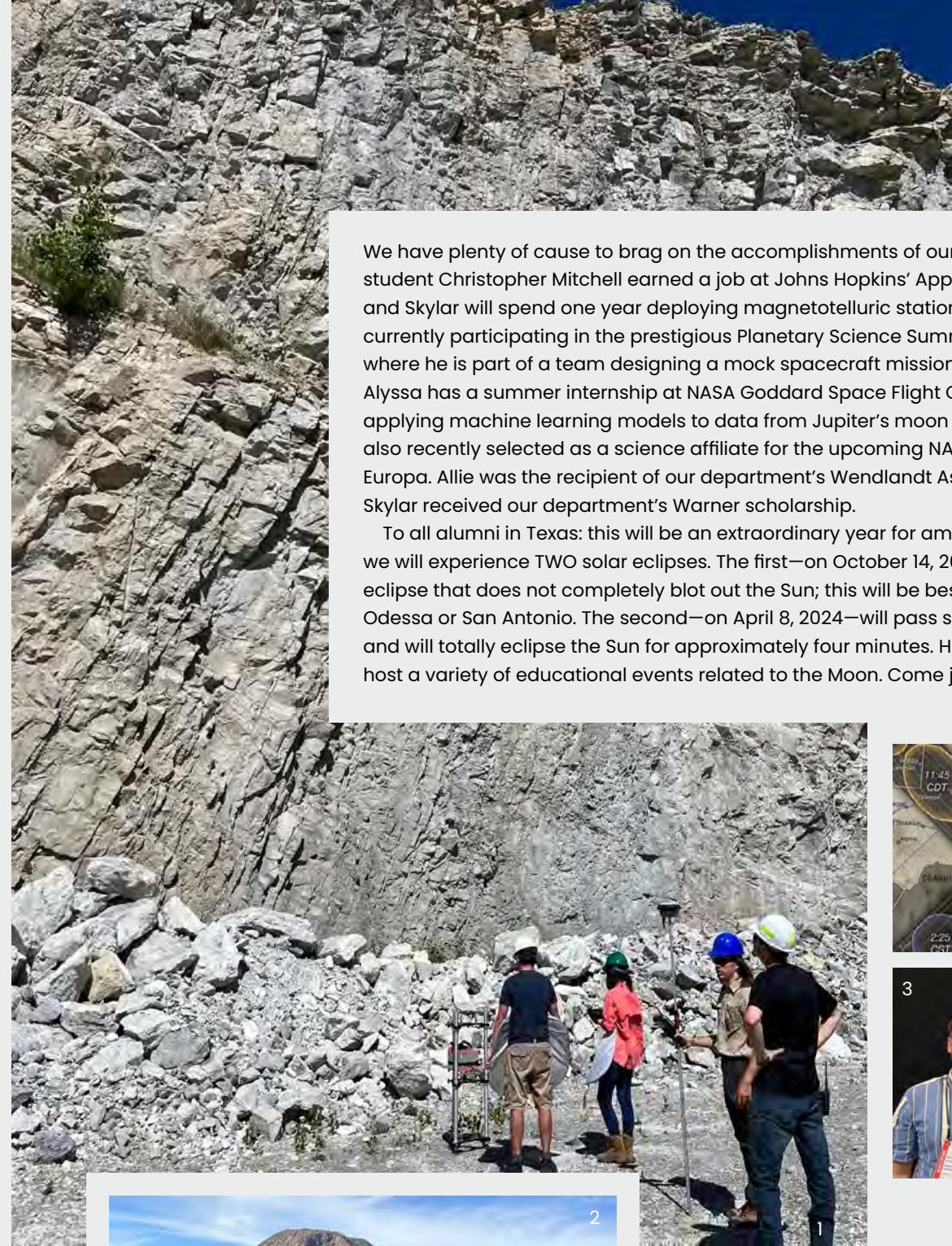
ASSISTANT PROFESSOR OF GEOPHYSICS & PLANETARY SCIENCE

If there were one theme for the happenings in the Planetary Research Group (PRG) this year, it would be an expansion of multi-disciplinary collaborations. In conjunction with SEG's newly created Planetary Exploration Task Force, Dr. James gave an invited presentation at the joint SEG/AAPG IMAGE conference last fall on the topic of applied geophysics on the Moon. Dr. James was also invited to organize a planetary science section at this year's GAGE/SAGE meeting in Pasadena. While SEG, AAPG, GAGE, and SAGE have historically focused on Earth, the task force and conferences seem to signal that these organizations are increasingly plying their trade beyond Earth. As this becomes a reality, Baylor will be well positioned to build bridges from Earth to the planets.

The PRG has also been working to strengthen local inter-departmental ties. Dr. Jeff Lee—a Ph.D. student in Geosciences—is collaborating with Lorin Matthews and others at CASPER to develop new computationally efficient

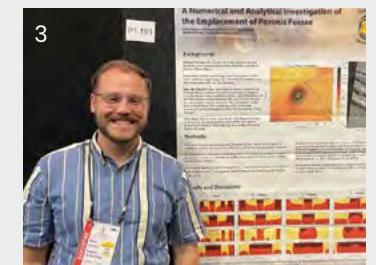
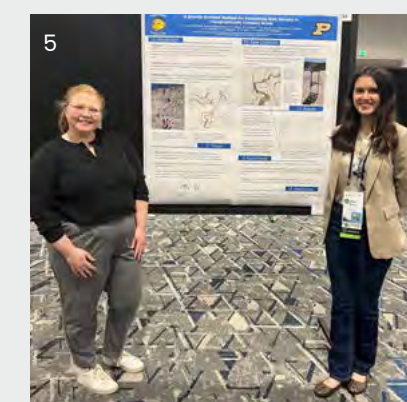
simulations of the Moon-forming impact. Dr. Don Hood—a postdoctoral researcher in our group—has leveraged a \$290,000 grant from NASA to collaborate with the Aeolian Lab at Texas A&M for the goal of understanding the behavior of ice-rich landscapes on Mars. Dr. James recently co-submitted a provisional patent with the Yokochi lab in the department of Mechanical Engineering for a novel geophysical sensor, and is collaborating with newly-hired Drs. Allison and Jordon in Materials Engineering toward the goal of developing ISRU applications for lunar regolith.

Various students in the PRG have shared their research at academic meetings this year. Ph.D. student Nick Wagner presented about stress at magma ascent under volcanic edifices on Mars at the meeting of the International Association of Volcanology and Chemistry of the Earth in New Zealand. Several students presented at the Lunar and Planetary Science Conference in The Woodlands, including Jeff, Nick, Alyssa Mills, Katie Broad, Allie North, and Skylar Hoover. Jeff Lee shared about bolide trajectories in atmospheres; Nick shared about the response of Mars' solid interior to seasonal ice loads; Alyssa shared about chaos terrains on Europa; Allie presented preliminary results of NASA-funded work on lunar silicic volcanism; finally, Katie and Skylar presented results from a month-long geophysical survey at the Kentland Crater in Indiana. Undergraduate Bradley King also made an excellent presentation at Baylor about a possible crater in Louisiana; this presentation was the culmination of a research course supervised by Dr. Don Hood.



We have plenty of cause to brag on the accomplishments of our students. Former M.S. student Christopher Mitchell earned a job at Johns Hopkins' Applied Physics Laboratory, and Skylar will spend one year deploying magnetotelluric stations for USArray. Nick is currently participating in the prestigious Planetary Science Summer School at NASA JPL, where he is part of a team designing a mock spacecraft mission to the planet Titan. Alyssa has a summer internship at NASA Goddard Space Flight Center, where she is applying machine learning models to data from Jupiter's moon Europa. Alyssa was also recently selected as a science affiliate for the upcoming NASA Flagship mission to Europa. Allie was the recipient of our department's Wendlandt Assistantship award, and Skylar received our department's Warner scholarship.

To all alumni in Texas: this will be an extraordinary year for amateur astronomy in that we will experience TWO solar eclipses. The first—on October 14, 2023—will be an annular eclipse that does not completely blot out the Sun; this will be best viewed from Midland, Odessa or San Antonio. The second—on April 8, 2024—will pass straight through Waco and will totally eclipse the Sun for approximately four minutes. Here on campus, we will host a variety of educational events related to the Moon. Come join us if you are able!



1. Dr. James, Skylar Hoover, and Ben Sadler making gravity gradient measurements at a quarry inside the Kentland Crater. 2. Skylar, Emanuel, Nick, Ben, Alyssa, Allie, and Katie on the Volcanology class trip to Big Bend. 3. Nick Wagner presenting at IAVCEI in New Zealand. 4. Katie and Skylar presenting a poster at the Lunar and Planetary Science Conference. 5. Texas will experience both the annular eclipse in 2023 and the total eclipse in 2024. Credit: NASA/Scientific Visualization Studio/ Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center



DR. DAN PEPPE

ASSOCIATE PROFESSOR OF PALEOCLIMATE

This past year was a fun and successful year for my research group. I've continued my research on reconstructing terrestrial ecosystems in the Paleocene and Neogene. I continue to work on several projects including on early Miocene and Plio-Pleistocene environments in eastern Africa, on early Paleocene ecosystems in the San Juan Basin in New Mexico, and on developing and refining fossil leaf-based proxies for reconstructing climate and ecology in the past.

Excitingly, my collaborators and I published tandem papers in the journal *Science* on one of the major research projects I have been working on for more than a decade. Briefly, the results of our work showed three major things. First, we documented occurrence of C₄ plants, which are typically tropical and warm season grasses, in Africa in the early Miocene as far back as 21 million years ago. These findings pushed back the earliest occurrence of C₄ plants in Africa by more

than 10 million years! Second, we documented a wide diversity of habitats, ranging from closed canopy forests to wooded grasslands in the early Miocene. Importantly, this changes the prevailing paradigm that tropical Africa was a continuous forest until 10 million years ago. Third, we documented the occurrence of early apes in all the reconstructed habitats. Importantly, we were able to make a high-resolution reconstruction of the habitat of the early ape, *Morotopithecus*. We found that *Morotopithecus* lived in an open woodland environment with grassy areas, and that it primarily ate leaves and not fruit. This suggests that the anatomical adaptations of early apes were not for eating fruit in forests, but instead for climbing up and down trees and out the edge of branches to eat leaves. This new idea for the evolution of early apes is completely new and will cause a major rethinking about the evolution of our ancestors! We summarized the results of our work in a short piece for [The Conversation](#) which provides some additional details of our work. In addition to these publications, there were lots of great things happening in my lab. Jie Geng and Des



Thorne completed their Masters, and postdoctoral researcher, Sifan Koriche, and PhD students Kahsay Nugsse Tesfay and Venanzio Munyaka continued to make great progress on their research.

Jie Geng did his MS thesis research focused on reconstructing light environments and CO₂ of the early Paleocene in the San Juan Basin using fossil leaves. He was focused on looking at the features of cell preserved in fossil leaf cuticle. His results are really interesting, and we are hoping to turn his work into a publication that combines his data with some generated by my former PhD student Joe Milligan during his dissertation. Greg defended his thesis in the early summer and graduated in August.

Des Thorne's MS research focused on modern and fossil sycamores. Des measured a variety of size and shape characteristics, as well as geochemical and molecular characters of modern sycamores grown under different light conditions. She then used that information to develop a proxy for light environments and applied it to fossil leaves from the San Juan Basin. Des's work opens exciting new avenues for reconstructing light environments in the past. She graduated in May.

Venanzio Munyaka is a PhD student who is working on early Miocene floras and paleoenvironments in eastern Africa. This summer, he conducted fieldwork in Kenya and collected an early Miocene flora from an important fossils site called Koru. He then spent time at the National Museum of Kenya (NMK) in Nairobi working to describe, photograph, and identify the fossil leaves. He's presenting some of his results at GSA this fall. He also collected sediment samples to analyze for phytoliths, which are microscopic silica bodies created by plant cells that are preserved in paleosols, from early and middle Miocene sites in northern Kenya west of Lake Turkana. He spent time at the NMK processing the samples and photographing phytoliths that he found. He'll be bringing those samples back for continued analyses.

Kahsay Nugsse Tesfay is a PhD student who is working on the magnetostratigraphy of the Gona Paleoanthropological Research area in the Afar Rift of Ethiopia and on understanding rift block rotation in the Ethiopian Rift System. Over the last year, he measured and analyzed many samples and has some great results that have important implication for our understanding of the age of early hominin fossils. He presented the results of this work at AGU in 2022 and we are working on publishing the results. We also conducted fieldwork in Ethiopia in summer 2023 and Kahsay brought back a huge number of samples from multiple rift blocks near the triple junction between the Main Ethiopian Rift System, the Gulf of Aden Rift, and the Red Sea Rift. He'll be spending lots of time in the lab in 2023-2024!

Sifan Koriche has been working on developing a water budget model for Lake Victoria and trying to understand the drivers of lake level change in Lake Victoria. He's working on a manuscript on his work and will be leading a session at AGU focused on the relationship between climate and lakes.

I was on sabbatical in 2023 and spent a fair amount of time doing much needed maintenance and modernizing in my paleomag lab and worked on completing the analyses on several studies that I've been working on for far too long! It was a very productive semester and nice to have time to focus exclusively on research.

In summer 2023, I spent a good chunk of the summer in eastern Africa. I conducted fieldwork on early Miocene sites in western Kenya, near Lake Victoria, and in northern Kenya, near Lake Turkana, and in several grabens in the Afar region in Ethiopia. The work was very productive, and we had some terrific fossil finds and some great geology. I'm looking forward to a great 2023-2024 year to come!



1. Field camp at Koru in western Kenya. 2. West Turkana field team (l to r): Dan Peppe, Bill Lukens, Susy Cote, Francis Mucheni, Joslyn Herald, Josie Hutt, Venanzio Munyaka. 3. Vertebrate fossil hunting at Kapurtay, western Kenya. 4. Early Miocene fossil leaves from Koru, Kenya. 5. 17 million year old mud cracks from the Naserte Formation, northern Kenya (left). Modern mud cracks in the Naserte Laga, northern Kenya (right).



DR. ELIZABETH PETSIOS

ASSISTANT PROFESSOR OF PALEONTOLOGY

This last academic year has been packed with travel for both me and my students. International conferences and workshops are picking up where they left off now that overseas travel restrictions have been mostly lifted. We started off the academic year by attending the 6th International Paleontological Congress in Khon Kaen, Thailand. My graduate student Nathan Wright gave a talk on his work on 3D tomography of parasitized fossil and living crustaceans. I gave a talk on the prevalence of spine-infesting parasite snails on sea urchin populations in the tropics. While in Thailand, we were able to visit a dinosaur dig site, visit the ruins of a Khmer Empire temple, and celebrate the Thai Lantern Festival, Loi Krathong, at the University of Kohn Kaen.

Next, we packed our bags for Panama. My student Jerrad Watts, myself, and a team of researchers, faculty, postdocs, and graduate students from all over the world embarked on a 10-day journey on the sailboat *Sail la Vie*. We started in Panama City, made our way up to Colón, and boarded. We then sailed out through the mouth of the Panama Canal towards our final destination at Bocas del Toro. Along the way, we anchored every couple of kilometers to take ecological samples via snorkeling and scuba diving. The purpose of the trip was to sample the seafloor invertebrate communities along a transect of high to low anthropogenic impact, to measure the health of these Caribbean ecosystems. We returned to Panama City a few months later to process the samples we had collected on the boat at the facilities of the Smithsonian Tropical Research Institute.

I was invited to participate in a collaborative workshop for the PaleoSynthesis Project's BITE subgroup. The BITE group (Biotic Interactions in deep Time) was tasked with building a comprehensive open-access online database of data on biotic interactions in the fossil record.



I joined paleontologists from around the world in a week-long workshop at the University of Erlangen-Nuremberg in Germany to work on this database. We successfully designed a database that will be implemented in the coming months and would be accessible to paleontologists around the world.

In terms of my classes, the Invertebrate Paleontology class was enrolled to capacity this year, with both Geology and Biology majors. Nathan Wright and Stephanie White successfully proposed their PhD dissertations and are now PhD candidates. Jerrad started making progress towards his project on exploring the evolution on spine shape in sea urchins. Undergraduate Victoria Holman is wrapping up the data collection on her mollusk predation project and has started writing her undergraduate research thesis. She will also be presenting her work as a poster at the Geological Society of America national meeting in Pittsburgh, PA. Leo Maduro-Salvarrey will be starting as an M.S. student in the Fall and will be working on Late Paleozoic invertebrate fossils from Texas. Overall, this was a great year for both research, travel, and teaching.



1. Loi Krathong Festival in Khon Kaen, Thailand 2. The Sail de Vie in Shelter Bay, Colón. 3. Group photo on the last day of the boat expedition, in Bocas del Toro. 4. Crest of the Paleontology Department at the University of Erlangen-Nuremberg.



DR. JAY PULLIAM

W.M. KECK FOUNDATION PROFESSOR OF GEOPHYSICS
& GRADUATE PROGRAM DIRECTOR

Two students from the seismology group received their M.S. degrees in December 2022: Aicha Coulibaly and Brady Spears. Brady, who is now working at the Los Alamos National Lab, used the data our group recorded at the Monahans sand dunes, in west Texas, to write a thesis concerning the joint modeling of Horizontal-to-Vertical Spectral Ratios (HVSZ) and surface wave dispersion measurements. Aicha performed travel time tomography for Texas and Oklahoma using data from the EarthScope project and the more recent TexNet seismic network. She is now working with Geosyntec Consultants in The Woodlands. Hannah Mejia received an M.A. degree in May 2023. She is working as a data scientist in the Dallas-Ft. Worth area.

Debajeet Barman, Brady Spears, and Ben Sadler presented research results at the 2023 Fall meeting of the American Geophysical Union in Chicago and Debajeet and

Ben also attended and presented their research at the annual meeting of the Seismological Society of America. Debajeet was also awarded a \$2000 fellowship by the Fort Worth Geological Society in recognition of his research achievements, which are indeed impressive. He has devised and implemented several techniques for using ambient noise (continuous recordings of ground motion) to produce crustal models of the entire southern United States, from the Texas-New Mexico border to the coast of Georgia. His project involves manipulating and cross-correlation tens of terabytes of data, so he has had to devise efficient strategies for bookkeeping and programming of GPUs to arrive at tractable algorithms.

The Seismological Society meeting was especially enjoyable since many of us are studying the structure, tectonics, and seismic hazard of the northern Caribbean. On the plane ride home I looked

down at many of the seismic station we installed there in 2003 and 2013-14. The latter set is still in place and is sending data in real time to our lab at Baylor.

PhD students Yashwant Soni, Nnamdi Ajah, and Sandra Rosero Ruedo were joined this year by new M.S. student Luis Munoz Santos, from the Dominican Republic. Luis is working on applications of machine learning to seismic network operations, particularly with respect to picking and locating earthquakes from continuous waveform data. Yashwant is working on Ambient Noise Interferometry, Nnamdi is working on Pn & Sn (seismic waves that arrive at distances of 150-1000 km) travel time tomography, and Sandra is working on travel time tomography using local and distant (teleseismic) waves.

Two postdoctoral fellows, Sachin Kumar and Mukesh Das, joined us this year in Waco. Both received their PhDs from the Indian Institute



1. Postdoc Mukesh Das, PhD student Ben Sadler, and Professor Jay Pulliam in front of Ben's poster at the 2023 annual meeting of the Seismological Society of America. This year the SSA meeting was held in San Juan, Puerto Rico. 2 Postdoctoral Scholars Mukesh Das (left) and Sachin Kumar. Mukesh and Sachin both received their PhDs from the Indian Institute of Technology/Indian School of Mines, where Baylor alumnus Mohit Agrawal (PhD 2015) is on the faculty and where Jay Pulliam taught in 2019 while on research leave from Baylor.

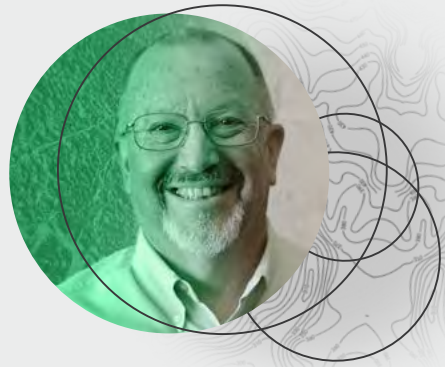
of Technology/Indian School of Mines and I met them when I was a visiting professor there in 2019. Sachin completed and published a paper on the crustal structure of the island of Hispaniola, which he deduced by modeling transverse receiver function gathers. He is now applying the same technique to data from Bangladesh in an effort to learn the nature and provenance of the crust beneath the Bengal Fan. The Bengal Fan, by the way, is the world's deepest pile of sediments and the Gulf of Mexico coast is the second deepest. Mukesh Das is applying a receiver function modeling technique that Ben Sadler developed during his dissertation research to broadband seismic data recorded on the GoM coast in Texas, Louisiana, Mississippi, Alabama, and the Florida panhandle. Ben published an excellent paper in the Journal of Geophysical Research this year

concerning this technique and its application to the Permian Basin region. Mukesh is finding similarly outstanding results in the broader Mississippi Embayment region.

Our collaboration with the National Center for Seismology, an organized research unit of the Autonomous University of Santo Domingo in the Dominican Republic, is again quite active. Two of my colleagues, Eugenio Polanco and Jottin Leonel, visited Baylor in April 2023 to launch a new research initiative in which we will create a more comprehensive earthquake catalog that includes a locally-calibrated local magnitude scale for the island of Hispaniola.

Lastly, I became Graduate Program Director for our department this year, taking over from Dan Peppe after his long and highly successful run. Working with Jamie Ruth, the Department's Graduate Program

Coordinator, has been delightful. Her experience, diligence, and attention to detail have helped me learn the job. One thing that has become clear to me through this one year in the GPD job, and through my service on the department's scholarship committee, is that the gifts and donations that alumni and friends make to the Department are critical to our success. Funds that can be used to plug gaps in student support and to provide enrichment in the form of training and travel to workshops and meetings are highly valued and are put to good use. Many generations of alumni and friends have made sure that we have such funds and I want to thank you for your generosity.



DR. JOE YELDERMAN

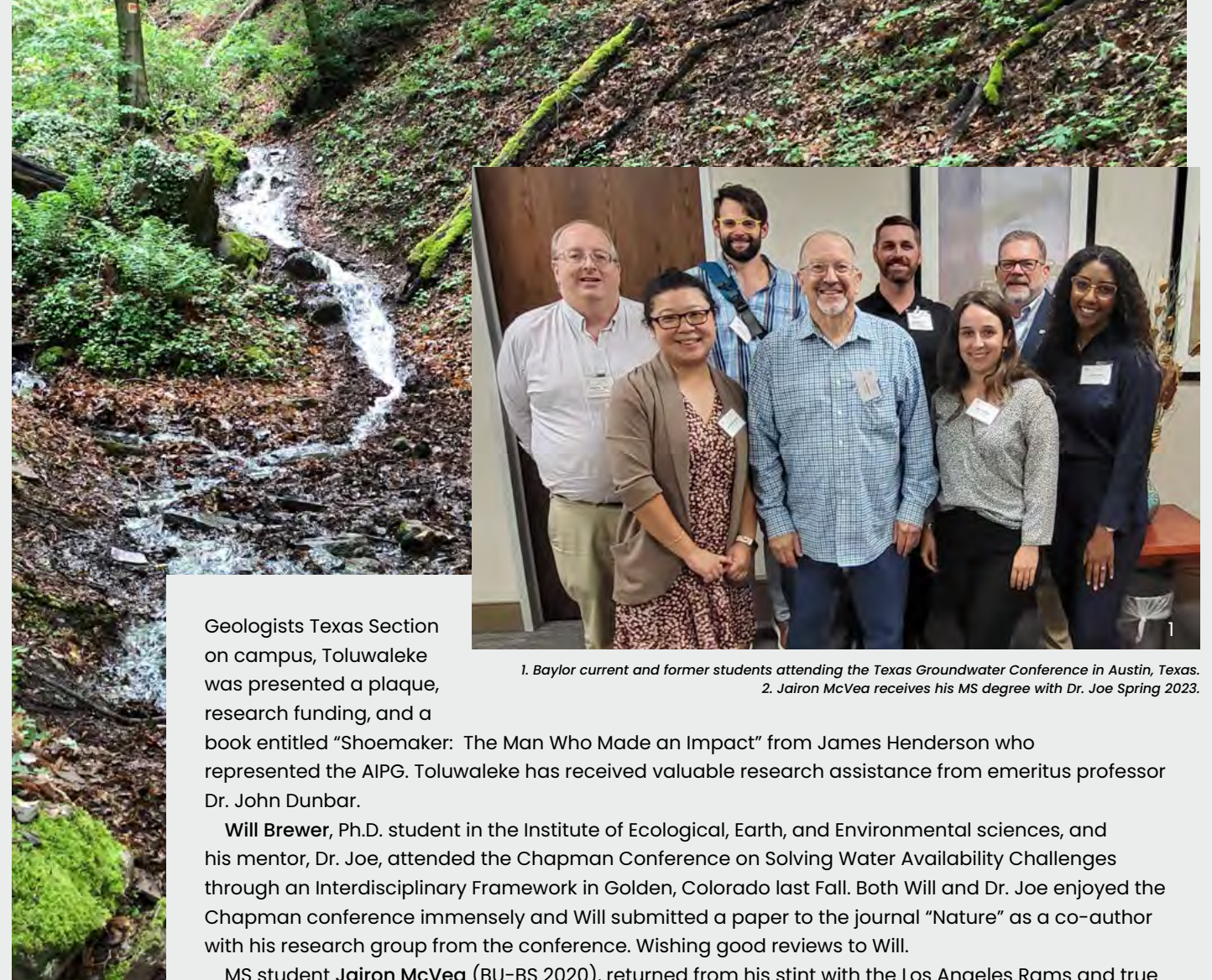
PROFESSOR OF HYDROGEOLOGY

Surface-water/groundwater interaction and data science are two of the hottest topics in current Texas groundwater discussions and the Yelderman hydrogeological group is deeply involved with both these research areas. The newest hydrogeology students are **Mark Nickels** and **Elena Muir**. Mark received his BS degree from Trinity University in San Antonio and for his MS thesis research at Baylor he will be working with the Brazos Valley Groundwater Conservation District in the Middle Segment of the Brazos River Alluvium Aquifer. Mark will be aided by **Vivian Yale** who will be studying the bedrock aquifers in the same area for her bachelor's thesis with a hydrogeoscience concentration for her Baylor Geosciences BS degree. Elena Muir joins Mark as a first-year MS student at Baylor and she will be investigating the impact of reservoirs on groundwater systems in Central Texas. Elena received her BS degree from Southern Methodist University in Dallas and will concentrate on two reservoirs: Lake Belton and Stillhouse Hollow Reservoir. Welcome Elena and Mark.



Second-year MS student **Rebekah Sowders** passed her proposal defense last year and is using data science to interpret the data dense water level patterns from the acoustic monitor-well system of the Southern Trinity Groundwater Conservation District where she works as an Intern. Rebekah was also the recipient of the Elan Alan Safety Scholarship from Baylor Geosciences this past year. This unique scholarship continues to encourage safety as a priority in Baylor Geosciences efforts.

Toluwaleke Ajayi ("A. J."), third-year PhD student, also passed his proposal defense this past year, and is making rapid progress on his research using geophysics to study karst springs providing critical habitat for the threatened Salado Salamander in Bell County. A.J. received funding from the Clearwater Underground Water Conservation District and several scholarships for his research including the Shoemaker Scholarship considered the most distinguished scholarship awarded by the American Institute of Professional Geologists, Texas section. During Baylor Geosciences' hosting of the Association of Environmental and Engineering



Geologists Texas Section on campus, Toluwaleke was presented a plaque, research funding, and a book entitled "Shoemaker: The Man Who Made an Impact" from James Henderson who represented the AIPG. Toluwaleke has received valuable research assistance from emeritus professor Dr. John Dunbar.

Will Brewer, Ph.D. student in the Institute of Ecological, Earth, and Environmental sciences, and his mentor, Dr. Joe, attended the Chapman Conference on Solving Water Availability Challenges through an Interdisciplinary Framework in Golden, Colorado last Fall. Both Will and Dr. Joe enjoyed the Chapman conference immensely and Will submitted a paper to the journal "Nature" as a co-author with his research group from the conference. Wishing good reviews to Will.

MS student **Jairon McVea** (BU-BS 2020), returned from his stint with the Los Angeles Rams and true to his word finished his MS degree with Dr. Joe (Figure 1) then took a job in Houston, Texas, with FUGRO, an international consulting firm. One of his first projects as a professional hydrogeologist involved sediment analysis related to anchoring offshore wind turbines on the Atlantic coast.

Dr. Joe attended the Texas Groundwater Conference in Austin sponsored by the American Groundwater Trust. It was an interesting conference and Dr. Joe enjoyed seeing current and former students making a difference by presenting research and moderating panel discussions (Figure 2).

FAMILY

Daughter Abigail and son-in-law Jared White live in Plano, Texas with granddaughter Kennedy (6 yrs.), grandson Hamilton (6th grade), and granddaughter Madison (8th Grade!). Son Cal, daughter-in-law Rachel, and granddaughters Elizabeth (6 yrs.) and Ada-Marie (4 yrs.), plus grandson Joe Calvin Yelderman IV (1yr.) live in Buda, Texas, where Cal is a product owner for Mitratesch. Son Logan is an Associate Professor of Psychology at Prairie View University. Logan and daughter-in-law Rachel Beth, grandson Bryce (9 yrs.), grandson Nolan (7 yrs.), grandson Beau (5 yrs.), and grandson Ty (3 yrs.) live near Brenham, Texas. Diane is enjoying retirement while helping on the home front babysitting grandchildren, staying active in Bible study with friends, and serving at Columbus Avenue Baptist Church with the internationals and food pantry ministries. Dr. Joe continues to serve as a deacon and Sunday School teacher with his loving wife of 48 years. The Yeldermans still live at 706 Woodland West, Woodway, Texas, and visitors are always welcome.

1. Baylor current and former students attending the Texas Groundwater Conference in Austin, Texas.
2. Jairon McVea receives his MS degree with Dr. Joe Spring 2023.



SHARON BROWNING

GEOLOGY FRESHMAN LABORATORY COORDINATOR

RETURN TO NORMAL?

We have remained aware of COVID-19 this past year but severe effects seem behind us. Alternative lab instruction remains available when necessary, but both students and TA's thrived with peer and instructor interaction in classes. Small lab sizes are planned for the foreseeable future after positive feedback from students and TA's. Only one summer course was taught online as part of Baylor's summer of enrichment.

I returned to the Earth Educator Rendezvous in July 2022, which was held in Minneapolis, MN. It was refreshing to see colleagues again after my brief hiatus in 2021, and the moderate temperatures of Minnesota were a respite from the Texas July heat.

I consider this the most valuable meeting I attend given it's focus on geoscience education; meeting with like minds to ensure excellence for our students.

Student recruitment efforts were increased in Summer 2022 with Wayne Hamilton and other faculty. We participated in two daily sessions during orientation, one focused on academic majors and one focused on campus connections. The academic session had less



Sic Em Science Day

traffic, but participants were more focused, while the campus connections session was more informal and led to better conversations. Department faculty were also available for visiting high school students throughout the year interested in geosciences. Best practices included the availability of course flyers for students/advisors, personal communication with students/parents, and maintaining relationships with advisors across campus.

I feel this past year saw a full return to our normal outreach activities which is also critical for future STEM students. The Central Texas Science and Engineering Fair was held virtually for a 2nd year in February 2022; this was my 2nd year to participate.

I also participated in a mineral camp with Upward Bound students from Region 12 this summer in conjunction with Judy York. Focus was on constructing models of crystal systems, mineral identification, and speaking to students about relevant STEM skills. October is typically our busiest month for outreach, coinciding with Earth Science Week. We participated in both Sic' Em Science at the Mayborn and the Fall Fossil Fest on October 15th and 22nd respectively, which are both consistent partners for outreach.

October 2022 also saw the Waco Civic Theater perform *Silent Sky*, a play about Henrietta Leavitt, an early 20th century astronomer who discovered the relationship between the period and luminosity of variable stars. Her discovery at a time when women were hired as "computers" but not given scientific credit. I was involved as a consultant in the play and held a star party at the Waco Wetlands for the cast and crew. I also had the opportunity to speak both with the Baylor Lariat and the theater's social media representative about my own experience as a female scientist.

WAYNE HAMILTON

PROGRAM CONSULTANT & LAB SAFETY COORDINATOR

TEACHING SUPPORT

I assisted Dr. Joe with his fall 2022 Hydrogeology and Water Management classes and then the spring 2023 Water Management class. The classes met twice a week and gave me interaction with the students to discuss and support Dr. Joe's teaching. When Dr. Joe had Chair duty class conflicts, I was able to substitute teach and keep the classes on schedule. My class support consisted of posting class information on Canvas, assisting with field labs, answering questions, and encouraging students. During the summer Dr. Joe and I worked on an electronic Water Management textbook that consisted of class lectures and field lab information. The electronic textbook was a trial to see if the online version would effectively supplement class lectures. In March 2023, our hydrogeology students and Dr. Joe attended the GSA South Central conference at Oklahoma State University. During the conference, I presented a presentation entitled: *Aquifer Assessment as a Method to Teach Hydrogeology at Baylor University, A Case Study*, with Joe Yelderian as coauthor.

GEOSCIENCE RECRUITING

During the summer I worked with Sharon Browning and Joe Yelderian with Baylor's New Student Orientation (NSO) program to make incoming students aware of the Geosciences degree program. The NSO outreach included a table with Geosciences classes, career, and faculty information. The lessons learned from the NSO led to a GSA National Conference presentation entitled: *Geosciences Undergraduate Recruiting Experience During New Student Orientation* with Sharon Browning, and Joe Yelderian. Other recruiting efforts included: exploring majors fair, providing Geosciences information during Distinguished Scholars Day, and showing the department to visiting high school students and their parents.

DEPARTMENT SUPPORT

I assisted the department with administrative tasks such as keeping the department vehicles running by helping with annual inspections, maintenance, repairs, and cleaning. The second activity is helping with Dr. Joe's lab safety requirements and general department safety support. The safety activities followed Baylor's BioRAFT online program, that includes annual lab reviews, monthly audits, student safety training, fire safety audits and proper waste disposal.

PERSONAL LIFE

We rented a house on the lake in Kingsland, Texas to have our annual family reunion with our children, grandchildren and three dogs. It was fun and somewhat chaotic vacation. Also, our daughter's family moved to Itasca to live on 15 acres and built a house that is only an hour from our home. Finally, our oldest son and wife purchased a house in Austin, which we helped them move into.

CLOSING

I'm thankful for Baylor giving me this opportunity to serve the department, where I've developed relationships with students, staff and faculty that have enriched my life. I'm looking forward to continuing to serve the Geosciences department with its mission to educate students.



1. Water Management Class
2. Jasmine, Wayne and Alix at GSA 2022 Denver
3. Water Management Class with Joe Yelderian
4. Joe, Jairon and Wayne at May 2023 Graduation



LILIANA MARIN

LAB MANAGER, GEOLUMINESCENCE DATING RESEARCH LAB

This has been a positive year for the Geoluminescence Dating Research Laboratory (BG Lab), a facility with resources and technology to generate chronologies, using Optically Stimulated Luminescence (OSL) approaches. This year we were involved with numerous projects in Quaternary sciences evaluating the timing and pace of climate change (drought and flood records), spatial and temporal variability in paleoseismicity, and assessing human-environmental interactions for the past 100 ka.

I have enjoyed working with PhD candidate Alix Fournier, master student Ashley Gonzalez, undergraduate students Bradley King and Trenton Meier from the Geoscience and Anthropology departments respectively. With the new graduate students, we have experimented with new techniques of TTOSL, IRSL, VIOSL and OSL and have attempted to characterize for dating a new mineralogy diopside. Later in 2022, Gabriela Velasco Fernandez, a new Laboratory Assistant joined the lab crew, and a postdoctoral research scientist, Dr. Sowmya Revanna, who joined the team with deep knowledge in Remote Sensing, computer science, and image interpretation.

Since the lab is continuously operational through the year, we process a volume of samples for OSL analysis, which generates resources that support expenditures for lab

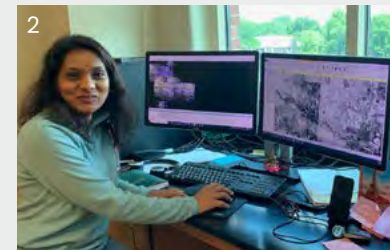
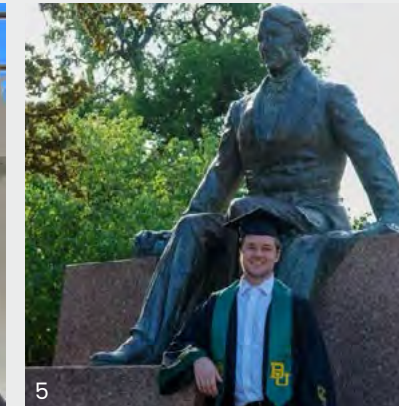
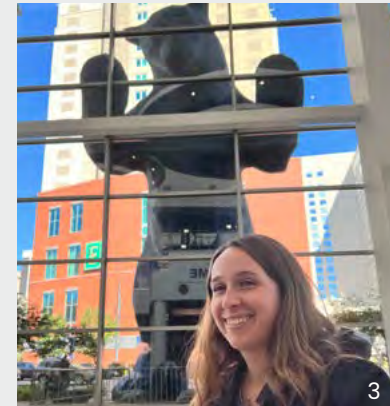
needs. Most important, these funds financed the stipends for graduate and undergraduate students, and salaries for the Laboratory assistant and the new post-doctoral researcher. The number of projects and flow of new samples to the lab were as abundant as that in 2021.

We advanced 35 collaborative research projects, preparing 212 samples for dating and calculated and interpreted the OSL ages to forward deeper understanding of Quaternary processes.

These projects informed grand challenges across the geosciences and paleoanthropology and these collaborative efforts with international colleagues, provide intellectual visibility for Baylor University. Academically, the people from the lab produced a professional video, explaining step by step the protocols used in the lab to prepare samples to date using OSL methods. This video coupled with the paper published by us in *the JoVE journal* on August 2, 2021 (DOI:10.3791/62706) titled "*Isolation of quartz grains for optically stimulated luminescence (OSL) dating of Quaternary sediments for paleoenvironmental research*", <https://www.jove.com/t/62706/isolation-quartz-grains-for-optically-stimulated-luminescence-osl>. We also participated with presentations in the GSA meeting in October. At the end of the year, we submitted for review the manuscript titled:

"Late Quaternary fluvial and aeolian depositional environments for the western Red River, Southern Great Plains, USA" which was recently published in *Quaternary Research*

Apart from the coordination of the lab, I participated in different activities in service to the department. I served as a mentor *Promoting Geoscience Research, Education and Success (PROGRESS)* for a Texas A&M student, I participated in the *Portal to the Public Training* at the Mayborn Museum. I volunteered in both GSA and AGU booths to promote the Geoscience Department at Baylor. As a coordinator of a research lab, I attended the Lab Safety Day summit in October, volunteering the lab for the recycling program. I matriculated in two classes: In spring, *Paleoclimatic and Monsoon* offered in the department during the spring semester, and in fall the online class *Designing Instruction for Virtual Engagement (DIVE)* taught by the Baylor Learning Design Team. In summer I taught the online version of the GEO1401-Earthquakes and other Natural Disasters. Finally, I volunteered to organize the Soils Lab used by for many groups in the department for sample preparation and lab classes.



1. LCME AGU: Liliana Marin, exhibitor at AGU. Geosciences Department-Baylor University Booth, Chicago, December 2022. 2. Dr. Sowmya Revanna, Postdoctoral visitor. Remote Sensing and GIS technics. 3. Alix Fournier Geoscience, PhD candidate, Expositor at GSA Denver. 4. Ashley Gonzalez Geosciences Master Student, Expositor at GSA Denver. 5. Gabriela Velasco-Fernandez, Geochronology Lab Assistant. 6. Trenton Meier, Undergraduate student. Graduated with a Bachelor in Anthropology and Minor in Geosciences, May 2023. 6. Bradley King Senior Undergraduate student Geosciences Department.

TIM MEREDITH

INSTRUMENTATION SPECIALIST & COMPUTER SYSTEMS ADMINISTRATOR, PALEOMAGNETISM & GEOPHYSICS LABS

My responsibilities focus on supporting faculty and students in the paleobotany and geophysics laboratories, providing administrative IT support, and maintaining the various field systems and equipment for both labs.

This year provided many opportunities for maintaining and upgrading systems in both the Paleobotany and Geophysics labs. The paleomagnetometer is a very specialized item that is the core of operations in paleobotany and requires constant attention to software updates and hardware adjustments. Additionally, we've started construction of a custom serial sampler to collect isotope samples from fossil mammoth teeth. This is quite a challenging project that should be complete and in use very soon.

In the geophysics lab we added several new computers to our internal network available for student's research. We are able to tailor these systems to provide unique software platforms based on the unique research requirements of each student. We also provide a display of seismic data in near-real time from several sensor emplacements in Dominican Republic, as well as other areas of the Caribbean. We've been able to streamline this data flow and increase network reliability by adding a dedicated server.

Paleobotany and Geophysics programs are challenging and dynamic environments that provide a great opportunity to support the efforts of our students, faculty, and staff.





GABRIELA VELASCO FERNANDEZ

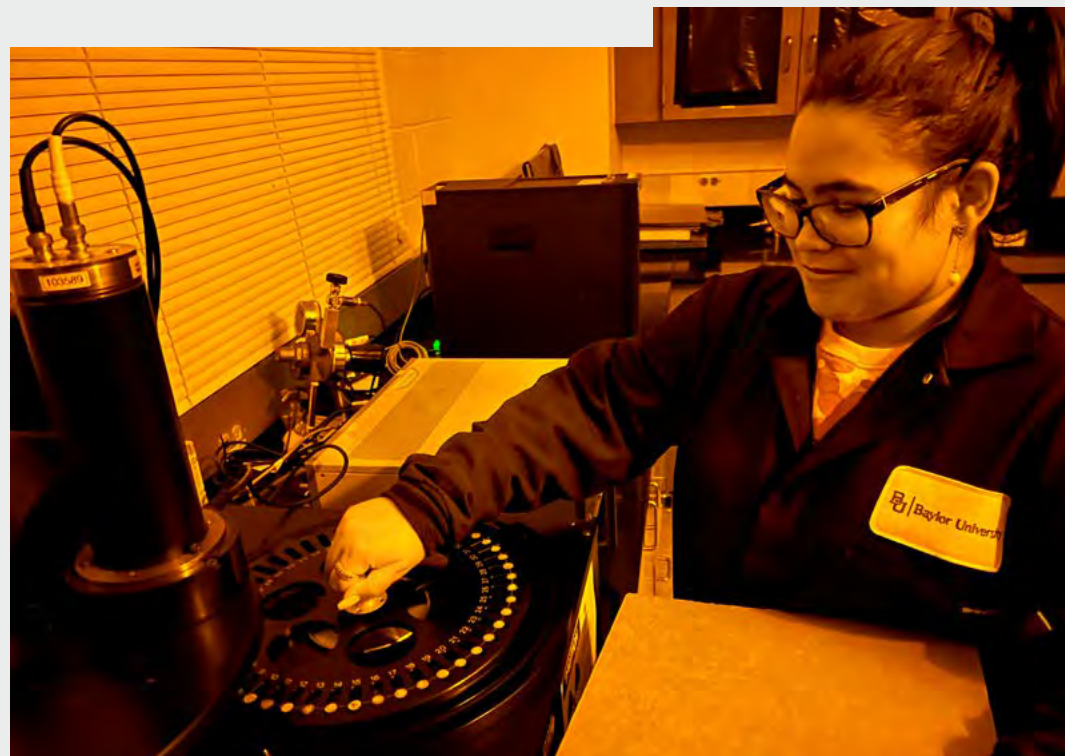
RESEARCH ASSOCIATE, GEOLUMINESCENCE DATING LAB

I have been a staff member of the Geoscience Department for the last 11 months; this is my first contribution to the departmental newsletter. I feel blessed to be part of this important group.

My academic background consists of two associate degrees in science and art respectively through McLennan Community College. A bachelor's in biology with a minor in Chemistry through Texas Tech University, and currently, I am pursuing my master's degree in Biopsychology at the Liberty University. Con-currently, I am working on my pre-requisites for Nursing Program at University of Texas at Arlington. I have had some work experience, most relevant was the previous occupation in Abbvie Pharmaceutical, which gave me some skills that can be applied in the lab environment.

Here at Baylor University, I work with Ms. Liliana Marin and Dr. Steve Forman in the Geoluminescence Dating Research Laboratory. I am in charge of the chemical process of the protocols to prepare samples for OSL dating techniques.

These 11 months have enriched my life learning new practices in the "dark lab", lab safety techniques, sampling of many different sedimentary environments, groupwork, time-management; I have a new circle of friends, and I have reached new perspective in life. Hopefully, I can continue graduate studies through Baylor in the future. I am looking forward to the new academic year and I hope I can serve properly Baylor University and the Geosciences Department that have welcome me so well.



DR. REN ZHANG

LAB MANAGER - STABLE ISOTOPE SPECTROMETRY LAB



Surprisingly, last year was a non-stop analyzing year for me as different samples never stopped coming in and quite often I had to use off-office hours or weekends to shorten waiting lines. To summarize, I have made 6,393 isotopic analyses for both internal and external academic users and have generated over \$32K in annual revenue—both become the newest records for this lab.

I didn't have too much to say about how to successfully maintain daily operations of the Stable Isotope Laboratory, and it is just a routine work. To make sure the analytical system is functioning well and is ready to analyze samples, I have to perform following tasks: 1) daily tuning/calibration/testing; 2) regular maintenance, such as changing pump oil once a year, baking out GC column twice a year, changing EA reactor packings after every 2000–3000 analyses, changing EA water trap packing after every 100–300 analyses, and so on; 3) inventory control, which ensures you have enough consumable parts or materials such as gas cylinders, references, ash removal inserts for continuous

operations (this can be achieved by either purchasing new ones or properly cleaning the used ones); 4) lab safety, which can prevent an accident or injury from happening in the lab; and 5) troubleshooting, which involves solving various operational problems and is very important for providing timely analytical services.

Because the current IRMS system is over 14 years old, inevitably something bad might happen. For example, I had problems with introducing reference gases into the system as the On/Off valves in Conflo IV and Gas Bench II didn't respond quickly. However, what bothered me the most in the past year was the computer software problem. The original IRMS operation software (Isodat 3.0) was based on Windows XP, which is now running on a relatively new desktop with Windows 8 operating system. It looks like that the Isodat 3.0 doesn't work very well on Windows 8 and can frequently cause application programs to stop working, especially when it switches to different configurations (i.e., EA → Gas Bench → EA).

As a result, I had to keep an eye on whole isotope acquisition process and couldn't let the system run samples overnight. In addition, I also experienced bad communications between the IRMS Isodat 3.0 and EA operating software, which never happened before. Sometimes operation problems (i.e., N₂ to CO₂ mass jump problems) were caused by changes in sample types and sizes (i.e., pure biological vs geological samples), and I just needed to adjust the acquisition method accordingly to solve the problem.

Finally, I would like to take this opportunity to thank all the people who have helped and supported me and this lab for the past year and look forward to working with you again in the coming year!

The Baylor Association for Women Geoscientists (BAWG) has a fruitful year focused of both public outreach and community building events, affording an opportunity for members to share their passion for the Geosciences while fostering relationships and developing public engagement skillsets. Last Fall, we took part in multiple community service outreach activities in Waco, including Mayborn Sic'Em Science, Waco Mammoth National Monument (WMNM) Fall Fossil Fest, the Girl Scout Star Party, and Silent Sky. In the Spring, members volunteered at the Girl Scouts STEM Fest and WMNM's Mammoths on the March events. We are ever grateful to Ms. Sharron Browning for her enthusiasm and guidance while helping BAWG better serve Waco and inspire future generations of women geoscientists.

Community-building events for BAWG members were often co-hosted with the Baylor Geological Society (BGS), as many of our core members overlap between the two organizations. Together, we hosted a pumpkin carving and movie night social where we enjoyed Halloween snacks while carving pumpkins together. In December, we held a potluck competition and bowling night. Both events proved to be successful community building events and supplied much needed fun during a busy semester. In January, our first co-hosted meeting of the semester included a talk from the Baylor Career Center staff regarding what services they freely offer to students, information on internships, job opportunities and prospects after graduation, resume writing tips, and more.

BAWG hosted a Peers in Science Communication panel featuring three Geosciences graduate students: Jordan Chapman, Ashley Gonzalez, and Will Brewer. The goal of this panel was to showcase the many talents of our students, learn Science Communication techniques, and hold an open discussion on better ways to communicate and share our research with a wide, curious audience, reaching well beyond academic journals and directly into the communities we serve. Jordan shared SciComm advice and taught us about the many tools and techniques he applies when podcasting and creating SciComm media, Ashley discussed connecting her WMNM research to the public and how to convey complex ideas to a broad audience, and Will shared his experiences participating in interdisciplinary research collaboration and bridging the gap between disciplines. We greatly enjoyed learning from our panelists and had a great discussion!

OUR 2022 - 2023 EXECUTIVE COMMITTEE INCLUDED:

- Jasmine Kidwell - President
- Alix Fournier - Vice President
- Ashley Gonzalez - Treasurer
- Victoria Holman - Secretary
- Megan Lever - Undergraduate Rep.
- Dr. Don Hood - Mentorship Chair
- Dr. Elizabeth Petsios - Faculty Advisor

BAYLOR ASSOCIATION FOR WOMEN GEOSCIENTISTS

BY: JASMINE KIDWELL, 2022 - 2023 BAWG PRESIDENT



We met throughout the year to plan events and stay up to date on BAWG business. BAWG Mentorship Chair, Dr. Don Hood, held weekly open mentorship hours for students seeking advice about graduate school, presenting at professional conferences, and pursuing a career in the Geosciences. We concluded the spring semester with BAWG officer elections for the 2023-2024 academic year.

The **2023 - 2024 EXECUTIVE COMMITTEE** will again be advised by Dr. Elizabeth Petsios and includes both undergraduate and graduate students:

- Victoria Holman - President
- Allie North - Vice President
- Ashley Gonzalez - Treasurer
- Emily McDonald - Secretary and Undergraduate Rep.
- Jasmine Kidwell - Mentorship Chair

We look forward to serving you next year!

DR. PEPPE'S PERSEVERANCE PAYS OFF

For the last ten years Dr. Daniel Peppe has conducted research with students, postdocs, and colleagues culminating in a pair of major articles in the journal *Science*. Dr. Peppe's work describes a paradigm-shifting discovery of the vegetation prevalent in prehistoric Africa during the Miocene epoch. Funding from the National Science Foundation supported Dr. Peppe's research in Kenya and Uganda. To learn more about Dr. Peppe and his research check out his personal page and the Baylor Geosciences web site. Congratulations Dr. Peppe.

Dr. Daniel Peppe in the field during his research discovery.



FALL 2023

NEW ALUMNI STATUS FOR TWO TERRIFIC TEACHERS



Baylor Geosciences will miss Dr. Kenneth "Kenny" Befus and Dr. Lyndsay DiPietro. Both have ventured away from the department to new positions but are nearby colleagues. Dr. Befus is now at the University of Texas - Bureau of Economic Geology and Lyndsay is part of the Baylor Anthropology Department. Dr. Befus is a stellar researcher, the face of R1 at Baylor, and an exceptional teacher/mentor. Lyndsay was one of Baylor Geosciences' most popular introductory teachers and a critical component of our capstone summer field course. We wish them the best in their new positions and hope they will stay connected to Baylor Geosciences.



BAYLOR GEOLOGICAL SOCIETY

The Baylor Geological Society (BGS) had an eventful year coordinating collaborative events with the Baylor Association for Women Geoscientists (BAWG), participating in community outreach, and fostering professional development. BGS and BAWG came together to host holiday-themed social events including a pumpkin carving event and a holiday bowling party- both of which were a blast! BGS also provided volunteers for hands-on demonstrations that promoted scientific engagement with the public at several community outreach events hosted by both the Waco Mammoth National Monument and the Central Texas Girl Scouts. Lastly, BGS partnered with the Baylor Career Center for a resume-building workshop to advance members' marketability for their future careers. BGS wrapped up the year with officer elections for the 2023-2024 academic year.

The 2023 – 2024 executive committee:

- Tyler Dowdy** – President
 - Venanzio Munyaka** – Vice President
 - Angelina Rodriguez** – Treasurer
 - Victoria Holman** – Secretary
 - Evan Cerna** – Historian
 - Jordan Walker** – AAPG Representative
 - Allie North** – Undergraduate Representative
- BGS graduate student member, Alix Fournier, conducting a stream flow demonstration at the Waco Mammoth National Monument Fall Fossil Fest held in October.*

FALL 2023

BAYLOR GEOSCIENCES HOSTS ASSOCIATION OF ENVIRONMENTAL AND ENGINEERING GEOLOGISTS (AEG) MEETING

The Texas Section of the Association of Environmental and Engineering Geologists (AEG) was hosted by Baylor Geosciences February 18, 2023. The focus of the meeting was paleontology of the Waco Mammoth Site. Three graduate students from Baylor Geosciences; Dava Butler (mentored by Dr. Dan Peppe), Maree Yard, (mentored by Dr. Steve Forman) and Ashley Gonzales, (mentored by Dr. Steve Forman) presented their research to approximately 40 AEG members from the Edwards Aquifer Authority, Texas Commission on Environmental Quality, Texas Board of Professional Geoscientists, Arcosa Industries, Gehrig Inc., University of Texas, and University of Texas at San Antonio. Dr. Lindsey Yann, Paleontologist for the National Park Service at the Waco Mammoth National Monument and Visiting Scholar in the Baylor Geosciences Department also presented and led a tour of the national monument.



Dr. Lindsey Yann showing jacketed specimens in the Carille Geosciences Research Building.
Dava Butler presenting her research at the Texas section winter meeting of AEG.



Members of BGS and BAWG coming together for a festive evening of bowling and potluck dishes in celebration of the holidays at BGS and BAWG's collaborative holiday party hosted in the SUB.



Dr. Lindsey Yann, National Park Service paleontologist for the Waco Mammoth National Monument and visiting scholar in the Baylor Geosciences Department, working with student interns in the Carlile Research Building. Dr. Yann contributes significantly to Baylor Geosciences sharing her paleontological expertise and mentoring students. Pictured below are three student interns who worked with Dr. Yann this past summer.

Jared Shiffert and Dr. Lindsey Yann using the Carlile Research Building facilities to study collections from the Waco Mammoth National Monument.

CARLILE RESEARCH BUILDING CONTRIBUTES TO NATIONAL PARK SERVICE RESEARCH AT THE WACO MAMMOTH NATIONAL MONUMENT.



Briana Salcido has an MS from the University of Texas – El Paso, Guillermo Roque is an undergraduate student from the University of California at Berkley and Jared Shiffert is a graduate student from Cambridge University. It is a wonderful experience to share ideas and experience with students from so many different places.

Guillermo Roque and Briana Salcido working on Mammoth site casts in the Carlile Research Building.

VICTORIA HOLMAN

PARTICIPATES IN THE PALEONTOLOGICAL SOCIETY STUDENT AMBASSADOR PROGRAM AT GSA

Victoria Holman, is not only the 2023 Robert T. Hill award recipient for Baylor Geosciences and the incoming president of the Baylor Association for Women Geoscientists but is also a recipient of the Paleontological Society Student Ambassador Program! Victoria received a \$1000 travel grant to the 2023 National meeting of the Geological Society of America, admission to the Paleontological Society banquet at the meeting, and a 1-year membership to the Paleontological Society to support her growth in paleontology.

As a Paleontological Society student ambassador, she will volunteer at the Paleontological Society booth during the meeting and use social media to communicate about her experience at the meeting. In addition, there will be opportunities to collaborate with the Paleontological Society Communications Committee. All of the student ambassadors will be announced at the Paleontology Society banquet. Victoria is mentored by Dr. Elizabeth Petsios. Congratulations to Victoria and Dr. Petsios. We look forward to the contributions they will both make to paleontology into the future!



GEOPROBE TRAINING SUPPORTS RESEARCH IN BAYLOR GEOSCIENCES

Doug Koehler from Geoprobe conducted a two-day training course for Baylor geoscientists on the application and safety of the Baylor Geosciences departmental Geoprobe rig. Five participants representing four professors and their research areas within Baylor Geosciences department participated. This was an appropriate course to maintain safety and to provide the ability to conduct important research effectively where core samples are necessary.



1. Will Brewer, Jasmine Kidwell, Alix Fournier, Josh Ford, and Dr. James Fulton participated in a Geoprobe training course held at Eastland Lakes.
2. Doug Koehler from Geoprobe instructs Josh Ford, Baylor Ph.D. student, on the proper use of the Geoprobe rig.

BAYLOR'S GEO GRADUATE PROGRAM 2022-23

JAY PULLIAM, SHARON BROWNING, AND JAMIE RUTH

Our graduate program is strong...and it's gaining in momentum. In the past year (June 1, 2022 to May 31, 2023) we awarded four PhD degrees, six M.S. degrees, and one M.A. degree. Our committees increasingly drew members from across the United States, allowing our students to obtain input from experts at the forefront of their specialties in addition to experts on the Baylor campus. Burke Leonce was awarded the Graduate School's Outstanding Dissertation Award in STEM (Science, Technology, Engineering, and Math) fields for 2023-24. This award is given by a committee of deans and graduate faculty to Baylor doctoral candidates who exhibit exceptional scholarship, research, and writing. Burke, a native of St. Lucia, is one of the international students who make up nearly 40% of our graduate student body. This number is a testament to our higher profile and greater esteem around the world.



Our graduate teaching assistants continue to post the highest evaluations in the STEM departments, with an average rating of 5.57 (out of 6.00) for the year. The average for all STEM departments is 5.12 but more than 20% of our lab sections reported perfect scores of 6.0! Our consistently high scores indicate that we are serving the undergraduates well and that our graduate students are talented teachers. Lab Coordinator Sharon Browning holds training sessions each year that set the GTAs up for success and the department recognizes the best teachers each year, which provides motivation for all the GTAs to do their best. This year, Kahsay Nugsse Tesfay, Toluwaleke Ajayi, and Sandra Rosero Rueda were nominated by the Graduate School for Outstanding Graduate Student Instructor awards following the Fall 2022 semester and Jeff Lee, Anna Lesko, and Manyiel Mel were nominated for the Spring 2023 semester.

Our graduate recruitment for the coming year was again highly successful. We issued nine offers and received seven acceptances: four for M.S. degrees and three for PhDs. Note that Baylor's Graduate School no longer provides stipends for M.S. students, so our program will now depend solely on gifts and endowments from friends and alumni, as well as external grants to our faculty.



STUDENT AWARDS



Baylor Geosciences Ph.D. student, **Toluwaleke Ajayi**, Receives Distinguished Scholarship from the American Institute of Professional Geologist. Congratulations to Geosciences Ph.D. candidate, Toluwaleke Ajayi, who was presented "the most distinguished scholarship awarded by the AIPG in Texas", the Shoemaker Scholarship. District representative, James Henderson, drove to Waco to personally present Toluwaleke with a check for \$2,500.00, a plaque memorializing Mr. Ajayi's award, and a book entitled "Shoemaker: The Man Who Made an Impact."

Toluwaleke is studying the hydrogeologic connections critical to protecting the "threatened" Salado Salamander in the Northern Segment of the Edwards Balcones Fault Zone Aquifer. He is using geophysics, dye tracing, and groundwater modeling techniques to help the Clearwater Underground Water Conservation District manage the aquifer for both people and salamanders. Toluwaleke is mentored by Dr. Joe C. Yelderman, Jr., professor of hydrogeology and currently Chair of the Baylor Geosciences Department.



Recent Ph.D. Graduate, **Dr. Burke Leonce**, Selected by the Baylor University Graduate School for the STEM Research Area Outstanding Dissertation Award for 2022-2023.

This award is given to Baylor doctoral candidates who exhibit exceptional scholarship, research, and writing. Nominees were recommended by their departments, and their work has been recognized as exceptional by the Graduate School and their committee of deans and graduate program directors.



Geosciences PhD Student, **Alyssa Mills**, Selected the Winner of the Dr. Steven G. Driese Outstanding Grant Proposal Award. The Spring 2023 Dr. Steven G. Driese Outstanding Grant Proposal Award winner is **Alyssa Mills** from the Department of Geosciences for her GEO 5222 research proposal entitled "*Piecing Together the Chaos Puzzle: An Evaluation of Seafloor Volcanism on Europa through Gravity Analyses*" with mentor Dr. Peter James. <https://www.baylor.edu/graduate/index.php?id=983809>



Angelina Rodriguez & Vivian Yale Represented the Geosciences Department at the spring 2023 College of Arts & Sciences Honors Convocation.

Victoria Holman – Robert T. Hill Award for Academic Excellence in Geology.

Alix Fournier & Rebekah Sowders – Elan Allen Field Safety Award

Nick Wagner – Outstanding Teaching Assistant Award

Toluwaleke Ajayi & Kahsay Tesfay – Honorees, Outstanding Teaching Assistant Award

GRADUATES

AUGUST, 2023

MASTER OF SCIENCE

JIE GENG

Reconstructing the early Paleocene light environments using fossil Platanites from the San Juan Basin, New Mexico, and its implications for stomatal pCO2 reconstructions

ADVISOR: DR. DANIEL PEPPE

EMANUEL GIOVANINI

Elastic thermobarometry on metapelites and igneous rocks across the crustal section of the Famatinian Arc, Argentina

ADVISOR: DR. KENNETH BEFUS

DOCTOR OF PHILOSOPHY

ZHAO WANG

Leaf-level molecular markers of temperature, light, and water stress

ADVISOR: DR. WILLIAM HOCKADAY



Jaiiron Mc Vea with Dr. Joe Yelderman

MAY, 2023

BACHELOR OF SCIENCE

MEGAN N. LEVER

ANGELINA N. RODRIGUEZ

MASTER OF ARTS IN EARTH SCIENCE

HANNAH MEJIA

MASTER OF SCIENCE

JAIRON MC VEA

Unstressed Groundwater Flow Paths in the Brazos Alluvium Aquifer with Implications for temporal Ranges in Groundwater to Surface Water Interactions

ADVISOR: DR. JOE YELDERMAN

DESIRAE THORNE

Using Sycamore Leaves to Reconstruct ancient Light Environments

ADVISOR: DR. DANIEL PEPPE

DOCTOR OF PHILOSOPHY

BURKE LEONCE

Structure-reactivity Mechanisms of Organic Matter Sorption and Photochemical Transformation in Aqueous Environments

ADVISOR: DR. WILLIAM C. HOCKADAY

REBECCA TAORMINA

Quaternary landscape evolution, pedology, and geoarchaeology in central Texas

ADVISOR: DR. LEE NORDT

DAVID (BART) YEATES

Identification of a thermal maturation high, revised maturity map, and production trends of the Late Devonian Duvernay Formation, Alberta, Canada

ADVISOR: DR. STACY ATCHLEY

DECEMBER, 2022

BACHELOR OF SCIENCE

GEORGE ALLEN

MASTER OF ARTS IN EARTH SCIENCE

WILLIAM A. BREWER

MASTER OF SCIENCE

AICHA COULIBALY

Seismic Tomography of the Former Southern Margin of Laurentia using Teleseismic P and Local Pg phases

ADVISOR: DR. JAY PULLIAM

BRADY SPEARS

Seismic Site Characterization via Joint Modeling of Horizontal-to-Vertical Spectral Ratios and Surface Wave Dispersion: Developing and Validating a Geophysical Tool for Deciphering Quaternary Stratigraphic Architecture of the Monahans Dune Field, West Texas

ADVISOR: DR. JAY PULLIAM



Dr. Bill Hockaday with Dr. Burke Leonce



Dr. Rebecca Taormina Childs with new daughter, Rowan Cassidy Childs, born on May 12, 2023.



Desirae Thorne with Dr. Dan Peppe

FAMILY CIRCLE

C.G. (BUD) TYNER (B.S., 1961 & M.S., 1964)

C.G. (Bud) Tyner is a semi-retired geoscientist has spent most of his career as an independent oil and gas prospecting geologist. Has written a book titled *A Changing Road: Waco to Acadiana To The Cretaceous* a sequel to his first book, *The Journey, Growing Up* in the 40s and 50s. He and his wife live in the northern suburbs of Houston, Texas.

A Changing Road begins with being awarded a four-year athletic scholarship to Baylor University, Waco, Texas, after winning the Texas State discus title as a high school senior in 1957. Challenges came from all directions, in the classroom, at track meets, on amazing geology department sponsored field trips and culminating with summer jobs handling dynamite on a seismograph crew in the alligator and lethal water moccasin infested marshes and swamps in the Cajun country of South Louisiana. And it all comes to a surprising ending, which proved to be forever life changing.

DAVID M. BOYLAN, PG (M.S., 1986)

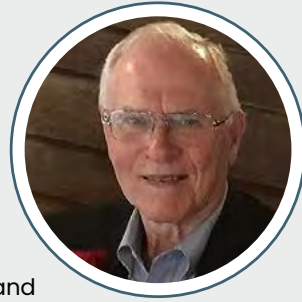
David retired as principal hydrogeologist of B&H Environmental Consulting, LLC, after 40 years of industrial and environmental consulting in the fields of civil engineering, land development and hydrogeologic investigations. He and His wife, Judi, reside in Pipe Creek, TX, with their children and grandchildren nearby.

DR. MATTHEW J. PRANTER (M.S., 1989)

It is my great pleasure to announce Dr. Matthew Pranter as the new incoming Director of the School of Geosciences effective July 1, 2023. In this role he will hold the Eberly Chair and remain on the faculty as Professor of Geosciences. Matt has earned the respect and admiration of his colleagues and peers during his 10 years of service at the University of Oklahoma and 12 years of service at the University of Colorado Boulder. In addition to Matt's academic background in both geology and geological engineering, he has experience as a geoscientist in industry in both research and operations. His current research is focused on petroleum geosciences, energy resources, reservoir characterization and modeling, and sedimentary geology. Matt greatly enjoys working with and advising students and teaches courses at both the undergraduate and graduate levels. Matt has been an active member of AAPG since 1986, is a member of the AAPG Executive Committee, and serves as Editor. Matt looks forward to representing the School of Geosciences and engaging with faculty, staff, students, and alumni. Please join me in congratulating Dr. Pranter on his new role. I am so excited to begin working with Matt as he leads the School of Geosciences in achieving its aspirations and realizing its mission.

Excerpt from announcement by:

John K. Antonio - Interim Dean and Lester A. Day Family Chair
University of Oklahoma | Mewbourne College of Earth and Energy



IN MEMORIAM

William J. Bechtel, Sr.
(B.S. 1959) who passed away on October 30, 2022.

Kenneth H. Brittain
(B.S. in Geology 1960 & M.S. in Education, 1975) who passed away on December 8, 2022

Steven L. Keyes
(B.S., 1976 & M.S., 1983) who passed away on September 22, 2022.

Clifford A. Walker
(M.S., 1973) who passed away on February 6, 2023

HUNTER HARLOW (BS, 2010)

From a single hat to an entire company, Baylor alum's company blossoms in Waco

When Hunter Harlow (BS '10) graduated from Baylor with a degree in geosciences/geology, he didn't imagine taking the road less traveled.

It all started with an idea to create a cooler hat for Big Bend National Park; Sendero Hat Co. created a fun design that included a topographic map inside the bill of the hat. Soon enough, they rebranded to Sendero Provisions Co. and went from packing up hundreds of boxes during their lunch break to hiring about 20 people full-time and operating their own warehousing, fulfillment and distribution. Today, the brand is international.

"It's wild. We're in a few stores in France, a few in the UK, Germany, Spain, and Japan," Harlow says. "Two years ago we sold our 100,000th hat, and now we're at our 300,000th. And the fun thing now is that it's not just hats. We've got an in-house fashion team, and often our question is, 'What else do we want in our closets?' Almost everything I wear now is Sendero."

Harlow credits a lot of business success to the STEM mindset he received at Baylor.

"It teaches you how to critically think, how to problem solve, pattern recognition, being a self-taught learner, and then being able to apply, especially geoscience," Harlow says. "It's the same thing I do with Sendero. I take all of these different aspects of business or running a fashion brand or e-com or wholesale or supply chain or design, production, sourcing, and then bring them all together to make a product."

Often, people are surprised these products are dreamt up in Waco, Texas.

"I feel like Texans have opinions on Waco, but if you're actually here, a part of the community, you know it's a special place," Harlow says. "Of course, Waco has grown since 2006, and being a Baylor

DR. JOSHUA BROWNLOW (PH.D., 2016)

Dr. Joshua Brownlow recently co-authored a publication demonstrating a method to treat produced water in an effort to reduce injected disposal volumes in the Permian Basin.

Dr. Brownlow studied with Dr. Joe C. Yelderman Jr. and the late Dr. Scott James while at Baylor and now works as Senior Staff Geologist, Strategic Planning and Field Development at Pioneer Natural Resources in their Subsurface Technology Division. The article was published in the Journal "Desalination" and is entitled, *Field demonstration of intensified membrane distillation for treating oil field produced waters for unconventional wells*.

It is great to see our alumni having success in their careers. Equally gratifying is seeing their contributions improving water management for the betterment of society.



grad, it was important to me to invest in the community here. It's where all of our friends, our church, and the family that we've made are."

Community is a big part of the Sendero brand. It's part of why, across the globe, people love their products.

"We're trying to build a lifestyle and a lifestyle brand; we know we're not cowboys, and we own that," Harlow says. "I'm hyper conscious about that, as I want to be super authentic and come with a sense of 'This is who we are and is representative of how we grew up, the culture that we experienced growing up and who we are now.'"

Harlow mentions an example — their cap that reads "Cowboy Hat" across the front — as a perfect example of creating their own brand. The hat is now viral, being seen on celebrities like Gwen Stefani, Justin Bieber and in *Teen Vogue*.

"It's amazing because everyone embraces it; everyone knows they can be a part of the brand," Harlow explains. "We're in Free People, Anthropologie, Urban Outfitters, Madewell, Cavender's, Atwoods, etc. — that's a wide range of audiences. Any and all are welcome."

Sendero Provisions Co. continues to create a lifestyle, and they're always inviting others to be a part of it, especially Baylor students looking for work experience. The group loves being involved with Baylor through internships, speaking at the business school, etc. "We hope to continue to be a part of the community and pour into it," Harlow says. "I wouldn't be here doing this in Waco without Baylor — I'm incredibly thankful." Sic 'em, Hunter and Sendero Provisions!

Article from Baylor Proud News

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One Bear Place #97354
Waco, TX 76798-7354

Change Service Requested

FACULTY

DR. STACY ATCHLEY
Professor

—

DR. STEVE DWORKIN
*Professor, Undergraduate
Program Director*

—

DR. STEVE FORMAN
Professor

—

DR. JAMES FULTON
Assistant Professor

—

DR. WILLIAM HOCKADAY
*Associate Professor,
Associate Dean for Research,
Graduate School*

—

DR. PETER JAMES
Assistant Professor

—

DR. LEE NORDT
*Dean, College of Arts & Sciences
& Professor*

—

DR. DANIEL PEPPE
Associate Professor

—

DR. ELIZABETH PETSIOS
Assistant Professor

DR. JAY PULLIAM
*W.M. Keck Foundation Professor
of Geophysics & Graduate
Program Director*

—

DR. JOE YELDERMAN
Department Chair & Professor

EMERITUS PROFESSORS

DR. PETER ALLEN

—

DR. RENA BONEM

—

DR. VINCENT CRONIN

—

DR. STEVEN G. DRIESE

—

DR. JOHN DUNBAR

—

DR. TOM GOFORTH

—

DR. DON GREENE

—

DR. DON PARKER

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SHARON BROWNING
Teaching Lab Coordinator

—

WAYNE HAMILTON
*Program Consultant, Laboratory
Safety Coordinator*

LILIANA MARIN
*Geoscience Instrumentation
Specialist, Luminescence
Geochronology Research*

—

TIM MEREDITH
*Instrumentation Specialist and
Computer Systems Administrator,
Paleomagnetism and Geophysics
Laboratories*

—

GABRIELA VELASCO-FERNANDEZ
*Research Associate,
Geoluminescence Dating Lab*

—

DR. LINDSEY YANN
Research Associate

—

DR. REN ZHANG
*Stable Isotope Mass Spectrometry
Technician*

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PAULETTE PENNEY
Office Manager

—

JANELLE ATCHLEY
Budget Coordinator

—

JAMIE RUTH
Graduate Program Coordinator