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DEAR ALUMNI AND FRIENDS OF THE BAYLOR DEPARTMENT OF GEO SCIENCES: THE PAST YEAR HAS SEEN A WHIRLWIND OF CHANGES IN THE DEPARTMENT, EXACERBATED BY THE UNANTICIPATED COVID-19 PANDEMIC CRISIS.

To begin with, in August of 2019 I accepted reappointment by the College as Interim Chair of Geosciences for two years after Dr. Stacy Atchley stepped down as Chair (and he had served two 3-year terms). This was the last year for Drs. Peter Allen and John Dunbar to serve as Geosciences Faculty and their retirement and separation are now effective from Baylor University. Also, in the fall I filed for my retirement to occur on May 31, 2022, along with my colleagues Drs. Vince Cronin and Don Greene. Consequently, in the span of 3 years the Department will have lost 5 Faculty lines to retirement. Ordinarily this would be a good thing in terms of providing opportunities for the Department to hire replacement Faculty to replenish the ranks, but circumstances described in what follows lead to great uncertainty as to whether this will happen.

In mid-March came the arrival of the coronavirus into Texas and COVID-19 cases, followed by the closure of Baylor University and of face-to-face (f-2-f) classroom instruction, as well as the reassignment of Faculty, Staff and students to primarily working at home; additionally, all current spring classes were required to be converted to on-line with an extra week after Spring Break provided for Faculty to make the conversion. The Geosciences Faculty rose to the
challenge, to the extent that when asked by the College to offer on-line instruction for the two summer sessions Geosciences was able to offer multiple freshman classes. An unfortunate COVID-19 casualty was the College’s cancellation of our Hydrology & Surface Processes Faculty search to replace Dr. Allen, after we had interviewed one candidate and had two scheduled for interviews during the University closure. The search had generated a rich and deep pool of applicants and cancellation represents a great disappointment for the search committee chaired by Dr. Joe Yelderman. Another casualty was Dr. Stacy Atchley's Graduate Advanced Field Sequence Stratigraphy course that he planned to teach in the field during the mini-semester, which had to be cancelled. Creating a summer on-line Field Geology Capstone course, which Field Camp Director Dr. Steve Dworkin, (assisted by Dr. Lyndsay DiPietro) developed, was perhaps the greatest challenge. Travel for field research and attendance at conferences was also prohibited during the latter part of the spring and during the summer.

The University reopened to on-campus students this fall, but with an instructional mix that is targeted as 1/3 on-line, 1/3 hybrid (mixture of online and f-2-f) and 1/3 in-class (f-2-f) instruction. This has necessitated having the Department think very carefully about what we teach, and where and when we teach. For classrooms with f-2-f instructional components the seating will only be at 25% classroom capacity to maintain social distancing requirements and wearing face masks are required. As you might imagine faculty and student research has also taken a hit, with research labs beginning to reopen. And it seems unlikely that there will be approval for either new or replacement Faculty positions next year. The depressed oil and gas market, also related to the COVID-19 pandemic, has created a bad ripple effect with our students not getting jobs or internships, and in some cases, having their offers rescinded.

I am optimistic that eventually we will return to more “normal” times when we are able to resume f-2-f teaching, geoscience field trips and research, and attending professional meetings and conferences again. I want to end this message on several positive notes. One highlight is the $2 million “anonymous” endowment established this past year in support of the Graduate program (primarily Masters) this past year. Graduate Program Director Dr.
Dan Peppe led us to a banner year in our Ph.D. student recruiting with a record number of applications as well as an incoming class of 8 students. Dr. Jay Pulliam received a prestigious Fulbright-Nehru Fellowship that allowed him to spend the entire fall semester conducting seismological research in India with his former student Dr. Mohit Agrawal. Dr. Steve Forman received the highly competitive Farouk el-Baz Award in Desert Research from the GSA Quaternary Geology and Geomorphology Division at the Fall GSA meeting. Congratulations are in order for Dr. Scott James, who was tenured and promoted to Associate Professor; congratulations are also extended to Assistant Professor Kenny Befus, who is currently being reviewed this fall for his candidacy for tenure and promotion, and Dr. Befus just received a highly competitive 5-year $530K NSF Career Award, the first in the Department! Tenure-track Assistant Professors Drs. James (Jamey) Fulton, Peter James and Elizabeth (Liz) Petsios all received an additional 1-year from Baylor University to their tenure clocks to compensate for their lost progress on research during COVID-19 and to help ensure their success in the future. There are also a couple of additional positive funding announcements: 1) Dr. Peter James’s ACS PRF proposal was funded a couple of days ago ($110K becomes available June 1), and 2) approximately $40K was received from Advantage Energy Resources of Calgary in support of Madison Hood’s M.S. thesis project through the APS program, which is a funding miracle given the recent collapse of the oil market – and even more of a miracle coming from Canada whose industry is in even worse shape than the U.S.!

I want to thank all the generous donors and supporters of the Baylor Geosciences Department this past year – without you we would have great difficulty weathering this time of budget uncertainty and severe restrictions on teaching, research, and travel. Please do not hesitate to contact me or Ms. Kelli Edmond in the Baylor University Development office if you have an idea for a gift or endowment. Finally, in the interests of budgetary restrictions and in the spirit of being good stewards of our financial resources, we have gone to digital only and not printed and mailed the newsletter this year.

Yours truly,

PROFESSOR AND INTERIM CHAIR OF GEOSCIENCES
HELLO TO MY FORMER STUDENTS, BAYLOR ALUMNI AND FORMER BAYLOR CLASSMATES. AS THE CORONAVIRUS HAS UPENDED ALL OUR LIVES, I THOUGHT I WOULD SIMILARLY UPEND MY TYPICAL NEWSLETTER ENTRY.

That is, my entry this year departs from my traditional discussion of what’s currently happening to myself and my current students, and instead, revisits shared experiences with my former classmates and students. To that end, I mined through past image files and located a number of keepers from bygone field courses…all the way back to 1983 when I was a fledgling undergraduate geology student with nothing but hopes and dreams of what the future held. Little did I know that my geologic future would include fieldtrips with a host of great students. So here’s to you all! Thanks for the memories!

PHOTO 1: Students of the Baylor Geology undergraduate summer field course class of 1983 taught by Drs. Peter Allen and O.T. Hayward. From left to right students include Bill Hardy, James Buice, Scott Harlan, Tracy Kreitz, Robert Hughes, Mike Hawthorne, Bryan Man, and Stacy Atchley. As I very vaguely recall, this photo was taken somewhere near Pocatello, Idaho.

PHOTO 2: Once again, members of the Baylor Geology undergraduate field course class of 1983 taught by Drs. Peter Allen and O.T. Hayward. In the background, the standard-issue Baylor Geology van and pickup. From left to right at the pickup are James Buice (driving), Scott Harlan (at passenger door) and Kaye Lynn Kemp. In the foreground from left to right are myself, Brenda Brooks, Tracy Kreitz, Bryan Man and Mike Hawthorne. Photo taken near Camp Verde, Arizona.
PHOTO 3: Baylor Geology Graduate Stratigraphy students from 1998. From left to right are Lucy (last name unfortunately escapes me), Chris Boyer, Patrice Chauvin and Chris Sembritzky. Photo taken while students were preparing our evening camp dinner at Last Chance Canyon, Guadalupe Mountains, Texas.

PHOTO 4: Baylor Geology Graduate Stratigraphy students from 2000. From left to right are Rob Forkner, Tom Boucher, Paige Clark and Shane Prochnow. Photo taken at Sitting Bull Falls within Last Chance Canyon, Guadalupe Mountains, Texas.

PHOTO 5: Baylor Geology Graduate Stratigraphy students from 2000. Standing in front of the tent from left to right are Tom Boucher, Shane Prochnow, Paige Clark and Rob Forkner. Photo taken at campsite on BLM land on unpaved road approaching the Needles District of Canyonlands National Park.

PHOTO 6: Baylor Geology Graduate Stratigraphy students from 2004. From left to right they include Carrie Wallestad, Jon Koenig and Julia Kahmann. Photo taken in Salt Flat graben with the classic view of the western escarpment of the Guadalupe Mountains, Texas in the background.
PHOTO 7: Baylor Geology Graduate Stratigraphy students from 2004. Jon Koenig is tending the stove and preparing the evening meal at our Last Chance Canyon, Guadalupe Mountains, Texas campsite, while Carrie Wallestad (background center) and Julia Kahmann (background right) look on.

PHOTO 8: Baylor Geology Graduate Stratigraphy students from 2006. This photo was taken while our group was trying to escape the Tularosa Basin, New Mexico which unknown to us had prohibited camping due to fire danger. We threw together a makeshift road-side dinner while trying to make our way to a yet-to-be-located small town hotel. From left to right students include Brian Bayliss, John Bongino, Mark Millard, Erika Josson and David Cleveland.

PHOTO 9: Baylor Geology Graduate Stratigraphy students from 2006. From left to right students include David Cleveland, Mark Millard, John Bongino and Brian Bayliss. Photo taken at the summit of Guadalupe Peak, Guadalupe Mountains National Park, Texas.

PHOTO 10: Baylor Geology Graduate Stratigraphy students from 2008. From left to right students include Stephen Clark, Steve Ahr, Jana Edwards, Stacy Atochley (instructor), Holly Meier, Chris Gotcher, Jason Mintz, Aislyn Trendell, Luke Hunt, Michael Zahler, Nate Ball, Gary Stinchcomb and Aaron Shunk. Photo taken at Horn Point located at the halfway point down Honaker Trail into the San Juan River Canyon, southeastern Utah.
PHOTO 11: Baylor Geology Graduate Stratigraphy students from 2010. From left to right students include Carrie Rockett, Ryan Dhillon, Scott Douglas, Ryan Lindsay, Stephen Secrest and Adam Damman. Photo taken at the roadside viewing pullout for the “Marfa Mystery Lights” near Marfa, Texas. As a side-note, the Marfa Lights result from an unknown “cryptic” phenomenon. Interestingly, Stephen Secrest and Adam Damman claimed to have a UFO sighting while observing the night sky several days later at our campsite at Honaker Trail, southeastern Utah. This sighting was debunked, however, by Yours Truly who discovered the UFOs were actually vehicle headlights along a distant highway.

PHOTO 12: Baylor Geology Graduate Stratigraphy students from 2012. From left to right students include Garrett Felda, Alex Van Plantinga, Stacy Atchley (instructor), Justin Von Bargen, Ken Boling, Kelly Jones, Kim Kuijper, Emily Beverly, and Amos Culbertson.

PHOTO 13: Baylor Geology Graduate Stratigraphy students from 2014. From left to right students on the front row include Josh Kirby, Adam Davis, Erin Idleman (kneeling), Bill Lukens, Caitlin Leslie (kneeling), Brian Crass, Kieron Prince and Kim Kuijper (TA). On the back row from left to right students include Josh Brownlow, Yohan Letourmy, Zack Valdez, Andrew Flynn, Hunter Harlow, and Tanner Mills. Photo taken at our Sacramento Mountains, New Mexico campsite near the Three River Petroglyphs.

PHOTO 14: Baylor Geology Graduate Stratigraphy students from 2014. Students clearly identifiable from left to right include Bill Lukens (green t shirt), Zack Valdez (red backpack), Josh Brownlow (visor, as usual), Josh Kirby (gray t shirt), Caitlin Leslie (blue cap), Yohan Letourmy (sleeveless blue shirt), Kim Kuijper (TA, white cap), Stacy Atchley (instructor), Kieron Prince (orange field book), Brian Crass (standing). Photo taken at Panorama Point, Last Chance Canyon, Guadalupe Mountains, Texas. Photo courtesy of Hunter Harlow.

students from 2014. From left to right students include Adam Davis, Caitlin Leslie, Erin Idleman, Andrew Flynn, Kim Kuijper (TA), Bill Lukens, Yohan Letourmy, Kieron Prince and Josh Brownlow. Photo taken while the class was preparing our evening meal at campsite adjacent cliffs of the Jurassic Navajo Sandstone in Furniture Draw of Buckhorn Wash, San Rafael Swell, central Utah.

PHOTO 16: Baylor Geology Graduate Stratigraphy students from 2016. Students launching from a dune crest at White Sands National Monument include from left to right Alyssa Johnson, Jared Hanson, Kristin Arndt, Daniel Parizek, Bart Yeates, and Ian Byram.

PHOTO 17: Baylor Geology Graduate Stratigraphy students from 2016. From left to right students include Jared Hanson, Daniel Parizek, Alyssa Johnson, Bart Yeates, Kristin Arndt and Ian Byram. Photo taken at the trailhead to Honaker Trail along the southern rim of the San Juan River Canyon, southeastern Utah.

PHOTO 18: Baylor Geology Graduate Stratigraphy students from 2018. From left to right students include Anna Thorson, Elisabeth Rau, Erin Noonan, Jacob Jarvis and Kent Ostman. Photo taken at the trailhead shelter next to the parking lot at McKittrick Canyon, Guadalupe Mountains National Park, Texas. Students are preparing for a class project presentation.

PHOTO 19: Baylor Geology Graduate Stratigraphy students from 2018. Students have their nose to the outcrop viewing the Navajo Sandstone at Aztec Butte, "Island in the Sky" District of Canyonlands National Park, southeastern Utah. From left to right students include Erin Noonan, Anna Thorson, Kent Ostman (white shirt) Elisabeth Rau, Jacob Jarvis (hidden but wearing a green shirt), Bart Yeates (TA).
**WE ARE BAYLORVGP.COM**

This is the new branding for my research group and lab. VGP stands for volcanology, gems, and petrology. Teaching and research took sure strides on each of the 3 pillars this year.

Volcanology’s highlights include a graduate course on the topic that was filled with a good bunch of students. We enjoyed a 4-day field trip to the spectacular Trans-Pecos volcanic field (Photos 1 and 2). New MS student Anna Ruefer joined the research group this year as a volcanologist-in-training. Anna’s is using embayments in quartz crystals and experimental petrology to understand how fast magma rises in volcanic conduits during eruptions (Photo 1). PhD student Roy and undergraduate Alex have anchored the gems and petrology pillars. Alex researched the source of Montana’s sapphire deposits. He also was my TA for Baylor’s first gems and gem minerals course, a freshman level lab science class. That course was a success thanks to Alex and the enthusiastic non-majors who enrolled. Whenever class got boring, they were quick to ask, “how much is that stone worth?”, which was the question that kept imaginations engaged. Alex is now off to University of Arkansas where he will continue to develop has a gem scientist with a MS project on turquoise. Roy has continued his research on Amazon jungle diamonds from the Guiana Shield. He is making great progress learning about their lifetime at the Earth’s surface. His first paper on the subject was recently accepted by *American Mineralogist*! Roy is now turning to a new approach for his next paper that takes advantage of imperfections in diamonds. These imperfections are actually small, entrapped crystals that preserve amazing information about how the diamonds formed billions of years ago in the mantle. (Photo 2)
That is the quick update of the crew. BaylorVGP is humming right along with pubs and funding (list below). Two NSF proposals were selected for funding, including an NSF CAREER. The CAREER is a 5-year grant that will allow more graduate students and a future post-doctoral research scientist to join the lab. These future additions will work on (1) deformation in diamonds of different colors and (2) how mineral inclusions preserve the pressure-temperature history of a crustal section of rocks from the southern Andes. They should be fun projects and I look forward to recruiting people for those roles.

**HIGHLIGHT PRODUCTS FROM BAYLORVGP THIS YEAR:**


Roy Bassoo (Graduate student paper!), Befus, K.S., Forman, S.L, Kopylova, M., Paragenesis and provenance of Guyana’s diamonds, American Mineralogist.


Kenny Befus, Manga, M., Lava Creek Tuff and the hollow reentrants, Geology.

Ben Andrews and Befus, K. S., Supersaturation nucleation and growth of plagioclase: a numerical model of decompression induced crystallization, Contributions to Mineralogy and Petrology.
Normally that would mean that I get about a year to work on other projects before devoting all of my time to the next edition, but the new coronavirus changed that (as it has changed most other plans). I now have a YouTube channel (Cronin-Geoscience-Ed) slowly collecting short videos for use in distance/online education, including a growing library of videos in support of Lab Manual users. As I write this, I am busily making a library of “tiny videos” of unknown specimens of minerals and rocks that students would normally work with in my Introductory Physical Geology lab. I am also making videos of all of the experiments in the Lab Manual.
Kate Hobart is navigating the shifting currents of grad school during a pandemic with considerable alacrity. Plans for geophysical field work, searching for the Dog Valley Fault near Truckee, California, have been put on hold as focus has shifted to an expanded analysis using LiDAR, InSAR, and GPS data. This will set the stage for field work when we can safely travel to the Tahoe area. We thank the support that former graduate students have provided for her work, and note that she was chosen to receive a Roy Shlemon Scholarship from the Environmental and Engineering Geology Division of GSA, and was selected for a “Women of Steele” award from the AEG. Kate plans to pursue a career in engineering/environmental geology when she finishes her MS in 2021, as my final graduate student at Baylor.

One of my mentors and role models in engineering geology, Jerry DeGraff, passed away too young earlier this year. I studied and taught from his textbook on engineering geology years ago and had long chats with him on many occasions — mostly about landslides and rockfalls, but also about the ethical practice of engineering geology. He had that magic combination of brilliance, humility, honesty, and a profound aura of authentic goodness expressed through caring. He was a most excellent human being. A memoriam from his colleagues at the Sacramento section of the AEG is available via https://aegsacto.wordpress.com/2020/04/09/memoriam-jerome-jerry-vernon-degraff/. I will miss his friendship and counsel.
I finish my teaching at Baylor at the end of 2021, officially retiring after a 1-semester "clean-out all your junk" sabbatical in the spring semester of 2022. As Tom Goforth can attest, I arrived at Baylor in 2002 with 96 boxes of rocks and minerals (to say nothing of the books) and have not stopped collecting in the interim. So, there is a lot to be moved. Cindy and I will be moving to a new house we designed and will soon start to build in Tyler, Texas, to be near her family. Our descendants, Kelly and Connor, are doing well in their new homes of Chicago (Kelly) and Portland, Oregon (Connor). Kelly earned a Master of Data Analytics at Notre Dame this past spring while continuing to work at the Lyric Opera, and Connor is working with his cousin Kevin Cronin building and renovating houses.

Much has changed with the spread of a global pandemic. To borrow a line from the Sage, living through this experience might not build character as much as it reveals character. Truth still matters, and so science will eventually provide a path through the forest. At the human level, we see affirmed daily "that kindness is the only strength there is," as Greg Boyle, S.J., puts it. Greg was three years ahead of me at Loyola High School in Los Angeles and was one of the many whose lives were changed by Jim Rude, S.J., who passed away earlier this year. His obituary is accessible via https://www.loyolahs.edu/eulogy-for-fr-james-a-rude-sj-50/. Greg, who founded Homeboy Industries to help lead gang members toward the light, says that the answer to most of the really hard questions in life is "kindness." And if you need something more, try "mercy." Truth, kindness, mercy, hope, and love matter. What we do matters. These — our words, thoughts, and actions — we can control as we try to cope with life during trying times.

Cindy and I are isolating at home with our fur-baby menagerie of three dogs and a cat. Oreo (the cat) and I are collaborating on a variety of projects, so our days are filled to overflowing. Cindy has been churning out cleverly designed masks for family and friends to use when they need to venture out. Cindy and I wish you continued good health and look forward to hearing from you.
In the fall semester of 2019, I taught two sections of the graduate GEO 5V90 “Seminar in Grant Proposal-Writing” with my colleague Bill Hockaday, which included graduate students from the Biology, Environmental Science, TIEEES and Physics Departments. In the spring semester of 2020, I taught GEO 5342 “Micromorphology” to 4 graduate students. Converting this course mid-way to all on-line was a challenge because it is microscope-based.

I continued serving a part-time appointment as Associate Dean for Research in the Graduate School, with one of my main assignments being overseeing the start of a cycle of 3-per year external evaluations of Baylor Ph.D. programs. Overseeing English language instruction (both speaking and writing) for international ESL graduate students was another priority and a new project involved developing screening and testing criteria for incoming International Teaching Assistants.

This past year I continued efforts to see my last two doctoral students progress towards completion of their Ph.D. dissertations. Yohan Letourmy continues his Ph.D. research at Joggins, Nova Scotia, on the stratigraphy and paleopedology of 1,000 m of Carboniferous fluvial and paleosol-bearing rocks, and he has one paper tentatively accepted, and hopes to finish in the fall or spring. My last Ph.D. student, Sarah Kogler, arrived in 2018 and in the summer of 2019 started conducting her research on the effects of rising sea-level on Gulf Coast soils at Aransas National Wildlife Refuge, TX, and she will apply results of studies of these modern soil analog systems to interpreting Upper Mississippian Pennington Formation paleosols, which crop out in eastern Tennessee and were “drowned” by repeated episodes of rising sea-level. She also conducted field work on the Pennington Fm. near Sparta, TN in the summer of 2019.
A planned field trip to Petrified Forest National Park in northern Arizona was to be led by Baylor Geosciences Faculty (Driese, Atchley, Dworkin) and Ph.D. graduate Aislyn Trendell-Barclay, and would have been held in conjunction with an international meeting (combining SEPM and the IAS that was to be convened in Flagstaff, AZ in April of 2020); unfortunately both were cancelled due to the COVID-19 pandemic and were rescheduled for a year later. My completed invited chapter for an AGU 100th Centennial Book Volume on Weathering and the History of Soils (with Lee Nordt and Gary Stinchcomb as co-authors) has still not come out, which is a disappointment, but should be published in 2020. My own research continues to focus on interdisciplinary paleoclimate and paleolandscape reconstructions using fossil soils, or paleosols, as well as conducting studies of modern soil systems (especially Vertisols) to develop climate proxies and analogs of ancient soils.

During the summer of 2019, Marylaine and I traveled to Knoxville, TN, which is our summer retreat from the Texas heat, and is our holiday gathering place with family. We vacationed with our children Mary Catherine, Nathan and Trevor, and daughter-in-law Lindsay, in Spain for two weeks in August of 2019, visiting Madrid first, and then Granada and Córdoba in southern Spain, concluding finally in Barcelona, where I had a poster to present for the International Goldschmidt Geochemistry meeting. The scenery and history were fascinating! On the Waco home front, Marylaine retired in March from her part-time job as archivist for McLennan Community College and is doing grand-parenting full-time. Mary Catherine continues in the Ph.D. program at Arizona State University, majoring in medical anthropology but living in Antigua, Guatemala. Finally, Trevor and Lindsay had our first two grandchildren, twins Ryan and Madeline, born in Knoxville on November 19, and we are greatly enjoying grandparenting.
THREE OF MY GRADUATE STUDENTS GRADUATED THIS YEAR: CONG JIN, MARILYN WISLER, AND KATARENA SHINER. THESE STUDENTS INVESTIGATED A DIVERSE ARRAY OF SCIENTIFIC TOPICS INCLUDING LATE TRIASSIC CLIMATE RECONSTRUCTIONS, DEVONIAN BLACK SHALE GEOCHEMISTRY, AND HOLOCENE CLIMATE CHANGE THAT INFLUENCED THE DEMISE OF THE MAYANS.

My current students include Kent Ostman who is continuing our investigation of Devonian black shale geochemistry and Nicole Price who is working on Paleocene climate change using rocks in the San Juan basin. My new Ph.D. student, Anna Lesko, will start this fall and she will be studying climate evolution across the K/P boundary using paleosols from Big Bend National Park.

Dr. Lyndsay DiPietro and I taught the undergraduate field course this summer without going into the field! Because the course was online, we have no pictures to share of our undergraduates tromping around in the mountains. This was truly a challenging endeavor as we tried to generate excises that would teach the students how to collect field data that would be used for making measured sections and geologic maps. We relied heavily on Google Earth and an assortment of high-resolution images that gave the students a sense of what it is like to be in the field. An example of a virtual field trip that we made of the Grand Canyon and the Colorado Plateau can be seen Here.
continue to learn the ropes of how to be the Undergraduate Program Director. When I have a question about undergraduate advising I contact Rena Bonem who, although she is happily retired, is always willing to help. It looks as if we are going to have an interesting school year coming up with a considerable amount of uncertainty about teaching classes in person versus online. I am becoming very comfortable with recording my lectures and chatting with students using Zoom, but I really miss the interpersonal relationships that develop with face to face interactions.
We are very proud of Don Esker, who defended ably his Ph.D. in October 2019 to a large crowd. His research is based predominantly at the Waco Mammoth National Monument using Sr, O and C isotopes to understand movement and environmental history prior to the herds demise. Don has an encyclopedia-like knowledge in Quaternary paleontology and an insightful approach to his research. Don landed a tenure-track position at his undergraduate alma mater, Marietta College, in southern Ohio as a professor of paleontology. Don is now living his dream, we overjoyed to see him move forward as a professional and gain a new collaborator. He brings deep and expanding knowledge and engaging enthusiasm for all animals large and small that went extinct for a new generation of students.

We welcomed Taylor Weeden, a MSc. student to the research group. Taylor received her BSc. from Grand Valley State University, MI and has developed a fascination with dune systems, with undergraduate research on the Great Lakes variant. Her research is based on the compelling question: Was there a 1930’s dust bowl in the Northern Great Plains? Taylor has combed the National Archives outside of DC and the 1930s aerial photographic record for evidence to refute or support this hypothesis. In turn, field work is planned in the Dakotas to measure dust flux from previously identified surfaces that were dust sources in the 1930s. This research should better frame the timing, spatially re-occurrence and sources for dust storms with drier boundary conditions in the Northern Plains.
Aridity, dust and megadroughts continue to concern us with ongoing and projected climate changes from rising concentration of atmospheric greenhouse gases, like carbon dioxide and methane in the 21st century. As Texas and much of the central USA dries, dust sources will abound from denude landscape surfaces, many which were former dune fields in past millennia. To quantify dust emissions from landscape elements in collaboration with Prof. Mark Sweeney from University of South Dakota and Eric McDonald of Desert Research Institute we are using his portable circular wind “tunnel.” We have now collected 100s of measurements of dust emissions from the gypsum dominated White Sands National Park, NM, and the almost pure quartz Monahans Dune Field in west Texas. White Sands is a dust emission hot spot for the Americas, while the Monahans is the other end member. This research demonstrates and quantifies an endless dust source with landscape aridification.

THE RED RIVER AND PECOS VALLEY FLUVIAL AND EOLIAN SYSTEMS

Our research continues on eolian systems associated with the Pecos River in west Texas and the Red River which straddles the Texas and Oklahoma border. We are fortunate to have access to the Department’s Geoprobe which can take 10 to 20 m long and continuous cores from most dune surfaces. Dr. Logan Wiest has mastered the use of the Geoprobe, through a bit of trial and error, and has been instrumental in extracting cores from the Monahans and from the Red River dunes. Zequn Wu, a PhD student is deep in the analysis of these cores to better understand the interactions of Red River fluvial and eolian systems in the last 2000 years. The trio of Logan Wiest now at Mansfield University, and Tori Todd and Connor Mayhack as graduate students, are analyzing and modeling the Quaternary eolian basin architecture near Monahans, TX using information from Geoprobe cores and borings, with recovery length between 3 and 40 m. Baylor has unique capabilities in analyzing cores with an abundance of well-equipped laboratories for particle size analysis, environmental magnetics, stable isotopes, biomarkers, molecular stratigraphy, grain-mineralogy, radiocarbon sample preparation and luminescence dating. The timeline to discoveries is significantly shorten compared to other programs because of the depth and breadth of analytical facilities and knowledgeable faculty. This is a golden age of discovery!
A NEW LUMINESCENCE DATING COMPUTATIONAL SYSTEM

A valuable addition to our research group was Liang Peng, a graduate student who has received a China Scholarship Council Scholarship for two years to study in the Geoluminescence Dating Research Laboratory as a joint PhD degree effort with the Institute of Geology and Geophysics in Beijing. Liang departed in Oct. 2019 for post-doctoral appointment in China and he is missed. Liang brought new rigor and computational expertise such that he developed the first integrated OSL dating calculation platform, which is open source, and freely available to the global community (https://www.baylor.edu/geosciences/index.php?id=962356).

Liang Peng with his quantitative insights, deep understanding of OSL dating and programming prowess has further advanced the science. We are fortunate to have hosted this international visitor who enriched our research environment.

2019 PUBLICATIONS


**2019 RESEARCH GRANTS**

1. Land surface processes, dust sources and particulate fluxes for the 1930s Dust Bowl Drought area, Great Plains. 6/1/2017-12/31/2020. National Science Foundation, $222,125.


When the university and school district shut down on-campus activities in March, Deirdre and I shared responsibilities for at-home teaching for Jada (11) and Dane (8). We also set up a home office to continue our research and writing activities (Deirdre is also a faculty member at Baylor), which was especially important as our research travels were put on hold for the summer. As we approach the Fall semester, we hope we can provide a semblance of normalcy for the returning and incoming students while remaining flexible for possible changes.

RESEARCH
Before the coronavirus outbreak, I submitted funding proposals to the American Chemical Society Petroleum Research Fund and NASA Exobiology Program. The Microbial Biogeochemistry Lab was active with students preparing and analyzing sediment samples to study changing environmental conditions during the end Devonian mass extinction. After spring break the lab shut down initially as we waited to see how the pandemic would affect us locally, then slowly reopened to limited activity this summer to allow graduate students to continue making progress on their research projects. While in the lab we are all wearing masks and maintaining distance, while only completing essential tasks and working from home as much as possible. Despite this inconvenience, we are making great progress on our research projects. Ph.D. student Sanjukta Dhar is currently measuring carbon and nitrogen isotopic compositions of Late Devonian–Early Carboniferous sedimentary rocks from Alberta, completing a study on the geographical distribution of carbon and nitrogen cycling processes. She is also using the new high-performance liquid chromatograph (HPLC) and LTQ linear ion trap mass spectrometer to study porphyrins extracted from the rock samples. Porphyrins are the chemical degradation products of photosynthetic pigments in ancient rocks, and they allow us to study the interaction between photosynthetic organisms and global biogeochemical cycles in the past.
This year Sanjukta will be developing methods for measuring the carbon and nitrogen isotopic composition of porphyrins using the new Thermo gas chromatograph–combustion–isotope ratio mass spectrometer (GC–C–IRMS) in the Stable Isotope Lab.

MS student Mason Frucci is completing a study of the elemental chemistry and organic geochemistry of the end-Devonian Exshaw Formation in Alberta. He is co-advised by Dr. Stacy Atchley, and his study is geared toward better understanding the hydrocarbon potential of the formation, which is correlative to the Bakken Formation in North Dakota. Mason has collaborated also with Dr. Bill Hockaday using the automated solvent extractor and gas chromatograph–mass spectrometer in the Organic Geochemistry Lab.

I have also been collaborating with Drs. Sascha Usenko (Environmental Science) and Stephen Trumble (Biology) along with graduate student Farzaneh Mansouri to develop methods for analyzing the isotopic composition of amino acids from whale earwax as a proxy for changing ocean biogeochemistry over the 20th–21st centuries. We have submitted a manuscript describing this method and anticipate its publication in 2020.

Research travels in 2019–2020 included a summer trip to the Alberta Energy Regulator Core Research Centre in Calgary, Alberta. Graduate student Mason Frucci described core along with Dr. Stacy Atchley and students from the Applied Petroleum Research Lab and obtained samples for organic geochemical analysis. I used the Geoscience Department’s handheld X-ray fluorescence spectrometer to measure elemental composition along the core sections and examined the core for microbial fabrics indicative of geochemical conditions. We also examined an outcrop and took samples of the Exshaw Formation at Crowsnest Pass in the eastern foothills of the Rocky Mountains in Southern Alberta. This core and outcrop sampling supports the research projects of Microbial Biogeochemistry Lab students Mason Frucci and Sanjukta Dhar described above. Both Sanjukta and Mason presented posters at the American Geophysical Union 2019 Fall Meeting in San Francisco.
Graduate students Mason Frucci and Julia Visy on the Crowsnest Pass, Alberta outcrop of the Devonian-Carboniferous Exshaw Formation.
In November the Microbial Biogeochemistry Lab hosted Evan Collins, a visiting graduate student from the University of Pittsburgh. We are collaborating with Evan and his advisor Dr. Joe Werne on a project studying the intact polar lipids and pigments in hypersaline lake sediments as markers for microbial response to climate change and chemical variability. Evan received training on the HPLC-MS system and analyzed his first batch of sample extracts, producing data that he presented on his AGU Fall Meeting poster. This collaboration continues to grow, and we have submitted a new proposal to study the microbial biogeochemistry of hypersaline mats in coastal sabkhas as analogs for microbial ecosystems on ancient Earth/Mars.

Sarah Catherine Weaver (Junior, University Scholar/Pre-Med) completed her two years working as a lab assistant during fall 2019. Her help was invaluable in the Microbial Biogeochemistry Lab helping with sample preparation, chemical extractions, and X-ray fluorescence analysis. For the Spring semester 2020 Sarah Catherine moved to a new position in student life, and we certainly miss having her in the lab.

TEACHING

After teaching graduate classes during the previous three semesters, I focused on teaching large lectures of World Oceans during the 2019-2020 academic year. After spring break, I transitioned the World Oceans lecture to an online format for the remainder of the semester. We were already using an e-textbook with on-line reading assignments and quizzes, so it was a relatively seamless transition that required me to record lectures and create on-line exams. The student response was positive, given the circumstances, though I hope to be able to return to a regular lecture format when I teach World Oceans again in 2021-2022. This fall I will be teaching Global Biogeochemical Cycles to graduate students, and I have been approved for a research leave sabbatical in spring 2021 to develop a new research area in studying nitrogen cycling in hypersaline microbial mats.

Summer study abroad programs were cancelled this year, so I did not travel with the Baylor in Italy program and contribute to the San Giuliano Archaeological Research Project in Barbarano Romano. I worked with this program in 2018 and 2019, spending two weeks providing geological context to the site, an evening lecture on the geology of Italy, and hands-on experience for undergraduate students using X-ray fluorescence elemental analysis of artifacts.
RECENT PUBLICATIONS


PRESENTATIONS

Fulton, J.M. Membrane lipids in virus infection and coccolithophore bloom termination in the ocean. Department of Biology, Baylor University, Waco, TX. (Feb. 2020)


When an electric breaker failed during a performance of Weinberger’s “Polka and Fugue”, the concert hall was plunged into total darkness. Much to our surprise the music did not stop.

Our high school band had rehearsed this intricate piece of music for months and everyone knew their part. This 50 year old event has been repeated again at Baylor. The lights have gone out and yet everyone knows their part. Everyone has a story to tell, but the most amazing story is that Baylor’s service to her students did not fail. The music plays on.

Providence made my personal story uneventful. In 2014 Baylor University initiated a year-long experimental program for online teaching. As a participant, about a dozen faculty pioneered the development of online instruction, and my World Geography class has been taught online every summer since that time. This spring my Earth Science class required a few days to go online as my lectures had been previously recorded. Meanwhile, the remaining Baylor faculty were asked the impossible, with only one week to make the transition to online instruction. As Albert Einstein once said, “Coincidence is God’s way of remaining anonymous”.

I believe the urge to get out into nature is not only a hallmark of geoscientists, but also an intrinsic part of the human condition. This year everyone was feeling the need to escape, and while New Mexico temporarily closed the door to Texans, Colorado was open for business! In previous years, Alison and I treated Colorado as a stopping point on the way to somewhere else. In the summer of 2020, Colorado was our primary destination. While we took in a lot of geology along the way, our leisurely vacation emphasized the joy of breathing fresh air and long hikes under cooler temperatures. On our return home, we Texans even managed to sneak into New Mexico via the Colorado border. Alison and I are sharing with you a few of the new memories we accumulated along the way.
Don is viewing the remains of a once thriving community built by ancestral Pueblo people circa 1150 to 1550 AD. The ash layer was ideal for enlargement by the Puebloans in the protected cliff face.
Don is standing beneath a 250 million year old outcrop of petrified sand dunes located twenty miles north of Pikes Peak.

Three recent avalanches can be seen on the south flank of Independence Pass. All three were the result of winter snow avalanches that ripped out entire forests with a momentum that carried the trees up the opposite north slope.

Don and Alison celebrating their 48th wedding anniversary on top of Independence Pass. If you are doing the math, Alison was a teenager when we married.

Don on the Roaring Fork River 20 miles south of Aspen, Colorado on state highway 82.

The unusually porous geology of Frijoles Canyon stands above Don in Bandelier National Monument. Two massive explosions from the Valles Caldera dated 1.2 million years ago spewed out 160 cubic miles of ash, pumice, and tuff.
THIS WAS MY NINTH YEAR OF TEACHING AT BAYLOR UNIVERSITY. I HAD THE PLEASURE OF TEAM-TEACHING WITH DR. STEVE DRIESE, THE GRADUATE GRANT WRITING COURSE.

I also had the new experience of teaching the freshman-level World Oceans course to small group of 20 students. It was a welcomed change from the class of 136 students last year. This fall I will welcome the new, incoming graduate students to our team-taught courses in Grant Writing and the Global Biogeochemical Cycles. Team teaching graduate courses is a great way to infuse new perspectives, ideas, and materials – keeping our courses up to date with the science that is always evolving.

RESEARCH
This year the Hockaday research group reached a major benchmark with its 50th peer-reviewed publication, which fortuitously landed in the prestigious journal *Nature Geoscience*. All four of our papers this year (listed below) were the outcome of exciting collaborations of Baylor students with new colleagues – Omar Harvey at Texas Christian University and Steven Hall at Iowa State University. As always, our work focuses on how molecular structure of natural organic matter affects and is altered by its fate in soil, water, and sediment.

STUDENT ACCOMPLISHMENTS
Ms. Zhao Wang and Mr. Burke Leonce are entering the third and fourth year of their doctoral dissertation research and making excellent progress. Zhao is teasing out the molecular signatures of water and light stress on the leaves of Oak and Juniper trees. The hope is to use these molecules in the rock record as “proxies” for reconstructing terrestrial paleoenvironments. Burke is well on his way to measuring the bonding energy of molecules as they attach to iron oxide minerals at the sediment–water interface. Zhao and Burke gave updates on their research by presenting at Geological Society of America and the Goldschmidt Conference.
LAB ALUMNI NEWS

I am very proud of the many successes of former students. Here are some highlights from recent graduates. Emily Blackaby (B.S. 2018) will begin graduate work at Colorado State University, National Resource Ecology Lab, with Professor Daniela Cusack. Dr. Todd Longbottom (PhD, 2017) is starting a second postdoc position at University of California, Merced, with Professor Asmeret Berhe. Dr. Zack Valdez (PhD, 2019) is starting a new role as executive science and technology policy fellow with the American Academy for the Advancement of Sciences (AAAS) in Washington D.C. On a personal note, congratulations are due to Creighton Meyers (B.S., 2014) for his marriage to Candice in June 2020.

Please follow and stay in touch with us at https://sites.baylor.edu/william_hockaday/

THE HOCKADAY LAB’S PUBLICATIONS

1. Steven J. Hall, Chenglong Ye, Samantha R. Weintraub, William Hockaday, Controls on soil organic carbon molecular composition at the continental scale, Nature Geoscience (NGS-2020-02-00360). Accepted July 18, 2020


This has been a year of growth for me and the Planetary Research Group, and this was the first year in which our group had critical mass for a “Planetary Geophysics” class in which we developed and applied techniques for studying the interiors of other planets.

We were joined this year by two new Ph.D. candidates: Nick Wagner and Rudger Dame. Nick came to Baylor from the Colorado School of Mines, where he majored in Geophysical Engineering. Nick won a prestigious summer internship at the Lunar and Planetary Institute in which he studied the orientations of bladed terrain structures on Pluto with New Horizons spacecraft data. Nick’s team also won first place at NASA’s RASC-AL competition by designing a hypothetical robotic spacecraft that would mine water from the Moon’s ice-rich poles. Rudger Dame came to Baylor from Brigham Young University with a similarly impressive resume: he interned jointly at the Lunar and Planetary Institute and NASA Johnson Space Center, where he studied the thermal decomposition of hydrogen peroxide on the surface of Mars. Rudger and Nick have joined Chris Mitchell—who is working on his M.S. degree—here in the Planetary Research Group.

This year was also my first opportunity to teach undergraduate classes. In the Spring 2020 semester I took over GEO 3319 “Geophysics” from John Dunbar, which is a required class for our department’s small-but-successful Geophysics major.

I also taught a new freshman-level class: GEO 1309 “Origins of Habitable Worlds”. This class provides an overview of planetary science and dives into the inner workings of NASA. For their final projects, the students in the class came up with their own proposals for NASA missions to various destinations in the Solar System, complete with engineering designs, mission patches, and science traceability matrices. It was a lot of work, but this class was my favorite teaching experience so far!

My own research has been chugging along as well. I was invited to give lectures at Case Western Reserve University and at the Cleveland Museum of Natural History to discuss last year’s paper about a mass anomaly under the Moon’s largest crater.
This “massive” discovery gives us a chance to study how mega-sized impacts deform planets and moons in our Solar System. Large asteroid impacts were once common during our planet’s formative years, but any traces of these mega-sized impacts were erased long ago by erosion and plate tectonics. Thus, studying these features on other planets teach us about our own planet; this research application is in keeping with our lab group’s informal motto: “Aim for heaven, and you’ll get Earth thrown in”.

I have also kept busy promoting Venus science: Rudger and I participated in the Venus Exploration Analysis Group meeting, which helps to outline NASA’s priorities vis-à-vis Earth’s sister planet. I was subsequently invited to address the science team for the European Space Agency’s EnVision mission, which would orbit Venus. This meeting was held at the headquarters for the French Space Agency in Paris. My favorite moment of this trip was the welcome reception held in the historic Paris Observatory. A line on the floor of the observatory marks the Paris meridian, which was a competitor to the Greenwich meridian for a long time. As someone who regularly relies on geodesy, I was fascinated by the history behind this.

The collaborations that I’ve found in this department have been wonderful. My students currently share a space with Jay Pulliam’s students, and this space also houses the computing equipment associated with the nascent Geovisualization lab. Geophysics and volcanology are two fields with considerable overlap, so I tagged along with Dr. Befus’s Volcanology class trip to Big Bend this year and snuck in some lessons about gravity measurements. In a collaboration between geophysics and hydrology, I also had the pleasure of co-advising a student—Wynne Casteel—on a recently concluded M.S. thesis project related to the Brazos River aquifer.

If you would like to learn more about the fledgling Planetary Research Group, visit the page for our research group: http://baylorplanetary.com

Or, follow the Planetary Research Group on Twitter: @baylorplanetary

I periodically tweet about research snippets and various science topics with my Twitter handle: @peterbjames
Despite writing under the pall of the COVID-19 pandemic, I am blessed to be doing so from Santa Cruz, a beach city near San Francisco.

I was awarded a summer sabbatical so while Baylor pays my salary, I negotiated for Sandia National Laboratories to cover my living expenses. Because Sandia and I heavily collaborate with Integral Incorporated, Integral has provided me an office, desk, two monitors (making my laptop my third), and all the office supplies I might need. The change of scenery makes this a welcome respite from the summer heat and humidity in Waco and I am working on some new and interesting projects.

2019 was a banner academic year for me. I was awarded tenure and it definitely feels good to have cleared this hurdle. But what truly made this a most special year for me were the successes of my grad students. Bulbul Ahmmed, or now better known as Dr. Ahmmed, successfully defended his dissertation and has been offered a post-doctoral appointment at Los Alamos National Laboratory – the premier scientific organization on the planet. Dylan Jiang, now Dr. Jiang also successfully defended his dissertation and is on the job market. He was expecting an offer from Saudi-Aramco, but that has been delayed because of COVID. We might enjoy the low gasoline prices, but in Houston alone, there are 360,000 members of the oil industry out of work. But these sorts of events are not new for the oil industry and it will certainly recover – the question is when? Fortunately, Dylan has an extremely valuable skillset combining geology and machine learning that will certainly make it easier for him to find a great career – it is only a matter of time. And last, but not least, Kathy Breen defended her dissertation in early July, and passed with flying colors. She is over the moon with the recent news that she was selected for a highly competitive post-doctoral appointment at NASA Goddard Space Flight Center where she will be applying her machine learning skills to atmospheric science. This is her “dream job” and I am extremely proud of her as I am of Drs. Ahmmed and Jiang. My fourth student whom I am co-advising with Prof. Atchley, Elisabeth Rau, passed her dissertation proposal as well so she has officially advanced to candidacy. Finally, my undergraduate research intern, Chris Holle, graduated and started work at AT&T in July – he will be sorely missed as he is excellent. Oh, and I should mention that my master’s degree student, Toluwani Soares, who had to take a medical leave this year, will be returning in the fall to complete her thesis.
This year I taught a new class, World Oceans. While it was disappointing that we had to transition to online teaching for the last few weeks of the course, I will have the opportunity to teach the whole class again in the fall.

My students had very productive years with their research. Bulbul has three manuscripts in the review process [1-3], Dylan had two papers published and two in review [4-7], and Kathy had one paper published and two that will be submitted this month [8-10]. Also, I had three additional papers published with a handful in preparation, as well as four conference papers [11-17].

In my personal life, I am blessed with a wonderful relationship with Angie, whom I met in 1995 and who came back into my life in 2017. She is the light of my life and I look forward to another 25 years of precious time with her. She and I have managed to stay healthy so far and I look forward to a fantastic 2020-2021 academic year and to returning to some level of normalcy after the COVID crisis is over.


FACULTY UPDATES

DR. DAN PEPPE
ASSOCIATE PROFESSOR OF PALEOMAGNETISM & PALEOBOTANY, GRADUATE PROGRAM DIRECTOR

THIS PAST YEAR HAS BEEN QUITE A WHIRLWIND AND THE SPRING AND SUMMER HAS GONE QUITE A BIT DIFFERENTLY THAN I EXPECTED! OVER THE PAST YEAR I’VE CONTINUED AS THE GRADUATE PROGRAM DIRECTOR, CONTINUED MY RESEARCH ON RECONSTRUCTING TERRESTRIAL ECOSYSTEMS, AND DEVELOPED AND TAUGHT A NEW INTRODUCTORY COURSE IN GEOSCIENCE – GEO 1307 EVOLUTION AND EXTINCTION.

In the research front, I continue to work on a variety of projects including reconstructing the climate and environments of Miocene hominoid sites in Kenya and Uganda, understanding early Paleocene ecosystems in the San Juan Basin in New Mexico, and developing paleoclimate and paleoecological proxies that can be applied to fossil leaves.

Most excitingly for my lab, two of my PhD students, Andrew Flynn and Aly Baumgartner, completed their dissertations and graduated this year!

Andrew Flynn graduated in May 2020. Andrew’s dissertation focused on reconstructing plant communities and climate of the Early Paleocene Nacimiento Formation in the San Juan Basin in New Mexico, as well as developing a high-resolution age model for the Nacimiento Formation. The results of his dissertation were published in Paleobiology and GSA Bulletin this year, and we have a number of additional manuscripts in development. The results of Andrew’s dissertation were really exciting and he demonstrated that the early Paleocene floras from the San Juan Basin and considerably more diverse than contemporaneous floras from the Northern Great Plains and that the climate of the San Juan Basin was significantly warmer and wetter and was most similar to modern tropical seasonal forests and tropical rainforests. Interestingly, he also found that despite the fact that there are major differences between the San Juan Basin and other early Paleocene floras across North America, all of the floras document a series of major extinction and origination events that occur at approximately the same time! We think that these extinction events are potential linked to some of the major outgassing events of the Deccan Traps that were erupting in India at that time. We are continuing to work on this project, and I’m excited to see it continue to develop.
Aly Baumgartner graduated in August 2020 and has begun a job as the Collections Manager at the Sternberg Museum of Natural History at Fort Hays State University. Aly’s dissertation focused on understanding how the morphology of leaves changes in response to climate. The first chapter of her dissertation was focused on how leaf morphology changes through development and in response to changing climate in multiple species of grapes. Her results demonstrated that both climate and development affected leaf shape, but importantly for climate models, the leaves that responded most strongly to climate change are the ones most likely to preserve in the rock record. This work was published in the American Journal of Botany this winter. The second chapter of her dissertation was focused on reconstructing the climate and ecology of early Miocene floras in Kenya. This manuscript demonstrated that there were major changes in plant communities that corresponded to changes in climate, and particularly increases and decreases in precipitation. This chapter is in review of Palaeogeography, Palaeoclimatology, Palaeoecology. The final chapter of her dissertation focused on modern African floras and the relationship between leaf morphology and climate across Africa. Interestingly, she documented some very strong patterns, but found that the relationships between leaf shape and climate were different for African floras. As part of this work she developed a new leaf shape-climate proxy applicable for African floras. We are continuing to work on this project and hopefully we’ll be able to develop a really robust climate proxy for African fossil floras.

In addition to Aly and Andrew completing their dissertations, my other PhD student, Joe Milligan, has been making great progress on his dissertation as well. Joe is also working in the San Juan Basin on early Paleocene floras, as well studying modern Sycamores. The first part of Joe’s dissertation is focused on developing a proxy for shade cover that can be applied to the fossil record using Sycamore leaves. As part of this work, Joe conducted a set of growth experiments where he grew Sycamores at the Lake Waco Wetlands under different light conditions. He found that there is a remarkable strong relationship between aspects of cell morphology and light availability, which will also be quantified in fossils. Using these relationships, Joe is working to develop a proxy...
for shade cover that can be applied to fossil leaves that we’ve collected in the San Juan Basin in New Mexico. Joe is also working on developing a Sycamore-specific CO2 proxy based on leaf cell morphology as well. Joe’s work is coming along well and I’m excited to share more of it next year.

This year I also developed a new introductory class in Geosciences called Evolution and Extinction. In the class we focus on answering the question: how has evolution and extinction shaped the history of life on Earth? In the class we focus on what the fossil records tells us about evolutionary processes, major extinction events in Earth history, the relationship between the Earth’s changing climates and environments and evolution, and the implications of future climate change for life on Earth. I really enjoyed teaching the course this fall and am also teaching it online this summer. I look forward to continuing to teach it in the future and hopefully I’ll be able to convince some of the students that take the course to become Geology majors or minors!

In addition to my research and teaching, I’ve continued to enjoy my work as the Graduate Program Director and getting a chance to interact with the graduate students in Geosciences. We have a great group of students, and I look forward to continuing teaching and working with them in the future. We’ve been regularly updating our Facebook, Twitter, and Instagram pages with information about what is happening in the department, so please follow us!

Obviously, the world has changed dramatically since early spring and life since March has been a whirlwind. My family was in Fort Davis in west Texas for spring break when we got the email that Baylor was closing and transitioning to fully online. All four of us have more or less been at home since, which has been quite an experience with two people attempting to transition to online teaching while at the same time helping a 5 and 7 year old transition to online learning, never mind trying to keep up with everything else. We are hoping that things will begin to look brighter as we transition to the fall. I hope that everyone reading this is healthy and managing this new COVID-19 world! If we’re lucky by the next newsletter things will be a lot more “normal”.

Dan Peppe and my family at Fort Davis State Park in March 2020 in one of our last pre-quarantine family photos and experiences!

Jeremiah Robinson (l) and Andrew Flynn (r) at the Chico Springs locality in the San Juan Basin, New Mexico prospecting for fossil leaves in May 2019.

Jeremiah Robinson and Andrew Flynn (r) at the Chico Springs locality in the San Juan Basin, New Mexico prospecting for fossil leaves in May 2019.

Dan Peppe holding a Miocene elephant femoral head on Rusinga Island, Kenya in summer 2019.
IT HAS BEEN QUITE A HECTIC YEAR, BOTH HERE IN THE GEOSCIENCES DEPARTMENT AND OF COURSE IN THE WORLD AT LARGE, BUT DESPITE ALL THAT, THE 2019-2020 ACADEMIC YEAR HAS BEEN LARGELY PRODUCTIVE FOR ME PROFESSIONALLY AND PERSONALLY.

I’ve been continuing the process of settling in here at Baylor, through recruiting more undergraduate and graduate students and building the Paleo Lab group. Cooper Malanoski, my first ever graduate student, started here in the Fall and has just successfully proposed his master’s thesis. His work on the brachiopod *Lingula* has revealed interesting trends in their paleoecology that has implications for surviving mass extinctions. Megan Jacobs started in the Spring and has already made great progress into her Ph.D. dissertation project on echinoids, while also catching the eye of Baylor’s Media Communications team for her work on pterosaurs.

The first half of the 2019-2020 academic year was relatively uneventful in terms of teaching, but nevertheless a fulfilling experience. In the Fall I taught Invertebrate Paleontology for the first time as a faculty member, which was an exciting opportunity to delve more deeply into the concepts and theories that make paleontology such a enjoyable subject for me with my students. In the Spring I went on to teach Earth and Life History, which transitioned into an online-only class after spring break due to the outbreak. I saw this as an opportunity to hone my online teaching skills and develop my curriculum to accommodate an online component, which, once this is all over, will still be utilized in my class for online offerings. Despite the difficulties of online teaching and the necessity to re-imaging course structures, I do still believe that offering online opportunities can make the Geosciences a more accessible degree option for many.
Echinoid from Brownwood - a partially articulated fossil of the Paleozoic echinoid Archaeocidaris found from the famous Brownwood Spillway.

Dinosaur tracks in the Paluxy River at Dinosaur Valley State Park with Rena Bonem and her GEO 1306 class.

A blue quartz specimen of llanite from the type locality in Llano.
here wasn’t much traveling or field work to be done in the second half of the academic year, given all the unfortunate events of early 2020, but I did manage to get myself and my students out into the field in the Fall of 2019. I took my class of Invertebrate Paleontology students to collect the Paleozoic fossils of Mineral Wells Geopark in Mineral Wells, TX, for their end-of-semester field experience. The Paleo Lab expeditions were to the Brownwood Spillway and Whitney Lake, as well as to several roadcuts in and around. I also had the opportunity to head into the field with Rena Bonem, who showed me around several localities near Palauxy, Glen Rose, and Valley Mills, as well as the famous dinosaur trackway at Dinosaur Valley State Park. A visit from an out-of-state colleague, who also happens to be an igneous petrologist, prompted a trip to the Llano Uplift region for a quick look at ilanite, granites, and schists near Llano and Horseshoe Bay. My very last expedition before the lock down was initiated was to the regional South-central GSA meeting in Fort Worth, where I was able to connect to quite a few local paleontologists and geologists.

Looking forward, I am excited to start the new academic year, whatever it may bring. My new Ph.D. student, Nathan Wright, coming from Knox College, will be starting in the Fall. A new postdoctoral researcher, Brendan Anderson from Cornell University, will also be joining the Paleo Lab. Despite the uncertainty and hardships that many of us were faced with in 2020, I remain hopeful that our faith and our commitment to family, friends, the department, and the Baylor community at large will see us through, and I look forward to the opportunity to experience it.
During the 2019–20 academic year my research group completed a three-year project funded by the Department of Energy (DOE) in which we designed, built, and tested a new, wireless seismic array for automated processing of continuous ground-motion data. Our approach will, hopefully, improve the strategies by which “seismic interferometry”, a new technique for extracting information about the Earth’s subsurface from ground motion data, is performed.

Aside from reports associated with that project, we published several papers concerning, for example, the structure and tectonics of the southern United States and the northeastern Caribbean. I also spent six months in India, where I taught a course at the Indian Institute of Technology (Indian School of Mines), gave lectures at eight institutions in India and Nepal, and launched several new projects. I particularly enjoyed working with Dr. Mohit Agrawal, a former Baylor PhD student who is now on the faculty at IIT(ISM). In student news: Alden Netto finished his PhD in the past year and is now working for BP in Houston. Joseph Soloman Thangraj published an innovative paper this Spring in which he uses a variety of seismic data to constrain the structure of the crust and sediment package beneath the Texas Gulf Coast. Ben Sadler was poised to finish his M.S. degree this summer and had an outstanding job lined up but decided to stay for a PhD instead. Postdoc Diego Quiros was offered, and has accepted, a faculty position at the University of Cape Town, South Africa, but travel restrictions associated with the COVID-19 pandemic have kept him from starting the job so far. Frank Sepulveda made great progress in his research, which forms the basis of the DOE project we completed in December. Hannah Mejia and Debajeet Barman continue their work on the NE Caribbean and southeastern United States, respectively.

In the DOE project we developed and tested a new, cost-effective, and non-invasive exploration method using ambient seismic noise with promising results. The general objectives of the project entitled “Development of a novel, near-real-time approach to geothermal seismic exploration and monitoring via ambient seismic noise interferometry” were to (1) build and test a new-generation seismic system that is capable of acquiring, transmitting, and processing seismic data in near-real-time, and (2) apply the new technology in a geothermal field setting.
The intent of the latter objective was to investigate opportunities for adapting survey acquisition parameters provided by near-real-time data processing. In Phase 1 we performed the system integration and testing of an inexpensive strategy for automating data acquisition, distribution, and processing of ambient noise using industry-standard, widely-available instrumentation. Our solution utilized an inexpensive embedded system (Raspberry Pi), which was configured to acquire data from the digitizer and insert it into a decentralized “big data store” called Apache Cassandra. Cassandra distributed and maintained up-to-date copies of the data at all nodes through a WiFi network and, at regular intervals, data were extracted from Cassandra and used to compute Green’s functions for all receiver pairs. Results were reviewed and progress toward convergence was assessed quantitatively, and messages were sent during the deployment that summarized the array’s performance, data metrics, and state of health. We successfully built and tested a 20-node RaPIER array at Eastland Lakes (Waco, TX) and the Soda Lake Geothermal Field (Fallon, NV) in 2017.

In Phase 2, completed last December, we upgraded system components, added and rewrote processing and data metric software, and the hardware configuration of the telemetry, and performed a successful test of the 144-node array at the San Emidio Geothermal Field in Nevada. We demonstrated that the larger array was able to perform its data acquisition, handling, telemetry, and processing functions successfully, so the advantages of real-time, in-field processing were realized. These advantages include continuous assessment of results and opportunities to re-deploy stations in more optimal configurations depending upon characteristics of the ambient noise field, and options to leave the array in place longer (or shorter) than originally planned and high levels of confidence that survey objectives have been achieved before the decision is made to demobilize the array. We also made progress in developing strategies for evaluating Green’s function convergence and in applying a technique (double beamforming) that ensures the most accurate velocity estimates in the shortest deployment duration.

Last year I was awarded a Fulbright-Nehru Distinguished Chair Fellowship to India, where I conducted research and lectured at the Indian Institute of Technology (Indian School of Mines) in Dhanbad, Jharkhand. The award was made by the J. William Fulbright Foreign Scholarship Board, which is made up of 12 members appointed by the President, and is funded by an annual appropriation made by the U.S. Congress to the U.S. Department of State. The Fulbright Program aims to increase mutual understanding between the people of the United States and the people of other countries and is the flagship international educational exchange program sponsored by the U.S. government. The government of India shares the costs of its visiting scholars from the U.S. and my host institution, IIT(ISM) Dhanbad, generously provided housing for me and my wife and a spacious office for me.

My Fulbright research project is intended to elucidate the lithospheric structure and tectonics of northeast India, a region that is being squeezed between the Indo–Burman mountain ranges to the east and the eastern Himalayan syntaxis to the north. Its role in India’s continuing drive into Asia is unclear but its ability to produce damaging earthquakes is well-documented: events in 1897 and 1950 are some of the largest ever recorded in Asia.
Installing a seismic station near Sukhna, Jharkhand.

With Dr. David Alvey, Director, Centre of Societal Mission, IIT-ISM.

One India, Clean India, Healthy India.

Brick brigade at the Kartavya school.

Host family of one of Mohit’s seismic stations.
his turned out to be a terrific project, on the one hand, because recent work has called into question the composition and origin of the Bangladeshi (and eastern West Bengal) crust, and frustrating because of the difficulty of accessing seismic data. When we did finally receive data from the National Centre for Seismology (NCS) it turned out to be inadequate, so we had to make two additional requests and refashion our approach. I had the good fortune to be invited to visit several of India’s leading geophysics research groups, where I made presentations that described the current knowledge and remaining challenges in understanding the northern Bay of Bengal region through comparisons to studies I had performed previously on the Gulf of Mexico. One common feature of these two regions is that their structures and histories are obscured by the two deepest piles of sediments on the planet. These thick sediment covers mean that only geophysical techniques can reveal the composition and structure of the lithosphere beneath. My presentations led to stimulating and enlightening discussions, but the data we need to answer definitively some of the unresolved questions is not yet available. Discussions therefore turned to forming an international collaboration to undertake a large-scale research program to investigate the region. The idea was well-received, efforts are underway, and will continue for several years, although the COVID-19 pandemic, which began only after we left India in January, will impact fieldwork, at least.

I count my experience in India to be among the handful of most consequential experiences of my professional career and personal life. I encountered entirely new research challenges and opportunities, made professional contacts, and learned of all the achievements and skills and potential of Indian researchers and institutes. Over the last thirty years I have established expertise in both techniques and specific knowledge of particular geological processes and geographic regions of the world but I did not expect, at this stage of my career, to launch an entirely new research program in an area I had never visited. The Fulbright program and Baylor’s research leave policy allowed me to do that and I am very grateful. I also made many good friends and learned a great deal about Indian culture, especially its diversity. I am especially intrigued by the ways in which Indians integrate their spirituality and long history into a rapidly changing and “modernizing” society. Given that many Indians are well-disposed toward the US and its people, I am impressed with India’s independence from the US popular culture, societal mores, and consumer products.
I am also grateful for access to research support from the W.M. Keck Foundation endowment at Baylor. In the past year I used Keck funds to support travel for graduate and undergraduate students to attend professional meetings, to allow undergraduates to join us in the field in Nevada, where we recorded new data, and to support small projects that were intended to test ideas and provide preliminary data that may be used in external research proposals later, and/or to provide data for a student’s thesis research. Given our current lockdown due to the COVID-19 virus, this summer’s research plans are at risk but we will substitute data analysis and computer modeling for our usual fieldwork and will have greater need for the funds when normal activities resume.
DR. JOE YELDERMAN
PROFESSOR OF HYDROGEOLOGY

DR. JOE’S HYDROGEOLOGY LAB MAINTAINED STEADY FLOW DESPITE A CANCELLED TRIP TO PUERTO RICO AND A LAST-MINUTE HALT IN THE FINAL THROES OF SEARCHING FOR DR. PETER ALLEN’S HYDROLOGY REPLACEMENT.

SINKHOLE CONFERENCE AND INVITED PRESENTATIONS

Dr. Joe and graduate student, Stephanie Wong, published Temperature: an inexpensive, but useful tool for mapping karst spring habitats, a peer-reviewed conference paper to be presented in Puerto Rico last April at the National Cave and Karst Institute Symposium (nicknamed the Sinkhole Conference). Coronavirus collapsed the conference but the paper was published, and they have a standing invitation to present their work next year.

Dr. Joe was invited to present The Trinity aquifer: from Geyser City to the most drawdown in Texas at the Texas Groundwater Association geoscience seminar on the Trinity aquifer held in Dallas, January 2020. Attending that presentation was alumnus, colleague, co-author, and sister, Frances Pelley (BA Earth Science and Math 1975, BS Geology 1976).

Regionally, the Groundwater Educational Outreach Cooperative asked Dr. Joe to provide a Hydrology 101 class and field trip to Groundwater Conservation Districts educational outreach personnel. The class was held at the Baylor Research Innovation Collaborative (BRIC) facility and Dr. Joe was ably assisted by Wayne Hamilton and PhD students Stephanie Wong and Will Brewer.

Locally, Dr. Joe led a Waco Water Walk attended by 20 people who trekked through Waco’s groundwater history from the Brazos River Alluvium aquifer at Indian Spring to the Trinity aquifer at La Pila Fountain.

Even with new challenges from Covid-19, hydrogeology and water management classes are attracting quality students from multiple departments. Increasing demand for the water management class required offering it every semester. Hopefully, Dr. Joe’s teaching will get even better after receiving the Centennial Professor award to study exurban drought, a human-induced drought resulting from groundwater-dependent recreational...
land development potentially depleting stream baseflow. Although Dr. Joe has only been associated with Baylor University as a student and professor for 50 years (1970–2020), he is humbled and honored to receive the Centennial Professor award for 2020.

STUDENTS

Claudia Dawson is the newest graduate student working with Dr. Joe. Claudia comes from Ohio State University and brings a strong research focus which she will apply to the study of gravel-pit lakes in the Brazos River Alluvium aquifer. Her work will complement fellow graduate student, Will Brewer, who also has a project related to gravel-pit lakes.

Taylor Watson is also a new addition to the lab and joins as an undergraduate geology major conducting a senior thesis at the World Hunger Farm in Waco (Figure 4). Taylor is assessing the sustainability of irrigation at the World Hunger Relief Institute (WHRI) using Geoprobe cores and electrical resistivity. Taylor received funding from the Elan Allen Safety fund.

Second-year MS student, Lauren Lubianski, received the Elan Allen Field Safety Scholarship for her field safety plan and successfully proposed her thesis on tributary stream recharge to the Brazos River Alluvium aquifer. Lauren is currently funded by the Southern Trinity Groundwater Conservation District where she will intern this year.

Second-year MS student, Clara Smith-Salgado received funding from the Clearwater Underground Water Conservation District (along with fellow graduate student, Stephanie Wong). Clara is using synoptic water levels to map springsheds and correlating precipitation with spring discharge at the downtown spring complex in Salado, Texas. The springs are inhabited by a threatened endemic salamander species. Part of Clara’s study is a chemical analysis of the springs in cooperation with the Texas Water Development Board spring monitoring program (Figure 6).

Wynne Casteel graduated in August 2020 with his MS in hydrogeology. He was funded by the Southern Trinity Groundwater Conservation District where he was an intern. He presented his thesis at Groundwater Week in Las Vegas and at the Geological Society of America meeting in Phoenix (Figure 7). He also received funding from the Len Assante Scholarship through the National Ground Water Research and Education Foundation.

PhD student in The Institute of Ecological, Earth, and Environmental sciences, Will Brewer, is progressing well. He received a Len Assante Scholarship through the National Ground Water Research and Education Foundation and is working through preliminary exams and research proposals while finishing his first project this fall. Will has been a teaching assistant for the geoscience summer field course and for the GIS labs in the Geosciences Department.
PhD Geoscience student, Stephanie Wong, published a paper with Dr. Joe and honed her teaching skills at Hydro 101 and the Hydrogeo-Workshop. Stephanie received funding from the Academy of Teaching and Learning at Baylor University and recruited Dr. Joe to speak in a panel on teaching through mentoring as part of the Robert Foster Cherry Award emphasis.

Former student, Ashley McGill, who was a McNair Scholar conducting research in Dr. Joe’s lab, presented her research on precipitation and recharge at the National GSA meeting in Phoenix before she graduated.

COLLEAGUES

I would like to thank Professor Emeritus colleagues Drs. Peter Allen and John Dunbar who contributed significantly to the hydrogeology lab throughout their years in the Baylor Geosciences Department. They have provided friendship as well as academic support and inspiration. I would also like to thank Scott James and Wayne Hamilton who currently contribute a great deal to the groundwater education at Baylor. Keep it up. I need the help. Thank you all. Dr. Joe

FAMILY

Daughter Abigail and son-in-law Jared White live in Plano, Texas with granddaughter Kennedy (3 yrs.), grandson Hamilton (3rd grade), and granddaughter Madison (5th Grade). Son Cal, daughter-in-law Rachel, and granddaughters Elizabeth (3 yrs.) and the newest addition, Ada-Marie (Figure 9) live in Buda, Texas where Cal is a product owner for Mitratech. Son Logan completed his fourth year as an assistant professor at Prairie View University in the psychology department. Logan and daughter-in-law Rachel Beth, grandson Bryce (6 yrs.), grandson Nolan (4 yrs.), and grandson Beau (2 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 internationals and the food pantry. Dr. Joe continues to serve as a deacon while attending Columbus Avenue Baptist Church with his loving wife of 45 years. The Yelderman’s still live at 706 Woodland West, Woodway, Texas and visitors are always welcome.
2020 GEOSCIENCES

STAFF UPDATES
A NEW ARTS AND SCIENCES CORE, CONFERENCES, AND OUTREACH.

FALL 2019 SAW CHANGES IN SOME OF OUR FRESHMAN COURSES WITH THE NEW CORE. THE REQUIREMENT OF TWO LAB SCIENCES WAS MODIFIED TO ONE LAB SCIENCE AND ONE GRAND CHALLENGE COURSE, A 3-HOUR COURSE WITHOUT A LAB COMPONENT.

Lab science courses are generally at the freshman level, while grand challenge courses have more latitude. Our department developed two new grand challenge options: Evolution and Extinction (Dr. Dan Peppe) and Origins of Habitable Worlds (Dr. Peter James). We also modified our Earth Through Time course by separating the lab into a one-hour component that integrated with both the lecture portion and the new Evolution and Extinction course. This allowed us to offer options for students who needed a grand challenge course, while our own majors and computer science students could maintain the required four-hour lab course. Fall 2019 also was the last time our environmental geology course was taught as we considered how best to meet the demands of students.
I attended the 5th meeting of the Earth Educator Rendezvous in Nashville, TN, in Summer 2019 at Tennessee State University. Designed to improve undergraduate education, this is a meeting of Earth science educators at all levels to discuss strategies, activities, and challenges in undergraduate education, as well as a variety of other educational topics. I led a round-table discussion on imposter syndrome, the perception that one’s student or professional position is not reflective of their knowledge, skill, and achievements. Many who attended this discussion were early in their career and valued the group discussions and common experiences they found. I am scheduled to lead a more formal workshop this summer on the topic, although this year’s will be a virtual meeting due to the current COVID-19 crisis.

Outreach Activities in 2019 included my colleague Dr. Liz Petsios and I participating in a skype talk to four 2nd grade classes at Garcia Elementary, a school in Grand Prairie, TX. The students were enthusiastic about dinosaurs and were eager to see more diverse examples of scientists. Our department also participated in Earth Science Week in October 2019 with two major events: Meet the Scientists at the Mayborn Museum and participation in National Fossil Day at the Waco Mammoth Site. Our continued partnership with the museum and the Mammoth Site has proven to be an effective way of introducing geoscience to the Waco community.

In April 2019, we hosted six Midway ISD elementary schools at the Waco Wetlands, meeting with all fourth graders over a six-day period. Activities included a geologic time walk, a fossil hunt, rock and mineral activities, and water-related activities in conjunction with Melissa Mullins of the Center for Reservoir and Aquatic Systems Research (CRASR). We were scheduled to repeat this outreach in April 2020, but it was canceled as were many other events this spring. I look forward to continuing to serve our students and our community as we look to the challenges in fall 2020.
THE FOLLOWING DESCRIBES MY WORK SERVING STUDENTS, STAFF AND FACULTY AT BAYLOR UNIVERSITY AND THE GEOSCIENCES DEPARTMENT.

TEACHING ASSISTANCE

I assisted Dr. Joe’s fall Environmental Geology and Hydrogeology classes and observed how he organized and presented the subjects. The classes met twice a week and gave me interaction with the students and opportunity to discuss and support Dr. Joe’s teaching. When Dr. Joe was out of town, I was able to substitute teach and keep the classes moving forward. I proctored tests, posted class information on Canvas, assisted with field labs, and encouraged students in class. Both classes were a fun group of students that I enjoyed being with and watching them grow and learn how Geosciences applies to their life and career.

The surprise of the spring semester was managing the impact of COVID-19 upon the classroom teaching and field lab classes. I assisted Dr. Joe with moving the Water Management class to Canvas an online learning management system. Via Canvas, we delivered PowerPoint lectures, homework assignments, and collected student presentations and term papers. Once we developed a pattern to a weeks’ worth of assignments, I believe the students understood what was required and accepted online learning. I’ll always prefer face-to-face lectures due to the interaction with students, but the on-line teaching stretched our creativity and learning that I believe will help the students in a more common electronic communication world.
The focus of the research activities was assisting graduate students Wynne Casteel and Sam Barber with their MS Thesis field work. I assisted Wynne with obtaining surveying coordinates for field geophysical instruments and drilling confirmation borings on property owned by a mining company. With Sam, I got in-and-out of the department pickup about a hundred times at road stream bridge crossings measuring the height and width of the Bosque River and its tributaries. My goal was to help both work safely and effectively in the field as they acquired the research data for their MS thesis.

In September at GSA 2019 meeting in Phoenix, I made a presentation entitled: Aquifer Tests an Educational, Technical, and Presentation Experiences at a Research University: A Case Study Working with a Local Water District. The presentation told of our Baylor experience planning, conducting, analyzing, presenting, and writing aquifer test reports for the Clearwater Underground Water Conservation District.

Also, in December 2019, at Groundwater Week Conference, in Las Vegas, I delivered a presentation called Assessing Unconfined Aquifers for Supplemental Potable Ground Water Resources in Central Texas, McLennan County. The presentation was co-authored by Geophysics Graduate Josh Morrison and Joe Yelderman Jr. The presentation shared Josh’s experience as an intern with CP&Y Engineering investigating shallow water resources near Riesel, Texas.

At the March 2020, GSA South-Central Conference in Fort Worth, I made an oral presentation that was updated with field data collected by undergraduate Taylor Watson. Furthermore, the department supported six undergraduate students attending the South-Central Conference. This was a first conference learning experience for the undergraduates exposing the students to technical and poster presentations, a variety of geological vendors, and career development workshops.

During the fall and winter, a west Texas foundation requested Baylor researchers to investigate produced water reuse in the Permian Basin. So, I worked with the Environmental Science department’s George Cobb and Ryan McManamay. In December we visited the foundation production field and office in Midland, Texas. The proposed Geoscience research involved enhanced aquifer recharge and associated governing regulatory review with most of the work done by the Environmental Science Department in water chemistry and toxicity testing. Due to downturn in the oil and gas prices, the proposed enhanced aquifer research has been postponed until a later date.
Ashley Trappe and Alex Goodsuhm conducting water level measurements as part of Dr. Joe’s Hydrogeology class.
DEPARTMENT SUPPORT

Knowing the importance and sense of accomplishment that administrative activities provide, I assist the department in two areas. First with departmental vehicles utilization, such as annual inspections, maintenance, repairs, and cleaning. This allows our faculty and students to get to the field and experience first-hand understanding of geology. Second is helping with laboratory and general safety support. This included monthly audits that are compliant with Baylor’s BioRAFT safety program, fire safety audits, plus active shooter learning and response with department staff.

Baylor rolled out Bear Care Coaching program to connect and aid undergraduate students in response to remote learning that COVID-19 caused. I connect once a week with twenty students via email and text messages to mostly provide encouragement through this uncertain and unpredicted COVID-19 off-campus learning period. The Bear Care Coaching is continuing through the summer and fall to provide additional support to undergraduate students.

PERSONAL

It has been a joy to be two hours away from our daughter and husband who have a one-year old son. Our grandson has his great grandmother’s Irish red hair and is constantly on the go that enlivens our quiet grandparent lifestyle. My wife and I attended my wife’s niece’s wedding in Fargo, North Dakota in August. It was great to see all our family and be away from the sweltering heat of Central Texas. In December we visited our youngest son who is in a PhD program at Georgetown University. Washington DC is a tremendous visitor’s town. We saw the Capital, National Archives, Library of Congress, President Wilson’s home, and the National Cathedral. On Sunday mornings, at our church, I’m “Mr. Wayne” for pre-school children leading music for these precious little ones. Being consistent each week with the same songs, connects with the children and is one of my most significant life activities. And finally, as a car lover---I traded my slow Honda Fit for a fast torque-steer Focus ST, that puts a smile on my face.

CLOSING

So, I’m thankful for this chance at a second life at Baylor after retirement from Shell Oil Company. It has been five years of learnings and relationships with students, staff and faculty that have greatly enriched my life. I’m looking forward to continuing to serve Baylor University in the future.
LILIANA MARIN
LAB MANAGER
GEOLUMINESCENCE DATING RESEARCH LAB

THE BAYLOR GEOCHRONOLOGY LABORATORY (BG LAB) IN THE DEPT. OF GEOSCIENCE AT BAYLOR UNIVERSITY IS A FACILITY WITH THE RESEARCH CAPABILITIES FOR OPTICALLY STIMULATED LUMINESCENCE (OSL). OSL IS A TECHNIQUE THAT QUANTIFIES THE RADIATION AND DOSIMETRIC PROPERTIES OF MINERALS, SUCH AS QUARTZ AND POTASSIUM FELDSPAR TO PROVIDE DEPOSITIONAL AGES FOR MANY SEDIMENTARY SYSTEMS, UP TO 1 MILLION YEARS. THE BG LAB IS UNIQUE TO THE STATE OF TEXAS, ONE AMONGST EIGHT IN U.S. AND THE ONLY ONE BILINGUAL, PROMOTING CUTTING-EDGE RESEARCH AND VISIBILITY FOR BAYLOR UNIVERSITY.

Our research in the lab focusses on addressing “grand challenges” such as evaluating the timing and pace of climate change, as reflected in drought and flood records, the spatial and temporal distribution of intraplate seismicity, and the timing of the inhabitation of the Americas. The BG Lab is known for pursuing meticulous, resourceful, and timely research. We produce a continues stream of data that requires daily analysis and statistical evaluation to maintain quality control. This dedication has been awarded with grants and research contracts from Dept. of Interior, National Geographic Society, the National Science Foundation, and other external sources.

This year we advanced 32 collaborative research projects, analyzing 143 samples for dating to forward the knowledge on the geomorphology Oman, Guyana, and Argentina, Utah, South Carolina, the stratigraphy of China, Argentina, the archeology of the Strait of Gibraltar, Belize, Argentina, Canada, Peru, Gila River, and Florida, the seismology of Chile, Mexico, Guatemala, the paleohydrology in Alabama, Arkansas, and Red River, the tectonic in Columbia River Basalts, Colorado, and the climate variability in Texas, Arizona, Monahans.

We continue developing and testing new knowledge about OSL-derived protocols in: Thermo-transfer Optical Stimulation Luminescence (TTOSL), and Post-IR-IRSL (pIRIR). We share willingly our expertise with the scientific community, supports graduate and undergraduate students, and international visitors. This year the following people worked in the lab advancing scientific studies in Quaternary.
Dr. Logan Wiest, from Baylor University worked as a post-doctoral scientist as part of our research group and industry-based geologists to gather stratigraphic and chronologic data, to model complex depositional architecture for the Monahans eolian system. Logan finished the appoint in May this year, and presently he is a faculty member at Mansfield University.

Dr. Liang Peng, a PhD student from the Institute of Geology and Geophysics in Beijing, graduated last December, was in the lab for two years, thanks to the China Scholarship Council award. His PhD research focused on Understanding the timing and causes of landscape instability and broader denudation for Hulunbuir Sandy Land, in northeast China. During the time in Baylor, he coauthored a scientific paper LDAC: a new Excel based package for calculating Luminescence equivalent dose and final burial age. This paper got published on Ancient TL Journal, Vol. 37, N0.2, 2019, and is accompanied by an open source OSL dating calculation platform, which is available to the global community through the lab webpage (https://www.baylor.edu/geosciences/index.php?id=962356). Presently, he is pursuing a postdoc at School of Earth Sciences, Zhejiang University (China).

Zequn Wu, in her fourth year as Baylor PhD candidate is working in the samples to improve her research on Evaluating the Red River (TX-OK) Aeolian-Fluvial System Sensitivity to Late Holocene Extreme Climate Variability, under the supervision of Dr. Steven Forman.

Connor Mayhack, a graduate from Baylor that has worked for the lab five years, and in the last one and a half years he is pursuing his MSc, under the supervision of Dr. Forman, working on the Chronology, Sedimentology and Stratigraphy of the Monahan's Dune Field in the past 70 ka.

Victoria Todd, another graduate from Baylor has worked for the lab for four years, and in the last two years she is pursuing his MSc, under the supervision of Dr. Forman, working on the Chronology, Sedimentology and Stratigraphy of the Monahan's Dune Field, Assessing the Older Depositions in the Area. To this end, with the help of the OSL personal, she is perfecting a TTOSL technique to push the upper limit of the method close to a million years.

Ashley Gonzalez, a senior undergraduate at Baylor, majoring in Forensic Anthropology; got integrated effortlessly within the group at the beginning of this year and has been a relentless assistant in the lab, demonstrating great skills and dedication for the job.

Shandell Thomas: An international junior Baylor undergraduate student from Trinidad and Tobago, majoring in Geology has been with us for two years. Shandell is collaborating in the research project in the Red River under Dr. Forman's supervision.

August Dreyer, a junior undergraduate at Baylor, pursuing a double BS in Geology and in Economics started working with us at the beginning of the spring semester.

During the sudden interruption of Spring semester, due to the COVID-19 pandemic, we are proud to report that the BG Lab continue operational, gathering OSL data for the pre-prepared samples. Connor was a vital supporter of this endeavor. In par with the first phase of reopening in Baylor in May, we resumed work at full schedule. We welcomed Connor, Tori and Ashley to work with us during the summer, preparing the backlog of samples in the lab for analysis. This reopening required major adjustment to the protocols in the lab. We adjusted the lab safety procedures to strictly follow the CDC guidelines to protect all of us adequately from the coronavirus. In this regard, all participants in the lab have been exemplary and disciplined to maintain the new norms required to work in this environment.
Along with the coordination of the lab, I have taught for the past five years one session of the Geology 1401 Earthquakes and other Natural Disasters class. I cherish the opportunity to maintain my connection with pedagogy and the students’ success. Complementary, I attended several Baylor workshops about good pedagogic practices and excellence in teaching. Beyond the extra-curricular and lab activities, I was a Baylor University exhibitor, in the 2019 GSA Annual Meeting and Exposition being held in Phoenix, Arizona, USA, 22–25 September 2019.

Finally, our group was proud to accompany Dr. Forman to receive the Farouk El-Baz Award for Desert Research. This honor was offered by the Quaternary Geology & Geomorphology Division of the Geological Society of America, where Dr. Forman gave a talk about a summary of his work for the past two. The presentation was called: Fourth Dimensional Understanding of Late Pleistocene Eolian Depositional Environments for the Monahans Dune Field, Texas, USA.
THE PAST YEAR WAS MY TENTH YEAR AT BAYLOR, AND MY ROLE AS AN INSTRUMENTATION SPECIALIST HAS NOT CHANGED SINCE I STARTED WORKING HERE: TRYING MY BEST TO ENSURE SMOOTH OPERATIONS OF THE STABLE ISOTOPE LABORATORY. TO ACHIEVE THIS, I HAD TO SPEND A LOT OF TIME FIXING VARIOUS OPERATIONAL PROBLEMS OF THE AGING SYSTEM.

In addition, regular maintenance, inventory control, and lab safety also played very important roles, but could not prevent some bad things from happening again and again. For example, due to the loss of either power or compressed air, the two Mass Spectrometers (MS) in the lab have experienced more involuntarily shutdowns for the past year than before—the old MS was unexpectedly shut down 13 times, comparing with only 4 times shutdowns for the previous year. The most significant power outage occurred in August 2019 and destroyed the computer. As a result, I had to replace it with a new specific computer ordered from Thermo because it was the only model that could run the current operation systems. It was never easy to set up a new computer and install the associated operation software and programs for the MS—as there was no way I could directly transfer files from the old computer to the new one. I had to upgrade the system step by step: first installing the fundamental operation system ISODAT 3.0, then using the Configurator to connect the MS with all its peripherals through a Conflo IV interface, and finally creating different methods and sequences for C/N/O/H isotope acquisition. The whole process was very tedious in detail and took us over two weeks to complete the task. All this required teamwork, and I needed to work together with both internal and external experts, such as Mr. Adam Watson from BSB ITS and Mr. Burt Wolff from Florida State University, to get the job done. After the installation of the new computer, I carefully tuned and calibrated the system, and then ran several tests to make sure each peripheral was working properly. To avoid being hit again by power outages in the future, I also installed a power surge protection unit, which helped the computer withstand the most recent power outages—already 5 times in 2020.
There was another unusual happening in the past several months and is still influencing our daily life and work. On March 11, 2020, Baylor University President Dr. Linda Livingstone announced that Baylor would shift to online instruction to curb the spread of the coronavirus (COVID-19), beginning on March 23. McLennan County also issued “Shelter-in-place” order on March 23. As a result, most of the faculty and staff would work from home, and only core research facilities in BSB could open as Baylor considered scientific research as one of its essential services. Therefore, my lab has been kept open to both internal and external users since the beginning of the COVID-19 pandemic. During the Shelter-in-place period, it was quiet on campus and seemed as if I was the only person who worked on the fourth floor of the Building. On June 3, Texas Governor Greg Abbott announced Phase III of reopening Texas, and I expect to see more people back on streets and around campus. Hopefully, we can see an end to the pandemic soon and then we can all have our normal life back.

To conclude, I have accommodated departmental stable isotope course and supported various ongoing research programs by providing 3163 reliable C/N/H/O stable isotope analyses and other related services for faculty and students from Baylor and other Universities. I also have generated enough funds to cover daily operating costs. Finally, I would like to thank you all in this Department for your time and kind support in the past year and look forward to working with you in the coming year!
It is an age-old adage that the best geologists are those who see the most rocks. The Baylor Geosciences Department has incorporated this pedagogical philosophy into its undergraduate curriculum by including a field component in most classes. It is a common occurrence to see Baylor Geology vans parked on the roadside with nearby students attentively bent over the outcropping rocks as they make crucial observations about the nature of the Earth. It should be no surprise to you that there is strong evidence indicating that students learn more effectively about the Earth through engaging in fieldwork.

Imagine, therefore, the crisis faced by Geology Departments when in April of 2020 it became clear that all summer courses would have to be taught online because of the COVID-19 pandemic. The challenge of creating meaningful virtual learning experiences that would enhance student’s skills in geologic problem solving seemed overwhelming. We have always believed that to learn geology, you must be in the field.
Therefore, when it became apparent that field courses could not be taught in the field a crisis developed in the Geoscience educational community. In response to this crisis, over 300 field camp directors and instructors worked together under the auspices of an NSF Rapid Response Research grant to share expertise and existing resources to develop new resources to support remote or virtual Capstone summer field experiences for undergraduate geoscience majors. The results of this effort are a small collection of virtual exercises that simulate the experience of data collection in the field. The Baylor Field Course utilized some of this material, but we ended up generating most of the course content ourselves.

What we learned from this experience was that an effective virtual field exercise needs high resolution imagery at the aerial, outcrop, and hand-sample scale. High resolution aerial images of the entire Earth are available from Google Earth and we relied heavily on this resource for our projects. The Google Earth image shown below is the introduction to one of our virtual field assignments and clearly shows the steeply dipping stratigraphy of the Wasatch Mountains, the Wasatch normal fault, and the field area for the project which winds through Ogden Canyon.
These types of aerial images proved to be such an effective teaching tool that I hope we will use them more often in courses taught in a classroom setting. In contrast, the use of the Street View feature in Google Earth was inadequate for outcrop and hand-sample study and hindered the learning experience of the students.

So – how did we do this summer? One of the comments in the student evaluations stated that: “Field camp should never ever be taught online”. I can’t disagree with this sentiment. None the less, the students measured section, made geologic maps and cross sections, and got exposed to lots of different types of geology – all virtually of course. There were no long hikes and no campfires – and that is what I missed the most.
DEAR PETE AND JOHN

RETIRED; GOODBYE, SO LONG, AND FAREWELL.
WE WILL MISS YOU.

This is quintessential Peter Allen. A Cheshire grin implying he knows something you don’t know, and you hope no one else will ever know. One of our more productive researchers and more popular teachers. He is blessed with a great sense of humor and a most creative mind. His sketches from faculty meetings are legendary and who else would have invented a tool to quantify stream-bed erosion that acquired a nickname I am reluctant to share. Peter Allen probably contributed more than anyone other than Jeff Arnold to the famous SWAT model and he was a prolific publisher. His humor, his critical insight, and that grin will be sorely missed by many. Best wishes.

Joe C. Yelderman Jr
RETIRED DEPARTMENTAL ELUCIDATOR

To me, this represents John Dunbar. Bright! Interesting! Difficult to understand! I always enjoyed talking with John because I always received an answer to my questions that was fascinating, insightful, and may have been correct. I usually did not know. It was always different from what I was expecting. It always made me think. John was one of our most helpful faculty members, giving enormous amounts of time to students and helping them with math and physics they did not completely grasp. Thank you, John.

Dr. Peter Allen
2020 GEOSCIENCES

STUDENT GROUPS

Over the summer, we participated in the Geology Day at the Waco Mammoth National Monument. During the fall semester, our group participated in Earth Science Week at the Mayborn Museum. Led by the Geosciences Department the event allowed both adults and kids to interact with professors and participate in hands-on activities. We also had a campout led by Dr. Stacy Atchley near Gatesville, TX where we saw dinosaur tracks preserved in a limestone outcrop and did some fossil collecting as well. We wrapped up the semester with our third annual holiday bowling party, which was organized with BAWG.

In the spring semester, we had the opportunity to visit the Brazos River Authority, where we were educated about water resource management.

Our volunteering, social, and educational activities during the year provided excellent ways to appreciate the geosciences as well as spread their appreciation through the community, and we look forward to more of the same during the upcoming year.

Benjamin Sadler
2019–2020 BGS/AAPG PRESIDENT
Dear Alumni and Friends,

In the spring of 2018 the Baylor Association for Women Geoscientist (BAWG) was chartered for the purpose of providing a supportive and encouraging environment for its members and to promote the professional development of women geoscientists. At Baylor we hope to achieve these goals through networking, community, and mentorship. This past Fall, BAWG inaugurated the semester with an afternoon tea party that included plenty of buttery scones, fellowship, and telestrations! Another memorable event was a graduate student panel purposed as a platform for the discussion of the graduate experience at Baylor as well as an avenue for tips and tricks to conquer our graduate studies. Mental health, family life, time management, and study tips were just a few of the topics discussed on the panel. We began the spring semester with our first Baylor faculty “retiree” panel where retiring faculty members Dr. John Dunbar, Dr. Peter Allen, and Dr. Joe Yelderman shared stories about their careers and what defined them both personally and professionally over the years. We appreciate the faculty members’ willingness to share their stories.

Fall 2020 will be full of novelty and enthusiasm as we all navigate rejoining campus life after the intrusion of COVID-19 into our daily lives. Some of the socially distant main events we have planned are our notorious His/Her Stories with alternating students and faculty each month, a geoscience career panel with special guests from neighboring petroleum companies, an online screening party of “The Bearded Lady Project” for the department, and various smaller events to promote community and mentorship within the department.

As networking is one of the main pillars of BAWG, we hope to build a strong relationship with alumni and friends of the geosciences department in the future. We appreciate your support and are open to suggestions of ways to ensure BAWG thrives at Baylor. We are excited to see this organization grow!

Best regards,

Elizabeth Raw
BAWG PRESIDENT

Julia Visy
BAWG VICE PRESIDENT
BACHELOR OF SCIENCES IN GEOLOGY
SARAH F. AL-MARWANY
JOSHUA M. CUELLAR
ASHLEY K. TRAPPE
CARSON L. MANKA

—

BACHELOR OF SCIENCES IN GEOPHYSICS
JOSHUA M. CUULLAR

—

MASTER OF SCIENCE IN GEOLOGY
KATARENA R. SHINER – Implications of Soil Geochemistry for Understanding Agricultural Cultivation by the Ancient Maya
MENTORS: DR. STEVE DWORKIN & DR. JULIE HODGARTH

MARIYLIN M. WISLER – Paleocceanographic Evolution of the Late Devonian Duvernay Formation: Insights from the Geochemistry of the Western Canada Sedimentary Basin
MENTOR: DR. STEVE DWORKIN

—

DOCTOR OF PHILOSOPHY
DONALD A. ESKER – Thermoregulation and Dental Isotopes Reveal the Behavior and Environment of Pleistocene Megafauna at Waco Mammoth National Monument
MENTOR: DR. STEVE FORMAN

ALDEN NETTO – Modeling the Crust and Upper Mantle Structure of the Southern U.S. Continental Margin Using Seismic and Gravity Data
MENTOR: DR. JAY PULLIAM

—

BACHELOR OF SCIENCES IN GEOPHYSICS
JOSHUA MORRISON

—

MASTER OF SCIENCE IN GEOLOGY
KATARENA R. SHINER – Implications of Soil Geochemistry for Understanding Agricultural Cultivation by the Ancient Maya
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MENTOR: DR. JAY PULLIAM

—

BACHELOR OF SCIENCES IN GEOLOGY
DAVID A. GOMEZ
ALEXANDER A. GOODSUHM
CHARLES E. TOMPKINS

—

DOCTOR OF PHILOSOPHY
ANDREW G. FLYNN – Early Paleocene Fossil Floras, Paleoclimate, and Magnetostratigraphy from the San Juan Basin, New Mexico, USA
MENTOR: DR. DAN PEPPE

CONG JIN – Late Triassic Climate Reconstructions Derived from Sandstones, Petrified Woods and Paleosols of the Chinle Formation at Petrified Forest National Park, Arizona
MENTOR: DR. STEVE DWORKIN

—

AWARDS
ALEXANDER GOODSUHM – Robert T. Hill Award for Academic Excellence in Geology.

WILL BREWER, LAUREN LUBIANSKI, CLARA SMITH-SALGADO, & STEPHANIE WONG – Elan Allen Safety scholarship for outstanding safety plans in field work.

STEPHANIE A. KRILL – Represented the Geosciences Department at the spring College of Arts & Sciences Honors Convocation.

SAMUEL BARBER – Baylor Geosciences June 2020 NAGT Outstanding TA Award for his excellent work as a teaching assistant. Sam will receive a one-year membership to NAGT (National Association of Geoscience Teachers) and an online subscription to their related journals.

NICK WAGNER – 2020-2021 Texas Space Grant Consortium (TSGC) Fellowship
READING THE CLUES IN MINERALS AND GEMSTONES

BAYLOR PROUD PROFESSORS

CELEBRATING INTERNATIONAL AWARD

DEPARTMENT OF GEO SCIENCES NEWS

CLICK YOUR WAY THROUGH OUR EXCITING NEWS
WE ARE EXCITED TO SHARE AN UPDATE OF ONE OF THE NEATEST ADDITIONS TO OUR DEPARTMENT. WE ARE BUILDING A NON-CENTRALIZED “GEOVISUALIZATION LAB” THAT IS HOME TO POWERFUL EQUIPMENT USED IN TEACHING AND RESEARCH. WE NOW HAVE MULTI-CORE COMPUTERS, 3D PRINTING, 3D SCANNING, A PHANTOM 4 DRONE, AND AN RTK GPS. THE LAB HAS MADE AN IMPRESSIVE AND DIVERSE IMPACT IN JUST ITS FIRST YEAR. HERE ARE SOME OF THE RESEARCH PROGRAMS THAT HAVE USED THE EQUIPMENT.

PALEONTOLOGY

Elizabeth Petsios was the first to use the Geovisualization lab for teaching responsibilities and has had a lot of ideas. Elizabeth recognized how the 3D scanner and 3D printer could be used to scale-up real specimens of microscopic foraminifera for a GEO 1406 (Historical Geology) lab activity. Forams are important for calculating relative sea surface temperature based on proportional abundance of left-coiling and right-coiling foraminifera from ocean sediment cores. Elizabeth used the hand-sized 3D specimens to help the students visualize the difference between left-coiling and right-coiling foraminifera (PHOTO 1). Elizabeth is also planning a scaled-down 3D print of the Glen Rose dinosaur trackway. The trackway must first be rendered using digital photogrammetry. After that is completed, the tracks will be 3D printed and then used in another Historical Geology lab activity. Students will use the 3D print, along with rulers, to calculate the foot length, stride length, leg height, and ultimately the movement speed of the dinosaurs that made the footprints. For research, undergraduate student workers are assessing biovolume of Pennsylvanian age marine benthic communities from Texas for paleoecological reconstruction. The 3D scanner will be used to make true color 3D renderings of representative taxa. 3D volume and sample abundance data will then be used to calculate biovolume. Because this will be a valuable resource for other researchers and teachers, the 3D renderings will be made publicly available on the Petsios Lab website.
GEOPHYSICS

Geophysics research has also heavily been involved of the use of Geovisualization equipment. Alden Netto used the powerful computer, nicknamed ‘Sitka’, to explore models of the southeastern U.S. lithosphere (PHOTO 2). Joseph Thangraj and Diego Quiros have also used the system for their Department of Energy funded project to develop an automated seismic array for seismic interferometry. Seismic interferometry is a relatively new technique for identifying and using seismic waves to explore the Earth’s interior. The project is directed at developing techniques for geothermal exploration, but its application extends far beyond that application. Our planetary geophysicists, Peter James and Chris Mitchell, used the RTK GPS to assist with a geophysical survey across Meteor Crater near Winslow, AZ. The crew went into the crater to perform a detailed geophysical survey and georeferenced the gravity anomaly readings to a LiDAR dataset.

VOLCANOES AND CRYSTALS

Tyler Leggett made a splash at AGU by printing large portions of his research poster on rhyolite lava flows in 3D. The news media heard about his poster via word of mouth and came by to interview and film him. Another interesting application Kenny Befus was the drone pilot tasked with collecting aerial footage of a series of dynamite explosions that were designed to simulate volcanic eruptions. He flew lower and closer to each explosion until the drone was eventually shot out of the air by a ballistic dirt clod. Surprisingly, the drone survived with not even a scratch. Some of the drone footage was shown on NPR’s TV program “Maddie about Science.”
VIRTUAL GEOSCIENCES HOMECOMING OPEN HOUSE
VIA A ZOOM MEETING
FRIDAY, OCTOBER 16, 2020 AT 7:00 PM.

Come talk with faculty and students about their virtual class, lab, and field course experiences. Also, help give Dr. Peter Allen and Dr. John Dunbar a memorable retirement farewell.

Due to social distancing the department was not able to have a formal celebration of Pete and John’s years of service to the University. Please join us to share your appreciation and memories with them at this virtual event.

Please check our website and social media accounts for more information.

WE WOULD LOVE TO HEAR UPDATES FROM OUR ALUMNI AND FRIENDS!

JOIN ZOOM MEETING

Meeting ID: 897 8450 1756
Passcode: 738010
ON OCTOBER 8, 2020 O.B. SHELBURNE (BS, 1955) RELEASED HIS BOOK:
FROM PRESIDIO TO THE PECOS RIVER: SURVEYING THE UNITED STATES–MEXICO BOUNDARY ALONG THE RIO GRANDE, 1852 AND 1853

The 1848 treaty of Guadalupe Hidalgo that ended the Mexican American War described a boundary between the two countries that was to be marked through a joint boundary commission effort. The section of the boundary along the Rio Grande from Presidio to the mouth of the Pecos River was arguably the most challenging, and it was surveyed by two American parties, one led by civilian surveyor M. T. W. Chandler in 1852, and the second led by Lieutenant Nathaniel Michler in 1853. Our understanding of these two surveys across the greater Big Bend has long been limited to the official reports and maps housed in the National Archives and never widely published. The discovery by Orville B. Shelburne of the journal kept by Dr. Charles C. Parry, surgeon-botanist-geologist for the 1852 party, has dramatically enriched the story by giving us a firsthand view of the Chandler boundary survey as it unfolded.

Parry’s journal forms the basis of From Presidio to the Pecos River, which documents the day-to-day working of the survey teams. The story Shelburne tells is one of scientific exploration under duress—surveyors stranded in towering canyons overnight without food or shelter; piloting inflatable rubber boats down wild rivers; rising to the challenges of a profoundly remote area, including the possibility of Indian attack. Shelburne’s comparison of the original boundary maps with their modern counterparts reveals the limitations of terrain and equipment on the survey teams.

Shelburne’s book provides a window on the adventure, near disaster, and true accomplishment of the surveyors’ work in documenting the course of the Rio Grande across the Big Bend region.

- Courtesy of Amazon.com book listing and description.
CONGRATULATIONS

DR. LAUREN MICHEL (PHD, 2014) for winning the QEP Award for Excellence in Creative Inquiry Instruction for the 2019 year at Tennessee Tech University where Lauren is an assistant professor in the department of Earth Sciences. In honor of her achievement Lauren received a commemorative plaque and a $1,000 award.

MICHAELA DONAHO (BS, 2018) for presenting her research at Goldschmidt 2019 conference in Barcelona, Spain. Michaela recently completed her master’s degree in Geological and Earth Sciences/Geosciences at Texas Christian University.

ALUMNI MEMORIAM

CONDOLENCES TO THE FRIENDS AND FAMILIES OF:

PAUL HAIRSTON
JANUARY 27, 2020
BS, 1983

DR. DEBRA SUE JENNINGS
JANUARY 1, 2020
PHD, 2014

LAURIE TSUCHIYA
NOVEMBER 2, 2019
BA, 1986 & MA, 1990
DEPARTMENT OF GEOSCIENCES

FACULTY

DR. STEVEN DRIESE
Interim Chairman, Associate Dean for Research, Graduate School & Professor

DR. STACY ATCHLEY
Professor

DR. KENNY BEFUS
Assistant Professor

DR. VINCENT CRONIN
Professor

DR. STEVE DWORKit
Professor, Undergraduate Program Director

DR. STEVE FORMAN
Professor

DR. JAMES FULTON
Assistant Professor

DR. DON GREENE
Professor

DR. WILLIAM HOCKADAY
Associate Professor

DR. PETER JAMES
Assistant Professor

DR. SCOTT JAMES
Associate Professor

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

DR. DANIEL PEPPE
Associate Professor & Graduate Program Director

DR. ELIZABETH PETSIOS
Assistant Professor

DR. JAY PULLIAM
W.M. Keck Foundation Professor of Geophysics

DR. JOE YELDERMAN
Professor

EMERITUS

DR. PETER ALLEN
Emeritus Professor

DR. RENA BONEM
Emeritus Professor

DR. JOHN DUNBAR
Emeritus Professor

DR. TOM GOFORTH
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DR. DON PARKER
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