



DEPARTMENT NEWS

Greetings! We have another year of exciting things to tell you about, and we look forward to hearing from you as well.

Student success. 2017 was another great year for CSUB geology student success stories. We continued our remarkable trend of awarding 30+ degrees, with 32 undergraduate and graduate receiving degrees in 2016-2017. Demographics of this group reflect the diversity of students at CSUB, and these students are going on to graduate school or obtaining professional positions. We also had a very strong showing of student research at GSA in Seattle (see the student news section), and students also presented research posters at AGU in New Orleans, Penn State's AfricaArray Diversity Initiative Meeting in Houston, at the Southern Coast Geologic Society in Orange County (where the student poster by **Sam McKinney** and **Jeffrey Buehler** (**David Miller**, advisor) won an award), and at SJGS and at SEG.

We hired a new geologist and plan to hire more. This past year we hired Assistant Professor **Chandranath Basak**, an aqueous geochemist with postdoc experience in Germany and at Lamont-Doherty Geological Observatory in Columbia University. Chandranath replaces Graham Andrews who took a tenure-track position at West Virginia University. We are delighted to welcome Chandranath to our team and **we are currently searching for a tenure-track, petroleum-oriented geologist** to start fall, 2018. We have been told that we may be able to increase our faculty by two over the next several years, and

this hire is part of the expansion. In addition to replacing Dirk and Jan when they retire, we hope to hire the second expansion faculty within the next few years. As we grow, we are very fortunate to have part-time instructors helping to cover courses: **Lisa Alpert, Karen Blount, Larry Drennan, Steve Kiouses, Pam Knight, Nick Moreno, Brian Pitts, Spencer Schroer** and **Gregg Wilkerson**.

New Seminar Series. We are now in the second year of our Department of Geological Sciences Seminar Series. **Adam Guo** has done a phenomenal job of organizing a diverse array of local, regional and national speakers from government agencies, industry and academia. Seminar topics ranged from seismic research on Mount St. Helens and moon rock analyses to discussions about gas hydrates and reservoir rocks to educational technology. Please plan to join us for future seminars—you won't be disappointed. Our spring seminar schedule is not yet available, but will include seminars from the petroleum geology position candidates, so stay tuned.

Grants. Geology faculty continue their remarkable record of acquiring external funding for research. In addition to a new \$295,000 NSF award to **Rathburn** (PI) and **Baron** (see Tony's section for a description), **Chandranath Basak** received two new NSF grants (that he brought with him), one grant for \$142,645 (PI) and the other for \$443,776 (Co-PI). The \$4,996,937, 5-year Phase II award for CSUB's NSF *Center for Research Excellence in Science and Technology* (CREST) is now in its second year. Geology

Emeritus Professor **Rob Negrini** was the lead for both Phase I and Phase II awards with Geological Sciences faculty **Andrews, Krugh, Gillespie, Guo, and Baron**, as well as four Biology, Math, and Engineering faculty as co-PIs and team members.

Rooms and hallways have changed. Our newly renovated student study and tutoring room has been a resounding success. The former library now includes freshly ground coffee, tea, snacks provided by the Geology Club, a microwave, a refrigerator, a light table, a magazine rack for science journals, oak cabinets to store study trays of rocks and minerals, and two white boards to go with new tables and a TV monitor. Even more changes are planned (including a microscope) to make this a more effective place for learning and informal interactions between faculty and students. We try to get together for coffee/tea and conversation in this room at 10:00 each weekday, but faculty and students can be found in the room at all hours. This is especially true for Tony, Chris and Chandranath, as they are the current leaders in the consumption of coffee/tea (although graduate students **Sade Haake** and **Maryanne Bobbitt** are not far behind). Please come by and join us for coffee/tea and conversation anytime that is convenient.



The Geology Club participates in the annual FAB Fest along with all of the NSME clubs. This event is hosted by CSUB for the community. This year the club helped the kids create their own fossil beds out of clay.

The hallways also look different. We now have two wall-mounted monitors in the hallway outside the geology office. One of these is used for up-to-date information about events, and student opportunities. The other is used for photos of students and faculty in the lab and the field. People often stop and watch the series of slides that include amazing ZZZZX trip photos taken by **Brian Pitts**. We also have four new oak cabinets mounted on the wall, soon to be populated with informative posters created by the Geology Club. Paleontology course students are currently in the process of rejuvenating one of the third floor displays with Paleozoic fossils, models and information. The display on the third floor is not the only exhibit to experience major changes. Students are also in the final stages of completely overhauling the geology displays on the first floor of Science II. Geology majors **Austin Fowler, Calvin Katipunan, Zach Webb, Karol Casas, Rick Fewtrell, Estefania Olaya, and Erin Walter** have created innovative and eye-catching 3-D displays that include disguised computer monitors, props and informative posters. You may have gotten a sneak-peak at the earthquake exhibit as it has already been featured as the background for several recent TV interviews about earthquakes given by **Chris Krugh**. We currently have the displays covered over, but will soon invite you all to the unveiling of the student-designed, student-built, educational/outreach exhibits.



The Geology Club Grand Canyon Spring Break Trip 2017

These exhibits include computer monitors that will primarily be used as a means of student recruitment and to advertise geology, the Department and the success of our alumni. In this light, we are currently putting together a series of PowerPoint slides for the computer monitors in the new displays, and would like to feature alumni. **We would greatly appreciate photos of each of our alumni and Emeriti, with text that includes your current job title or activities and a brief statement about your experience at CSUB.** We will use these to create PowerPoint slides for each person, or you can send in a PowerPoint slide that you created with photos and text--there is no prescribed format for these slides. If you wish to see an alumni PowerPoint slide that we created to get an idea for a template, just contact Tony at arathburn@csub.edu.

Our New Sandbox. Our latest educational device, the augmented reality sandbox (see the photo in Dirk's section), has everyone talking. Over the course of the summer, through determined hard work and ingenuity, three undergraduate geology students (**Zach Webb, Austin Fowler and Calvin Katipunan**) constructed this mobile device. This sandbox uses X-Box and computer technology to project dynamic topography on sand contained in a wooden box. The colorful contours change automatically as you shift the sand with your hands. You can also create a dynamic sea level, rain, rivers and lakes. Everyone who has seen the sandbox in action has fun creating islands, volcanoes, rain storms and crater lakes, and finds it difficult to tear themselves away. We have only begun to explore the uses of this sandbox in labs and outreach activities.

Community Engagement. This year was no exception--both students and faculty continue to be actively engaged in community outreach. With guidance from **Elizabeth Powers** and **Chris Krugh**, students in the Geology Club were especially active this year. We are all very proud that the Geology Club easily won the first annual (2016-17) NSME Community Service Cup by accumulating almost 200 community service hours. They worked in a variety of settings,

including CSUB outreach events and educational demonstrations in K-12 classrooms. **Elizabeth Powers** has been very active in NSME "Fab Fridays," where large numbers of local school children come by for tours and demonstrations. Faculty have also been active in outreach efforts. **Chris Krugh** was contacted by local, regional and national media, interviewed several times (including 4 times in one week) and appeared on local TV talking about earthquakes. Geology undergraduates were included in one of the interview videos about earthquake safety. Our seminar series, outreach displays, outreach events and Department tours are typically team efforts by geology faculty, staff and students.

We want to continue our close connections between the Department (students and faculty) and alumni and local industries. We also want to increase student experiences in applied geology and professional development. If you, or someone you know, are interested in teaching a course, leading a field trip, giving a seminar, or giving guest lectures (geology, professional development, etc.) to our students, please let us know.



A rare photo of full-time faculty and staff all in the same place at the same time! From the left, Chandranath, Adam, full-time lecturer and alumna Katie O'Sullivan, Sue, Elizabeth, Tony, and Dirk. Full-time lecturer David Miller is missing, as well as Emeriti Bob Horton and Rob Negrini.

FACULTY AND STAFF NEWS

Dirk Baron This was another busy year in which I served and as the Interim Director of CSUB's new California Energy Research Center and on university-wide search committees including as the chair for the search for a new Dean for the School of Natural Sciences, Mathematics, and Engineering. I am happy to report that we hired Kathleen Madden as the new dean of our school and Alan Fuchs as the new full-time Director for the Energy Center. I also completed another three-year department chair term this year. It is great to see the department thriving with record numbers of students receiving BS and MS Geology degrees, new faculty arriving, new grants, and much exciting research going on. However, I now enjoy having time to re-focus on working directly with students and my scholarly activities.

Other highlights from last year include the Annual Meeting of the Geological Society of America with presentations about our dual-credit Honors Geology classes local high schools.



Karen Blount's poster at the GSA meeting. Other teachers presenting or attending the meeting included Steve Kiouses, Jonathan Walker, Chris Carrisalez, Teri Madewell, Camille Ramirez, and Richard Ruiz.

The dual-credit classes started 20 years ago with **Pam Knight's** class at South High School and **Jan Gillespie**. Thanks to generous support from the National Science Foundation, Chevron, and others, we now have classes at eight schools, plus a summer class based at Ridgeview High School that is open to all Kern High School District students. In all, every year about 600 college-

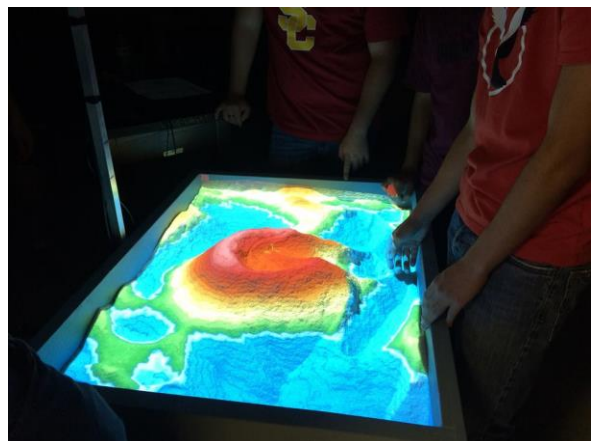
bound high school students now take a rigorous Geology class in their senior year. Many of our majors and graduates are now coming from these classes, including our 2017 Outstanding Graduating Senior **Valerie Petela**. She became interested in Geology through **Jonathan Walker's** first dual-credit Geology class at North High School and is now working on her MS Geology at Sacramento State.

The annual Geol 2010 field trip based at the Zzyzx Desert Studies Center is always a fun event. This year we were joined by a group from Bakersfield College and CSUB Provost **Dr. Jenny Zorn! Katie O'Sullivan** did a great job leading the trip and took us to a couple of new places.



On top of Kelso Dunes

Last, this year saw the completion of a long-standing project when students **Austin Fowler**, **Kalvin Katipunan**, and **Zach Webb**, with help from **Elizabeth Powers** put together a "augmented reality" sandbox and figured out the software for it. It is now a striking eye-catcher at outreach events and helps students understand contour lines and topographic maps.



The new "Augmented Reality" Sandbox

Janice Gillespie I continue to work for the US Geological Survey as a senior research scientist. I am helping them map protected aquifers in the oil-bearing basins in California pursuant to California Senate Bill 4-- the Well Stimulation Bill commonly called the Fracking Bill. It's been really fun to map underground and trace the outlines of ancient lake shores and deltas long buried under hundreds or thousands of feet of sediments that make up our alluvial aquifer. The Central Valley aquifer is the second largest aquifer in the US (the Ogallalla aquifer is the largest). Kern County is an exciting place to work because it produces more oil than any county in the US. It is also the second (or sometimes third...after Fresno (no. 1) and, sometimes, Tulare counties) largest ag producing county in the US. No piece of land in the nation works harder! Because underground mapping doesn't require me to be on site, I can work remotely using a variety of GIS programs. I am currently working in my new office in southwest Utah where I can look up and see the big red cliffs of the Jurassic Kayenta Formation outside my window. One day each week, I slip over to the paleo lab at the Grand Staircase Escalante National Monument to help pry dinosaur bones out of plaster jackets. The lab has a new T Rex skull that is particularly amazing! These dinosaurs are found on the eastern part of the monument in an area called the Kaiparowits Plateau and we are super concerned that it will be part of the monument that will be taken away as the new administration tries to downsize the national monuments. We are all hoping we can save the Kaiparowits so that we can keep finding cool dinosaur fossils!



Jan Gillespie (on the right) working (and playing) in the Grand Staircase-Escalante paleontology lab in Kanab, UT. T Rex for scale.

Junhua “Adam” Guo In this past year, I taught one graduate and one undergraduate class in the spring and the fall, respectively. In the summer, I again participated in the Chevron Revs Up program. Six high school students processed and analyzed Soda Lake sediment samples with X-ray Diffractometer. This fall, a new graduate student Alex Rodriguez joined my research group. Currently he continues to work on Soda Lake samples. Nick Mitchell, Karla Lopez, Obeyd Mohammadi have been working hard and finished their thesis draft. All three are anticipated to defend in the coming spring. Sade Haake, a graduate student being co-supervised by Dr. Krugh and me, has made good progress on his thesis project - wild fire impact on mountain slope soil's physical properties. He presented his initial results at the Annual Meeting of the Geological Society of America in October this year.

In the past year, I still have been involved in IODP #359 post cruise studies. A few papers were submitted to EPSL, Marine Geology, and Geology with my expedition collaborators. One chapter of my previous Ph.D. dissertation was updated by adding new data and submitted to Geosphere with my Ph.D. supervisor. Tulare Lake clay mineralogy manuscript will be submitted to Journal of Paleolimnology soon. This summer, I submitted

one grant proposal to DoD to acquire a new XRF. The results are still pending.

This fall, I attended my first annual meeting of AfricaArray project in Houston. Two geology students, Virginia Rodriguez and Azael Salinas, presented their project progress and results. This year, I also served as the department seminar series coordinator. I invited some speakers and scheduled their visit including Geoprism distinguished lecturer, CSU COAST speaker, IODP distinguished lecturer, Earth Cube Lecturer, AAPG guest speaker, etc.

At home, my wife Yan and all of the children have been doing well. I am so proud of the three big sisters in school. They were all awarded with "Student of the Month". They all like and enjoy mathematics. Alice is called "Math Ninja" in her class. This fall, we welcomed a new family member Bryan.



AfricaArray annual meeting with Virginia, Rodriguez (left) and Azael Salinas (middle) in Chevron, Houston.

Chris Krugh. My research group has been active in a number of exciting projects focused on the evolution of the southern Sierra Nevada. Blake Foreshee and Spencer Schroer successfully defended their MS thesis research which focused on the use of stream profile analysis to constrain incision histories of the lower Kern River and Caliente Creek watersheds respectively. Their results are remarkably consistent with rock uplift and erosion predicted by models of lithospheric removal beneath the southern Sierra Nevada and San Joaquin Basin. Undergraduate student Toni Ramirez joined the research group in Fall 2017 and has been conducting stream profile analysis of the Poso Creek watershed. Her research will allow us to compare histories across the Kern Arch and identify any south-to-north variations in rock uplift potentially associated with delamination processes. Maryanne Bobbitt and Erin Walter are using airborne LIDAR data and fieldwork to identify terrace remnants and rockfall/landslide deposits along the Kern Gorge section of the lower



Chris Krugh at the mouth of the Kern River

Kern River. This research will provide detailed constraints on the incision history of the lower Kern River as well as highlight the key geomorphic processes involved in bedrock channel erosion and knickpoint migration. Maryanne presented some preliminary findings at the 2017 AGU Annual Meeting in New Orleans, LA. Kristin Koehler is wrapping up her MS thesis research focused on stream profile analysis of watersheds that drain the footwall of the Southern Sierra Nevada Frontal Fault Zone (SNFFZ) on the

eastern flank of the Sierra Nevada. Her research will help to characterize footwall rock uplift and potentially constrain fault displacement patterns resulting from the interaction and mechanical linkage of segments within the SNFFZ. I am also co-supervising Sade Haake on his MS thesis research on the physical properties of soils impacted by the 2016 Erskine fire near Lake Isabella. Sade presented preliminary results on the impact of burn severity on soil properties at the 2017 GSA Annual Meeting in Seattle, WA and at AGU. These research projects were supported by the CSUB CREST Phase I & II grants awarded by the National Science Foundation.

David Miller In 2016-2017, I have continued my internship program on Tejon Ranch, in collaboration with the Tejon Ranch Conservancy, that is investigating Cenozoic fluvial conglomerates in southern California. Over two dozen undergraduate interns have spent the last two summers in the Pit of Hell (summer in the San Joaquin) leaving no stone unturned in their insurgent campaign to liberate the Eocene-Miocene conglomerates of Tejon Ranch. CSUB Geology undergrads from the intern program presented 17% of the posters in the Sedimentary, Clastics division at GSA Seattle in 2017. Wow! What a great crew. I am so proud of this bunch and saw several former students make the successful transition to the work force and grad school.



Undergrad presenters at the GSA National Meeting in Seattle, WA



Kenneth Watson and Jesus Moreno on the Tejon Ranch Conservancy

Katie O'Sullivan This year I've started an exciting research project with undergraduates Virginia Rodriguez and Stewart Harvin. We are using the brand new CT scanner from Dr. Brandon Pratt's (biology department) lab to analyze the crystals and vesicles in basaltic rocks. The CT scanner uses X-rays, exactly like the one at the doctor's office, to create a 3D model of a sample. The crystal and vesicle distributions can provide information on the eruption mechanisms, crystallization history, and paleo-elevation of a sample. The CT scanner is completely non-destructive, so precious samples can be analyzed without destroying them. I hope to extend this research to extra-terrestrial samples in the future. Virginia Rodriguez presented her research at the Africa Array Forum in Houston, TX in October 2017 and Stewart Harvin plans on presenting his research at the joint Cordilleran/Rocky Mountain

Geological Society of America conference in Flagstaff, AZ in May of 2018.

I taught Planetary Geology last Spring semester and we took a field trip to Mars (i.e. the Mojave National Preserve). Here we are dressed up as astronauts in a lava tube; which students found to be a great place to set up a Martian colony!

Last Fall semester I took 62 Physical Geology students out to the Desert Studies Center at Zzyzx for a 3-day, 2-night field trip. We toured the lava tube, sand dunes, & cinder cones in Mojave National Preserve and also explored Rainbow Basin near Barstow. This is a really exciting trip that exposes many non-geology majors to experiences they would otherwise never have to the opportunity to do, like driving on a dirt road, walking off the trail, sitting by a campfire at night, or seeing the Milky Way. On the last day of the trip I overheard a student say to a friend, "I never thought I would do anything like this in my whole life". I thought to myself, "Mission accomplished!".

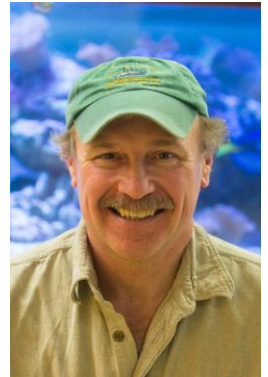


Photo Credit: Jordan Rendel

Tony Rathburn Department Chair, My first year at CSUB has been great. I spent the first two semesters getting my bearings and writing grant proposals and papers. This fall, Dirk Baron and I traded offices and duties as I became Department Chair. I am very excited about the opportunities and positive direction that we are headed in. My first semester as Department Chair has been made so much easier by much appreciated help and team work from Sue, Elizabeth, Dirk, Jan, Rob, Bob,

Chris, Adam, Chandranath, Katie and David. I also appreciate their patience as I still have many boxes crammed in a classroom while striving to get the rest of my lab and office materials unpacked and organized in between research, teaching and administrative duties.

Highlights of my 2017 spring semester included collecting research samples off San Diego on a new research ship. The most recent ship to be added to the American Research Fleet is the *R/V Sally Ride*, named after the first American female astronaut and the youngest American to fly in space (aboard Space Shuttle Challenger in 1983). Together with teams of scientists and technicians from Oregon State University, the United States Geological Survey, The University of Rhode Island, Sacramento State University, Scripps Institution of Oceanography, and Woods Hole Oceanographic institution, I participated on one of the science verification cruises (testing operations) aboard the *R/V Sally Ride*. While testing gear, we were able to obtain research cores from various seafloor locations in oxygen-poor, organic rich environments. I will use these samples to examine microfossils and living microfauna (modern analogs) to interpret paleoenvironmental changes.



In addition to the scientific aspects of the voyage, I was able to introduce a bit of educational fun. Before I left for the cruise, I asked students and



Before and after: decorated Styrofoam cups that were sent 1165 m to the bottom of the ocean.

staff to decorate Styrofoam cups with colored markers. I placed the cups in an onion bag donated by the ship's cook, and attached it to the multicorer before the package was sent 1165 m to the seafloor. Pressure at that depth squeezed much of the air out of the cups, reducing them in size by a least 50%. These shot glass sized souvenirs of the deep were brought back to the Styrofoam cup artists at CSUB.

In the early summer, Dirk Baron and I received an NSF grant of about \$295,00 plus 6 to 9 marine research voyages over the next 3 years. In collaboration with researchers at the University of San Diego (USD) and Scripps Institution of Oceanography (SIO), we plan to use hands-on experiences in oceanography and micropaleontology to increase the number of minority geology majors at CSUB. Local high school teachers, CSUB and USD science education majors as well as majors and non-majors will actively participate with experienced research scientists on SIO research voyages off the coast of San Diego. If you are a high school teacher or CSUB student, let me know if you would like to join us on one of our San Diego cruises. Alternatively, if you would be willing to help out with career workshops, please let me know.

One of my highlights for the fall was my trip to Moss Landing to meet the ship that had recovered my seafloor experiments. The colonization experiments had been on the seafloor off the Californian coast at 4000 m for the past year, and were deployed and recovered using Monterey Bay Research Institute's (MBARI) remotely operated vehicle. It was like Christmas morning as we viewed the experiments housed in seawater containers in the walk-in cold room (4 degrees C) on the ship. We had our hopes and suspicions, but didn't exactly know what would colonize the plastic mesh cubes. We were delighted to recover hundreds of attached foraminifera, dominated by two calcareous species—amazing, given that this habitat is well below the lysocline. This research is done in collaboration with my former student Ashley Burkett, now at Lockhaven University in Pennsylvania and Ken Smith at MBARI.

My teaching duties include historical geology, a professional development class and a course in paleontology and geobiology. I am always on the lookout for great fossil field trip localities in the region. I would be delighted to hear from folks with suggestions for field trips to local fossiliferous outcrops.

Chandranath Basak I started as an assistant professor at CSUB last August (coming from Columbia University, NYC). The first semester went by fast with settling down after a cross-country move and teaching two classes (one introductory and one graduate level). With a lot of help from the staff, faculty and students - I prevailed.

By training, I am an isotope geochemist who studies the chemistry of oceans and how oceans changed through time in the past. Last semester I taught 'Ocean Sciences' – a graduate level course that covered different facets of modern oceans and its importance in controlling global climate, both present and past. In future I hope to develop classes related to ocean chemistry and past climate change. My own ongoing research involves going out to sea and collecting seawater samples, which are then analyzed to study ocean chemistry. Very recently I received two National Science Foundation grants that will allow me to spend time at sea collecting samples. I will be spending part of fall 2018 sailing in the high winds of the Southern Ocean. The region is known for its rough seas, so I hope 'I prevail' to report back to you with exciting stories from the expedition.



*Chandranath's first visit to the Mojave Desert during the Physical Geology field trip.
[Photo courtesy: Brian Pitts]*

I am always looking for new projects and research directions to create opportunities for undergraduate and graduate research. Past and present faculty members within the department have a long history of working with lake sediments to reconstruct past climate. I am keen on bringing in my isotope knowledge to add to that endeavor. Isotopes of specific elements are like fingerprints, which can tell us how climate changed in the region. Particularly interesting will be the story of rain and drought for last several thousand years, important climate information beyond the range of instrumental record. Isotopes can also be used to track sources of sediments in basins and waters through sedimentary formations. I am excited to be here and look forward to meeting you all at future departmental events.

Rob Negrini In my first full year of retirement, I was still involved in publishing papers associated with research funded by the National Science Foundation. Two papers were published. The first was:

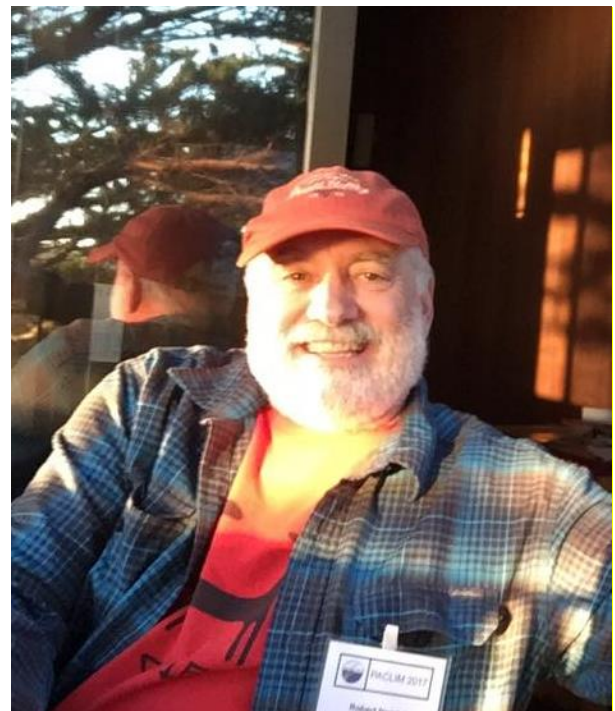
Tiner, R.J., R.M. Negrini, J.L. Antinao, E. McDonald, A. Maldonado, in press, Geophysical and geochemical constraints on the age and paleoclimate implications of Holocene lacustrine cores from the Andes of central Chile, *Journal of Quaternary Science*, DOI: 10.1002/jqs.3012

This paper is the published version of Rachel Tiner's thesis (Yay, Rachel!). Among its results is one of the first solid pieces of evidence from the southern hemisphere of the "8.2 ka event", a hemisphere-wide cooling spike recognized prominently in the Holocene part of the Greenland ice cores. Rachel's finding confirmed the computer modeling results of Chiang and others who predicted that the southern westerlies would weaken considerably during this brief interval of time. This allowed easterly incursion from the Amazon to cause high elevation storms in the high Andes that were otherwise dry throughout the early Holocene. The second paper was:

Lund, S., L. Benson, R. Negrini, J. Liddicoat, S. Mensing, 2017. A full-vector paleomagnetic secular variation record (PSV) from Pyramid Lake (Nevada) from 47–17

ka: Evidence for the successive Mono Lake and Laschamp Excursions, *Earth and Planetary Science Letters*, 458, 120-129, dx.doi.org/10.1016/j.epsl.2016.09.036

This is the second paper in three years (the other being the paper resulting from CSUB alumnus Dan McCuan's 2012 M.S. thesis) that demonstrated that there were two separate paleomagnetic excursions (large deviations of the magnetic pole from the Earth's geographic poles) in the late Pleistocene. This has implications for the age and stratigraphy of late Pleistocene sediments which, in turn, shows that Northern hemisphere climate changed abruptly in response to step-like changes at millennial time scales rather than slow changes in response to smooth Milankovitch cycles in orbital geometry. These two articles also show that the older excursion (41 ka Laschamp) was a short-termed but true and



complete reversal of the Earth's magnetic field, whereas the later excursion (34 ka Mono Lake) was a takeover of the field by the nondipole field after the main dipole field briefly died off. Interestingly, the biggest features of the nondipole field are likely the result of subduction zone graveyards in the lowest mantle which cool the uppermost core and induce local regions of

downwelling core (i.e., local “south” magnetic poles).

My wife, Jana McIntyre, and I also travelled a bit with friends including a 3+ week hiking/touring trip to Ireland. Ireland was a delightful surprise, especially its western coastal area with its dramatic mountain and coastal scenery, spectacular geology, and archeological ruins thousands of years older than Stonehenge.

Sue Holt I am in my 4th year as the Department ASC and am loving working with faculty, staff, and students. Every day holds different challenges and projects, keeping me extremely busy most days. This Fall I was fortunate enough to go on the Geol 2010 3-day Field Trip based at the Zzyzx Desert Studies Center. It was a great learning experience, as well as getting to spend relaxed, quality time with faculty, students and even our Provost, **Dr. Jenny Zorn**. The fact that we are a small department means we all know each other well which keeps us a very close, cohesive group.



Sue Holt at Rainbow Basin

The California Well Sample Repository (CWSR) is California’s only facility for permanent storage and public use of cores, sidewall samples, drill cuttings, microfaunal slides, paleontological reports, well files, check shot surveys, and more. The CWSR, founded in

1975, consists of two buildings located on the south side of the CSUB campus.

The CWSR is part of the CSUB Foundation. The operation of the facility is overseen by a Chairman (Larry Knauer) and a hired Curator (Charles James) who supervise several hired students and volunteers. A professor from the CSUB Department of Geological Sciences has the privilege of being the Director of the CWSR (formerly **Bob Horton**, now **Tony Rathburn**). Eight volunteers from the 60+ Club currently spend Wednesday mornings working on projects. An inconsistent number of current and former oil company geologists volunteer their time to clean up and catalog well files and other data. The CWSR depends entirely upon donations to operate, and relies heavily on volunteers. Please consider volunteering and/or donating materials (book collections, well sample materials, rock collections). Materials that are not useful for the CWSR can be used to support student scholarships. Please contact Larry Knauer for more information (contact information is included on the website (www.wellsample.com)).



Larry Knauer, Chairman CWSR

Use of the data in the CWSR is primarily by academic folks (students and professors); companies involved in oil exploration and

production; and environmental oriented companies and agencies. CWSR has seen a bit of an uptick in use recently that is related to ever increasing interest in locating real data pertinent to ground water projects.



CWSR Staff include: Mena Moernke, Chris Moland, Grant Obenshain, Charles James (Curator), and Scott Jones

At this point, the CWSR is in desperate need of additional space to store valuable well sample materials. It is getting more and more difficult to prioritize which materials to keep. An increase in the size of the CWSR and the amount of data it could preserve would be extremely useful to the state of California.



Volunteers include: Jane Tsuda, Irene Randolph, Sandy Dralle, Kim Jones, Stan Jones, and Kaye LeFebvre

Alan Fuchs, Professor of Engineering and Director of the California Energy Research Center.

In the Fall of 2017, I became the new Director for the California Energy Research Center (CERC), and look forward to working with the University and the community to find solutions for the many challenges at the nexus of energy / water / agriculture. I came to CSU Bakersfield after 19 years at the University of Nevada, Reno, where I was faculty and Chair of



Chemical and Materials Engineering. I also worked 12 years in the chemical industry at a company that is now part of Dow Chemicals. Throughout my career, I worked on areas related to energy and new materials research. My vision for CERC was presented at the Kern

Energy Summit in November 2017. The center will focus on the development of research and educational projects related to the unique and complex energy mix present in Kern County and Bakersfield. The center will bring together faculty and students from all of the departments in the School of NMSE as well as all the other schools in the University. In addition to engineering and science issues, the center will work on economics, business and energy policy issues. The future Energy and Engineering Innovation Center, the next building coming to the CSUB campus, is another priority. I am excited to be teaching a new class in the Spring 2018 – Research Problems in Chemical and Petroleum Engineering Design. This class will provide students an opportunity to identify interesting problems in engineering design and solve them using classic design methodologies. I am enjoying meeting students, faculty and staff in Geology and NSME and getting to know more about petroleum geology in Kern County. Please stop by my office in SCI III Office 131 and say hello.

DONATIONS

Please donate and help our students. With dwindling state funds, an expanding number of majors, rising costs, and aging educational materials, it gets more and more difficult to provide the level of educational experiences to our students that we have been able to give them in the past. The rising costs of summer field camp (still required at CSUB) also makes it increasingly difficult for students to afford this valuable experience. If you are unable to give money this year, please consider donating “in kind” items that we can use or sell. **We can put your old car, boat, aquarium, or book, rock/mineral/fossil collection to good use, and you can also write this donation off on your taxes.** Call us to find out how to make an in-kind donation. We are in need of many new microscopes and also plan to resurrect our geotechniques facility in a suitable room with a sufficient number of appropriate computers. Recognition opportunities are available at CSUB. Talk with us about naming items, rooms or facilities in recognition of donors/businesses/loved ones.

Support from the community and our alumni provide critical help to maintain the quality of education for our students. We sincerely appreciate those who have donated to the Department:

Corporations and Organizations

Aera, Chevron, California Resources Corporation, Penn State/Africa Array, Pacific Section APPG, and the San Joaquin Geological Society

Individuals

Robert and Jana Negrini, the John and Mary Coash Family, Florn Core, the Claude Fiddler Student Research Endowment, and the Claude Fiddler Field Endowment

Our apologies if we forgot someone. Please let us know so that we can acknowledge you in our next newsletter.



Geomorphology Field Trip

STUDENT NEWS

Sixty-Six CSUB and BC students, faculty and community members experience geologic wonders near ZZYZX

November 10, 2017

What makes sand sing, rocks bend, volcanoes erupt into cones of cinder, and marine corals end up in the desert? To learn the answers to these and other geological questions, community members and CSUB Provost **Dr. Jenny Zorn** joined CSUB and BC geology students and faculty on a three-day weekend at a former health resort. Claimed to cleanse the rich and famous “externally, internally, and eternally,” the facility is now home to the California State University Fullerton, Desert Studies Center (DSC, aka Zzyzx to CSUB Geology Department) in the Mojave National Preserve. Established in 1976, the Desert Studies Center provides opportunities for research, educational activities and experiencing desert environments. Waters of the Soda Springs oasis at ZZYZX no longer serve as a laxative for movie stars, but spring pools, palm trees and mountain vistas still provide a scenic backdrop for visitors.

The CSUB Geological Sciences Department and community donors sponsor an annual field expedition that exposes students to a diverse array of geological features. Led by CSUB geologist and alumnus **Dr. Katie O’Sullivan**, the group, including students from her physical geology course, made forays from the DSC, exploring desert environments and discovering the rich geological history of the region through hands-on

experiences. CSUB geology faculty discussed different aspects of the natural history of each field stop, including the faults and landscape evolution of the Kern River Gorge, 300-million-year-old corals in ancient tropical seas, cinder cone volcanoes, lava flows and underground lava tube caves, the singing sands of Kelso Dunes, the mineral resources resulting from ancient lakes,



Tony Rathburn discusses the fossils and paleoenvironments evident at this outcrop before students hunt for fossil corals during the ZZYZX trip.

and the events that caused rocks to bend into the multicolored layers of Rainbow Basin. Students were impressed with the experiences, and one student commented, “We were able to actually go out and see what we had learned in class, which you don’t really get to do in other classes. I would highly recommend this class and field trip to other students.”



Dirk Baron answers questions about ancient lake deposits and mineral resources during the ZZYZX field trip.

Dr. Wes Hildreth and Judy Fierstein, United States Geological Survey (USGS) geologists from Menlo Park, also visiting the DSC at the same time,

treated CSUB visitors to an after-dinner informational question-and-answer session. For several decades Dr. Hildreth and Judy Fierstein have studied volcanoes from Alaska to Chile. They came to the DSC for two weeks to begin mapping and collecting samples from 80 cinder cones and lava flows that will help them understand the sequence of volcanic activities in the region. Students learned about career paths in the USGS and the enjoyment of working in the field, as well as the science of volcanic age-dating.



GEOL 2010 students at Rainbow Basin

Dr. Tony Rathburn, Chair of the Department of Geological Sciences, said that “This trip provides an important opportunity for students to discover the natural processes that shape the world around us.” As one student put it, “The field trip was like a geology textbook came to life.”

November 2, 2017 -- Twenty-one CSUB Geology Students, Faculty, Alumni and Dual-Credit Teachers attended National Meetings in Seattle and Houston

California State University, Bakersfield (CSUB) Geology undergraduate and graduate students, faculty, alumni, and Dual-Credit geology teachers presented research results at the National Geological Society of America (GSA) Conference in Seattle this past week. At the same time, a CSUB undergraduate and an alumnus gave presentations at the AfricaArray Diversity Forum in Houston Texas.

Fourteen CSUB undergraduate authors and co-authors presented results of two years of field work on Tejon Ranch at the national meeting of the Geological Society of America (GSA) in Seattle Oct 22-25, 2017. Undergraduates presented evidence for large ancient river systems and changing drainage patterns in the southern San Joaquin Valley that will add important new knowledge to the geologic history of California and help manage water resources in the future. CSUB undergraduate authors and co-authors presented 17% of the posters in the Sedimentary, Clastics division garnering praise from leaders in industry and research. Students were part of a field internship program mentored by **Dr. David Miller**, CSUB Geological Sciences, which has involved dozens of undergraduates in field work in southern California between 2015-2017 and is supported by the Minority Science and Engineering Improvement Program (MSEIP), Dept. of Education, Louis Stokes Alliances for Minority Participation (LSAMP), National Science Foundation (NSF), CSUB Department of Geological Sciences, Research Council of CSUB, the Tejon Ranch Conservancy, and an anonymous donor. CSUB affiliates presenting the results of their research on Tejon Ranch at GSA in 2017 include (bold indicates undergraduate):

Lead authors: **Sarti, Ethan; McKinney, Sam;** James, Robert N., Miller, D.E.

Coauthors: **Montejo, Carlos; Gallagher, Tony; Scanlon, Darby; Moreno, Jesus; Rodriguez, Virginia; Spriester, Jacob; Watson, Kenneth; Buehler, Jeff; Jackson, Jake; Epuna, Favour; and Herrera, Peyton**

At the GSA meeting, **Gabriela Navarrete**, a CSUB geology undergraduate, presented the results of her research on the tectonic uplift of the Santa Rosalia Basin in Mexico. Selected from a national pool of applicants for an NSF Research Experience for Undergraduates (REU) Program, Gabby conducted field and lab work that formed the basis for her research poster (with coauthors from Mexico, the Indiana Geological Survey, and the University of Kansas City-Missouri).

Graduate students, Dual-Credit Teachers, faculty and alumni also presented research at the GSA Meeting. CSUB graduate student Sade Haake gave a poster presentation on his work on the impact of the 2016 Erskine fire on soil properties and landslide risk (co-authors: CSUB Geological Sciences faculty **Dr. Junhua Adam Guo** and **Dr. W. Chris Krugh**). **Stephan Kiouses**, Dual Credit High School teacher and CSUB geology lecturer, together with CSUB Professor **Dr. Dirk Baron**, presented their work on the influence of outdoor education on underserved high school students in the CSUB Dual-Credit Geology Program. CSUB Dual Credit High School teacher and CSUB geology lecturer, **Karen Blount** (with coauthor and CSUB alumnus, **Marc Halling**, also a Dual Credit High School teacher) presented their findings on the successful transition of students from High School to College/University. Each year, approximately 500 high school students take a geology course as part of the CSUB Geology Dual-Credit Program sponsored by Chevron and the CSUB Department of Geological Sciences.

CSUB undergraduate, **Virginia Rodriguez** (conducted research with **Dr. Katie O'Sullivan**, CSUB Geology faculty and CSUB alumnus) and former CSUB undergraduate **Azael Salinas** (now an MS student at Fresno State University) each gave presentations at the AfricaArray Forum in Houston Texas. The primary goals of the AfricaArray Program are education and improving the seismic network in Africa. One goal is to develop the geophysics program at the University of Witwatersrand in Johannesburg, South Africa, a founding partner along with Penn State University. Another goal of the Program is to improve Africa's seismic network to help mitigate earthquake disasters related to mining, a problem which claims many lives each year in South Africa. CSUB Geological Sciences Department, in partnership with the Penn State AfricaArray Program, has enabled geology majors, including Virginia and Azael, to be an active part of these efforts. CSUB Assistant Professor **J. Adam Guo** also attended the forum. The forum this year had to be delayed because of the flooding in Houston.

The following Geological Sciences faculty and students attended GSA in Seattle, Washington:

- Jesus Moreno (undergraduate)
- Sam McKinney (undergraduate)
- Kenneth Watson (undergraduate)
- Jeff Buehler (undergraduate)
- Ethan Sarti (undergraduate)
- Gabby Navarrete (undergraduate)
- Dr. David Miller (Lecturer, Geology)
- Karen Blount (Lecturer, Geology and Dual Credit High School Teacher)
- Stephan Kiouses (Lecturer, Geology and Dual Credit High School Teacher)
- Darby Scanlon (former geology undergrad, now getting MS at Portland State University)
- Dr. Dirk Baron (Professor, Geology)
- Dr. W. Chris Krugh (Assistant Professor, Geology)
- Dr. Anthony Rathburn (Professor, Geology)

These Dual-Credit Kern High School teachers also attended the GSA conference, the latter four also CSUB Geology graduates:

- Teri Madewell
- Jonathan Walker
- Chris Carrisalez
- Camille Ramirez
- Richard Ruiz

The following Geological Sciences students and faculty attended the AfricaArray forum in Houston, Texas:

- Dr. J. Adam Guo (Assistant Professor, Geology)
- Virginia Rodriguez (undergraduate)
- Azael Salinas (former undergraduate, now MS student at Fresno State University)

CSUB Geology Students Honored by Professional Organizations

May 9, 2017 — Students from California State University, Bakersfield were recently recognized at the San Joaquin Geological Society's annual "CSUB Night" on May 9th. The event started with CSUB Geological Sciences students presenting research posters on a wide variety of topics to local geologists and engineers. After dinner, several students were presented with 2017 summer field camp scholarship awards designed to help defray the costs of attending a summer field camp. **These awards are co-sponsored by the San Joaquin Geological Society (SJGS) and the Pacific Section of the American Association of Petroleum Geologists (PSAAPG).**

Summer field camp is typically a 5-6 week culminating experience where students apply their geological skills to solve field-based problems in varied geologic settings and environments. Many field camps visit regions outside of CA and several students travel overseas for this experience.

"Hands-on field-based experiences, like field camp, are a critical part of a geologist's education." Anthony Rathburn, Professor of Geology at CSUB, said, "We really appreciate the close ties we have with local organizations and businesses, and are grateful for the opportunities and funding that they make available to our students"

"These scholarships recognize the hard work of our students and significantly help with the cost of attending field camp." - William C. Krugh, Assistant Professor of Geology at CSUB

Scholarship awards were presented by the Presidents of the SJGS (Dr. Greg Gordon of Aera Energy, LLC) and PSAAPG (Dr. Bob Horton, CSUB Emeritus).

The following CSUB students each received \$1000 scholarships from SJGS and AAPG for 2017:

Alejandro Rodriguez
Michael Juybari-Johnson

Diana Hernandez Garcia
Cindy Rodriguez

The following students were recognized by special **SJGS and AAPG** awards of \$2000 each because of exceptional academic achievement:

Darby Scanlon
Zach Levinson



*SJGJ and Pacific Section AAPG
scholarship winners*

In addition, the San Joaquin Valley Petroleum Institute announced the CSUB student recipients of the **San Joaquin Valley Petroleum Institute Scholarship**. This scholarship was established by the San Joaquin Valley Chapter of the API to support CSUB students pursuing studies related to the petroleum industry.

2017 Award Winners:
Tony Gallagher
Darby Scanlon

Students from the CSUB Department of Geological Sciences have also been honored with several merit-based awards established through the generosity of a number of donors with ties to CSUB and the local community. Recipients of these annual awards are selected by a volunteer award committee consisting of CSUB Geological Sciences faculty.

At the campus-wide “Welcome Back Event” in August a documentary highlighting geology major **Darby Scanlon**’s study abroad experience at the

Hague was shown on the big screen for CSUB faculty and students. Darby was the focus of this YouTube video and he describes his experiences and impressions of summer school at the Hague. Check out this video at:
<https://www.youtube.com/watch?v=NOPjW1HAGl8>

The following describes awards and awardees for 2017:

James Weddle Scholarship: Mena Moerke

Dr. John and Emily Coash: Dr. John Coash, Dean Emeritus of the CSUB School of Arts and Sciences, along with his wife Emily, established this scholarship in support of undergraduate or graduate-level students majoring in either Geology or Nursing.

2017 Award Winner: (\$950)
Rick Fewtrell

H. Victor and Virginia C. Church Scholarship: This scholarship was established in honor of Dr. H. Victor Church, a geologist and founding member of the Well Sample Repository at CSUB, and his wife Virginia C. Church, a former teacher, to support CSUB students majoring in Geology.

2017 Award Winners (\$1,100 each):
Megan Varga
Michael Juybari-Johnson
Zachary Webb

C.E. Strange Scholarship: This scholarship was established by Mr. C. E. Strange, a local geologist, who wanted to provide financial assistance to undergraduate students majoring in Earth Science.

2017 Award Winners: (\$560 each):
Darby Scanlon
Deandra Alvear
Diana Hernandez Garcia
Enrique Valeriano
Erin Walter
Jamie Price
Janet Arroyo
Jonathan Pineda
Michael Juybari-Johnson
Toni Ramirez
Tony Gallagher

Trevor Miller
Zach Levinson
Mena Moerike

Sam Gonzalez Memorial Scholarship: The family of Sam Gonzalez and friends have developed this scholarship to honor their son and friend by supporting geology majors in pursuit of an undergraduate degree and a career in the field of geology.

2017 Award Winners: (\$980 each)

Favour Epuna
Erin Walter

**CSUB Geology Students Honored with Awards
from the CSUB School of Natural Sciences,
Mathematics, and Engineering**

May 2017 — The School of Natural Sciences, Mathematics and Engineering Scholarships awarded the following 2017 Awards to CSUB Geology Majors:

Theodore Decker Scholarship: This scholarship was established by Jack Decker as a memorial tribute to his son.

2017 Award Winners:

Sade Haake
Michael Juybari-Johnnson
Megan Varga

Fairie Decker Scholarship: This scholarship was established by Jack M. Decker in memory of his wife Fairie Decker Memorial to assist CSUB students preparing for careers.

2017 Award Winners:

Rick Fewtrell
Virginia Rodriguez

Jeanette Haskin Scholarship: This scholarship was established by Jeanette Haskin to award Women majoring in Science.

2017 Award Winner:

Favour Epuna

Millie Ablin Merit Scholarship: George Ablin, M.D., and Millie Ablin, R.N., L.H.D. established this scholarship in support of CSUB students who

are enrolled in the schools of Arts & Humanities and Natural Sciences, Mathematics & Engineering.

2017 Award Winner:

Zach Webb

Chevron Scholarship for Outstanding Students in the Department:

2017 Award Winners: (\$2,500 each)

Virginia Munoz
Zach Levinson

Outstanding Graduate thesis in Geological Sciences: Given to the graduating student whose graduate thesis was exceptional.

2017 Award Winner: Cristina Rivas

Outstanding Graduate Student in CSUB School of Natural Sciences, Mathematics, and Engineering: Presented to the most outstanding graduate student in the School.

2017 Award Winner: Blake Foreshee

Join the CSUB Geology Club site on Facebook to keep up on club activities, and job and scholarship opportunities. Mark your calendars for the **Geo Club BBQ March 9, 2018 at Lengthwise Brewery on District Blvd at 6pm.**

ALUMNI NEWS

Please contact Sue Holt sholt3@csub.edu to update your career and contact information.



**Join us on Facebook on the
CSUB Geology Club page.**

CLASS OF 2017 BA

Alfred Alvarado and Elizabeth Leiran earned their BA degree.

CLASS OF 2017 BS

Maryanne Bobbitt, Alejandro Rodriguez, Laura Estenssoro, Jesus Robles, Erin Walter, Maynor Lopez, and Janet Arroyo earned their

BS degree and are in the Master's Program at CSUB.

Valerie Patela is in the PhD program at Sac State.

Darby Scanlon is working on his Master's Degree at Oregon State.

Others include: Trevor Miller, Scott Savko,

CLASS OF 2017 MS

Spencer Schroer is teaching earth science at a high school in Michigan.

Abigail Martens is pursuing her PhD at the University of South Florida.

Marc Halling is teaching earth science at Ridgeview High School.

Blake Foreshee is an Engineering Geologist with the California Division of Oil, Gas, and Geothermal Resources.

Jeff Kimber and **Matthew Van Grinsven** both work locally with Division of Oil, Gas, and Geothermal Resources.

Richard Ruiz is teaching earth science at Ridgeview High School



Participants in the Spring 2017 Graduate Hooding — with Dr. Dirk Baron, Donald James, Josh Atkins, Abby Martens, Karla Anabel Lopez, Stephen Anderson, Blake Foreshee, Obeyd Mohammadi, Dr. J Adam Guo, and Dr. Chris Krugh.



Spring 2017 Undergraduate Commencement participants include l to r: Maynor Lopez, Diana Hernandez Garcia, Dawn Fine, Elizabeth Leiran, Laura Estenssoro, Tony Gallagher, Enrique Valeriano, AJ Alvarado, Valerie Patela, Israel Cruz, Erin Walter, Darby Scanlon, Chris Matamoros, and Jonathan Pineda

In the future, if you would like to receive this newsletter via email, please contact Sue Holt at sholt3@csub.edu with your email address.

Alumni Profiles:



My work is important because it ensures California's environmental health and natural resources are protected through the State's regulatory standards, which are some of the most stringent in the world.

Blake Foreshee
Engineering Geologist



#FacesOfConservation -- Meet Blake Foreshee, an Engineering Geologist in the Division of Oil, Gas, and Geothermal Resources' (DOGGR) Coastal District. Foreshee joined DOGGR to ensure California's natural resources are produced in a way that protects the public and the environment. Much of his work is in the field, conducting environmental inspections of oil and gas operations. His background in geology gives him scientific tools to analyze the potential impact of oil operations on groundwater quality and provide insight on how to improve those operations.

”
My work analyzing data, conducting field inspections, and enforcement on oil and gas operators safeguards the public, the environment, and California’s natural resources.

Erik Heaton
Engineering Geologist



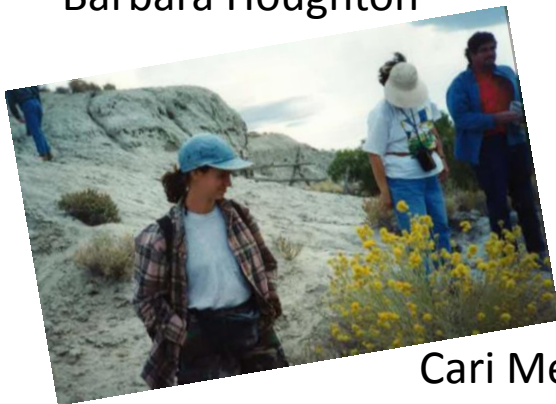
#FacesOfConservation--Meet Eric Heaton, an Engineering Geologist in the Division of Oil, Gas, and Geothermal Resources' (DOGGR) Coastal district. Eric analyzes data and technical information to ensure that oil producers prevent accidents. A typical day on the job could include scouting through bushes near an active mountain lion habitat to seek out an old idle well from 1915 or reviewing histories of 100 year-old wells drilled on the steep hillsides of the furthest back-country mountains to make sure they're not leaking. He finds a sense of excitement in the diversity of his work days.



Dr. Janice Gillespie



Barbara Houghton



Cari Meyer



Dr. Steven Mitchell

Dr. Bob
Horton

Jim Ostdick



Drs. Baron
and Negrini



Dr. Rob Negrini



Donations

We are committed to providing students with the quality of education that they need to become successful, contributing members of the community. Please consider becoming a supporter of our scholarship and field camp programs that make it possible for financially-challenged students to continue their studies and attend summer field camp. The Department has a number of outreach, field experience and educational initiatives that recruit students and enhance student learning. These programs depend on your support. **Every donation makes a difference.** As a result of budget cuts and changes in priorities, **many geology departments across the country have reduced their standards**, removed field camp requirements and reduced field and applied skills from their program. **Please give back** to the Department that is working hard to give current students the traditional field training and advanced technical education required to be a successful geologist. Donations from alumni and other engaged community members allow us to enrich and maintain classes and other student experiences beyond what state funding alone can provide.

Thank You!

Return to the address on the back of this page, to the attention of Tony Rathburn.

Affiliation (if applicable):

Address:

City, State, Zip Code:

Email:

Please indicate the amount you want to donate:

\$100 \$500 \$1,000 \$2,500 \$5,000
Other _____

Please indicate if you want your donation to go to one of these specific causes:

- ☐ **Sam Gonzalez Memorial Scholarship** (to support students who after exploring other fields have discovered Geology as their calling)
- ☐ **Student Scholarships (will be added to the CE Strange Scholarship Fund)**
- ☐ **Field Activities (will be added to the Claude Fiddler Field Endowment)**
- ☐ **Undergraduate Student Research**
- ☐ **Unrestricted to support current needs identified by department**



GEOLOGY CLUB AT CSUB HOSTS:
**THE 10TH ANNUAL
BBQ
DINNER**

09 FRIDAY MARCH 2018 | **06** O'CLOCK AT LENGTHWISE BREWERY
7700 District Blvd, Bakersfield, CA

Come join us for dinner and the club fundraiser. Friends, family, and supporters of the Geology Club are welcome to join us!

All proceeds will go towards our Spring Break trip, K-12 outreach materials, and field trips.

Ticket Prices:
Student: \$20.00
General: \$30.00

Price includes dinner buffet, networking and an opportunity drawing (tickets sold separately for the drawing).
TO PURCHASE TICKETS ASK ANY CLUB MEMBER OR ELIZABETH POWERS.

If you'd like to donate items for the drawing please
e-mail: csubgeology@gmail.com



California State University, Bakersfield
Department of Geological Sciences
66 SCI
9001 Stockdale Highway
Bakersfield, CA 93311

Address Service Requested

Geological Sciences Department
Fall 2017 Newsletter inside
