DEPARTMENT NEWS

2019 was another great year, and we have lots of exciting news to share with you. Please send us a note to let us know what you are up to as well.

In the Lead with Student Success. The Department continues to lead the CSU system in graduating geology majors, including women. Once again in 2018-2019, CSUB graduated more geology majors than any other geology program in the CSU system, awarding 23% of all geology degrees conferred in the CSU system. CSUB had the largest number of female geologists graduating with a Masters Degree, comprising 56% of all women geology MS graduates in the CSU system (and 20% of all female geology BS graduates). We are also very proud of our CSUB geology student researchers, whose efforts resulted in a number of awards, internships and media recognition (see the student news section).

People to Meet

We have had 100% turn-over in CSUB geology faculty over the past 8 years, and we are excited about the future. **We hired two new geologists this year and we are currently searching for two tenure-track geologists** to start fall, 2020**.** This past year we hired **Katie O'Sullivan, a CSUB Geology graduate** who received her PhD from Notre Dame University. As most of you know, Katie has been a Full-Time Lecturer in the Department, and we are absolutely delighted that she is joining us as a tenure-track Assistant Professor. We also hired **Bob Crewdson** as a Full-Time Lecturer. Bob received his PhD from the Colorado School of Mines, and has been working in the Valley for a number of years. Bob's focus will be on hydrogeology, and we are thrilled to welcome him to the Department.

This year we are replacing **Jan Gillespie** (who officially retired last August) and **Chandranath Basak**, who joined his wife in August at the University of Delaware. As we grow, we are very fortunate to have part-time instructors helping to cover courses: **Lisa Alpert, Jason Cotton, Thom Davis, Larry Drennan, Greg Gordon, Alyssa Kaess, Steve Kiouses, Pam Knight, Teri Madewell, John McCormick, Nick Moreno, Brian Pitts, Matt Van Grinsven,** and **Gregg Wilkerson**.

We continue to work closely with the United States Geological Society (USGS), and we currently have **2 USGS hydrologists, Olga Rodriquez and Maryanne Bobbitt, based at CSUB in the Department of Geological Sciences.** We hope to expand collaborations in the future.

This past year, **Dr. Anna Cruz, a postdoctoral Research Scientist from Brazil**, conducted marine science research at CSUB. Through an international grant, Anna was funded to work with Rathburn and Basak on core samples collected off the coasts of

Brazil and California. She conducted research, taught geology courses, and is now a postdoc at the University of Delaware with Chandranath Basak.

John Yu, recently retired from the Division of Oil, Gas, and Geothermal Resources (DOGGR), and is now based in the Department of Geological Sciences. In addition to working on a textbook, John began teaching courses related to petroleum reservoir evaluation and regulation.

Seminar Series. Once again we had a diverse array of local, regional and national speakers presenting interesting talks in our seminar series. We are always looking for speakers to give talks for our seminar series. Please let Adam Guo, our seminar series organizer, know if you or someone you know might be interested in giving a presentation. Our spring and fall seminar schedules cover a wide variety of topics, so please plan to join us. Check our Facebook page and get on our email list for notification of upcoming talks and events: **https://www.facebook.com/groups/CSUB-Geology-Club**

Grants. Faculty in the Department of Geological Sciences continue their long, extraordinary history of obtaining substantial external funding from a wide variety of sources such as the National Science Foundation (NSF), American Chemical Society (ACS) and the W.M. Keck Foundation. In addition to supporting student and faculty research, these grants provide appreciable indirect funds and faculty release time.

Funding highlights include the third year of the 5-year Phase II $4,996,937 award for CSUB's NSF *Center for Research Excellence in Science and Technology* (CREST). Geology Professor **Rob Negrini** (now Emeritus) was the lead PI for both the Phase I and Phase II awards, along with five Geological Sciences faculty (including Drs. **Krugh** and **Guo**), and four Biology, Math and Engineering faculty as co-PIs and team members. Another highlight was the second year of a 3-year, $297,459 NSF grant awarded to **Rathburn** (lead PI) and **Baron** (now Emeritus). This grant, in collaboration with Scripps institution of Oceanography and the University of San Diego, supports educational and research project opportunities for students, and also provides CSUB students and local high school teachers with hands-on research experiences on a research vessel at sea, in the classroom, and in the lab.

Students from the geological oceanography class visit the renovated geochemistry lab at CSUB. W.M. Keck Foundation funding awarded to Basak and Rathburn supports several upgrades to the analytical capabilities of the lab, providing more student research opportunities.

Drs. **Basak** and **Rathburn** were also successful in obtaining CSUB's first (at least in recent memory) Keck Foundation Grant. The $150,000 grant includes funding to improve geochemistry facilities in the Department and to engage students in marine research. **Liaosha Song** received a $55,000 grant from the American Chemical Society to study sandstone petroleum reservoirs in 3-D using state-of-the-art X-Ray technologies. In addition, **Liaosha** received an Interdisciplinary Energy Research Program grant from CSUB's California Energy Research Center (CERC) to work on petroleum reservoir fluid dynamics and modeling. **John Yu** was also awarded an Interdisciplinary Energy Research Program grant from CERC to develop a Blockchain database for aquifer protection in oilfields. Through funding from a successful, collaborative international proposal submitted by **Rathburn, Basak** and Brazilian colleagues, **Dr. Anna Cruz**, a postdoctoral Research Scientist from Brazil, conducted marine science research at CSUB. She worked on samples collected off the coasts of Brazil and California, and participated on marine research expeditions. **Chris Krugh** received and internal Instructionally Related Activities (IRA)

grant to support the ZZYZX trip and **Adam Guo** received an IRA grant for marine science education. External and internal proposals are submitted by faculty on a regular basis, and some, submitted in the spring, are still pending.

Publications Geological Sciences faculty excelled in scholarship, maintaining their long record of research excellence. In the 2018/2019 academic year, Geology tenure-track faculty published twelve peer-reviewed journal articles, with several more in review. The high quality of DGS faculty research is evidenced by the caliber and high impact factor commanded by the international journals these publications appeared in, including two papers in the journal *Scientific Reports (Nature Group)* (impact factor 4.525). Mentoring students in research is a priority, and faculty, together with students, gave numerous research presentations at local, regional, national and international meetings and conferences. Several CSUB geology students won awards and regional and national scholarships and internships. Four papers were also published by our Emeritus faculty, several with student co-authors (now graduated).

New Geology Courses at CSUB As we continue to evolve and hire new faculty, we are both enhancing traditional strengths and diversifying. We are offering an expanded collection of petroleum-related courses, including those focused on sequence stratigraphy, well analyses and regulation. We are also offering new courses in a variety of other topics, such as geological oceanography, applied GIS, volcanology, planetary geology, paleontology, and clay mineralogy. We continue to revise courses, such as those in hydrology and geochemistry, and now offer unique courses in the winter (January) and summer sessions. One of our summer courses is a field course taught by **Thom Davis and Katie O'Sullivan** on Santa Cruz Island, and is suitable for teachers and geologists of all experience levels. Each of our graduate classes meets one night/week, with separate courses taught on separate nights. **Multiple graduate-level courses, each taught one night/week, ensures that community members and students with jobs can fit courses into their schedule.** Check out our course listing and sign up for a class next semester.

Elizabeth Powers after unpacking much-needed, new microscopes and light sources purchased for geology labs. Note that the University doesn't provide funds for microscopes and many other items that we are sorely in need of. Please donate to help us provide quality educational experiences for students.

CSUB Hosts the 2019 PS-AAPG West Coast Student Expo For the first time in the history of PS-AAPG, CSUB hosted the West Coast Student Expo, attracting participants from across the country. CSUB Assistant Professor of Geology, **Liaosha Song** made the arrangements to host the Expo, and was instrumental in organizing this important, student-oriented event at CSUB. In addition to having the opportunity to present their research, student participants at the annual Expo were able to network and potentially interview with geoscience employers.

The 2019 Pacific Section American Association of Petroleum Geologists (PS-AAPG) West Coast Student Expo took place at CSU Bakersfield from October 4 to 5, 2019. Fifty-seven students registered to participate in the Expo, hailing from 19 institutions including: California State Polytechnic University Pomona, University of Cincinnati, CSU Bakersfield, CSU Northridge, CSU Long Beach, CSU Fresno, New Mexico Tech, Louisiana State University, Sacramento State University, San Diego State University, Stephen F. Austin State University, UC Santa Barbara, University of Alaska Anchorage, Portland State University, Texas Christian University, University of South Carolina, The University of Texas at Arlington, University of Georgia, and the University of Nevada Las Vegas.

Geologists and potential employers visit student research posters at the PS-AAPG West Coast Student Expo hosted by CSUB Geology.

The Student Expo also attracted sponsorships from the petroleum industry. Chevron, Aera Energy, and California Resources Corporation were Platinum Sponsor companies. The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) was a Government Agency Sponsor. Sponsoring organizations included PS-AAPG, Pacific Section Society for Sedimentary Geology (PS-SEPM), and Pacific Coast Section of Society of Exploration Geophysicists (PCS-SEG).

Geologists, employers and students enjoy lunch and round table discussions about career paths at the Student Expo at CSUB.

Event activities included a poster competition, a luncheon and roundtable discussion, and a company exposition, followed by a whole day of interviews on Saturday. The event was set at Solario de Fortaleza, Student Union, and Res Hall. CSUB geology students **Obeyd Mohammadi** and **Eneas Andrade Torres** won Master Student Poster Second Place, and Best Undergraduate Poster Awards, respectively. Many CSUB students were invited to interview.

Seven students received awards for the posters. CSUB geology master student Obeyd Mohammadi (third from the left) earned Second Place in Master Student Posters, and CSUB geology major Eneas Andrade Torres (center) received the award for Best Undergraduate Poster.

Visit us—there are lots of new things to see—The First and Third Floors of the Science II Building look very different. In addition to the new items we mentioned in last year's newsletter, we have added 14 new computers and twenty new chairs to the revitalized computer-focused room on the third floor. This room will be used for student research and training in petroleum-oriented software, ARC-GIS and hydrology. Although the room still needs improvements and additional funding (please help us with this), this room is becoming almost as popular as the adjacent tutoring room (the former library, which has coffee tea and snacks available). Please come by and join us for coffee/tea and conversation anytime that is convenient.

Chris Krugh looks on as Brandon Tamondong, Eneas Torres-Andrade and Sue Holt secure a geology photo collage (created by Geology student Karol Casas) above the amethyst donated by Robert Hoffman. The oak base for the amethyst was made by Bill Whitaker.

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In addition to the large, amethyst geode (donated by ***Robert (Bob) Hoffman,*** see details later in this newsletter***)*** near the elevator, we have added a display case highlighting a variety of spectacular rocks and minerals to welcome visitors to the third floor of Science II (in the background of the Women in Science Club photo included later in this newsletter). We continue to work on other displays on the first, second and third floors of Science II, and each is a work in progress. The first floor now has a display focusing on weather and climate that includes real-time data displayed from the weather station on campus. Thanks to fossils supplied by **Karen Blount** and the artistic talents of geology major **Hector Zavala**, there is also a new first floor display showcasing a variety of fossils from Shark Tooth Hill, including *Megalodon* teeth. Please drop by and visit our student-designed, student-built, educational outreach exhibits.

We are creating 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.**

Geology students studying in the student education/tutoring room. Clockwise from L to R: Carrie Williams, Bradley Squires, Emily Oliver, Sarah Hughes and Brandon Tamondong.

Community Engagement. The Department is very actively engaged in community outreach, and this year was no exception. Significant progress was made on a number of projects, and some of the highlights are included in other sections of this newsletter. We gave several tours of the Department this year, and visitors included University donors, local geologists, and members of the CSUB Board. Our seminar series, outreach displays, outreach events and Department tours are typically team efforts by geology faculty, staff and students.

CSUB Geologists on TV CSUB Associate Professor of Geology, **W. Chris Krugh** is often asked by the community to provide insight about local geology, and this year was no exception. The Ridgecrest earthquake created a spike in interest about faults and local geology, and Chris was interviewed multiple times. The Kern County Office of Emergency Services also consulted Chris. Here is the link for his Valley Public Radio interview:

https://www.kvpr.org/post/california-s-earthquake-risk-extends-far-beyond-san-andreas-fault

Associate Professor of Geology, W. Chris Krugh

Here are the links for two of Chris Krugh's 2019 TV interviews:

https://www.ket.com/news/geologist-explains-recent-earthquake-in-ridgecrest/

https://www.turnto23.com/news/local-news/sunday-marks-the-anniversary-of-devastating-1952-kern-county-earthquake

CSUB geology department leading the pack
Recognized for its many accomplishments and award-winning faculty and students, the CSUB Department of Geological Sciences was featured on local TV. Scientists in the Department conduct research all over the world, including here in the Central Valley. Geology graduate students **Toni Ramirez** and **Cindi Rodriquez** were interviewed by KBAK/KBFX to discuss the local relevance of their soil and landslide research. CSUB geology professor **Tony Rathburn** discussed the importance of student mentoring.

Here is the link to the video:
https://bakersfieldnow.com/news/local/csub-geology-department-leading-the-pack

CSUB Geology is over the Moon about rocks
The sky is not the limit when it comes to the lengths that CSUB geologist Dr. **Katie O'Sullivan** will go for her students. Recently, she arranged for moon rock samples to be sent to CSUB from NASA so that her students could experience the thrill of viewing lunar rocks that are 3 to 4.5 billion years old. Dr. O'Sullivan grew up in Bakersfield and, as a first-generation student, earned her Bachelor's degree in Geology at CSUB. After receiving her PhD at Notre Dame University, Dr. O'Sullivan returned to CSUB to teach geology. Her PhD research focused on the mineralogy of moon rocks, and Dr. O'Sullivan wanted her CSUB geology students to also experience the excitement and educational inspiration of examining lunar samples under the microscope. At Dr. O'Sullivan's request, NASA sent rock samples from every Apollo mission that collected geological samples of the moon.

CSUB geologist, Dr. Katie O'Sullivan shows moon rock thin sections to President Zelezny. NASA loaned moon rock samples to Dr. O'Sullivan, who studied moon rocks as part of her dissertation research. Photo taken by Geology lecturer, Brian Pitts

Under federal regulations the Geological Sciences Department could not advertise that the rock samples were at CSUB, and these national treasures had to be kept under lock and key when they were not in use. NASA provided 12 thin sections of rocks (rocks sliced and polished thin enough so that light can pass through the mineral crystals composing the rock) along with small pieces of rock and sediment embedded in plastic.

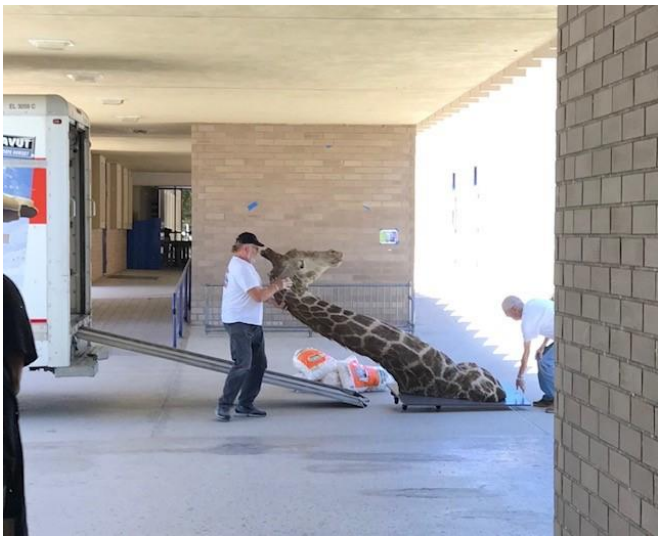
Students were fascinated with the thin sections of rock under the microscope, viewing everything from volcanic rock to impact-shattered rock to orange sediment. "I probably will never have another opportunity to look at real thin sections of moon rocks," said undergraduate geology major, **Carrie Williams**.

CSUB undergraduate geology major, Ariel Espindola examines moon rocks encased in plastic. Dr. Katie O'Sullivan's students became fascinated with lunar research. Photo taken by Geology lecturer, Brian Pitts.

CSUB President Lynnette Zelezny, Interim Provost Vernon Harper, NSME Dean Kathleen Madden and Associate Dean Todd McBride, along with geology faculty, also came by to view the 3 to 4.5 billion year-old national treasures that traveled 238,900 miles to CSUB. The experience impressed everyone, including geology major **Alexandria Garcia**, who indicated that, "This opportunity helped me to realize how much more information there is to discover with geological studies, both on Earth and in our Solar System. It is an experience I will never forget."

CSUB Geologist, Katie O'Sullivan shows moon rocks to NSME Dean Kathleen Madden and Associate Dean Todd McBride. NASA loaned national treasures from the moon to Dr. O'Sullivan for educational purposes. Photo taken by Geology lecturer, Brian Pitts

Heads Rolled. Just a heads up--the Head Room on the first floor of Science I is now the Headless Room. The taxidermy heads of African and North American animals that have stared at CSUB students for decades headed out this summer, but mounted a comeback elsewhere. Some of them, including the giraffe, are now downtown at the Buena Vista Museum of Natural History and Science. Taft College transported the rest of the grateful heads to be displayed in Taft. Looking ahead, the first floor of Science I is being renovated, with new, lively attractions, including the Magic Planet, which is sure to turn heads.



Moving ahead, the giraffe goes on a trip to its new home downtown at the Buena Vista Museum of Natural History and Science. Photo courtesy of Katie Van Grinsven.

The Magic Planet—finally! As a result of delays in renovation of the Headless Room and changes in security plans, installment of the much-anticipated Magic Planet was postponed—until now. Through funding from Chevron, NSME, the CSUB Dept. Of Geological Sciences and an IRA grant awarded to **Tony Rathburn**, the Head(less) Room in Science I is being transformed into into a dynamic learning environment, where students and visitors can explore a wide variety of 3-D and 4-D (time) content that uses real data. Acquiring the Magic Planet is part of an effort to use 3-D visual technology and real data to help convey the concepts and relevance of Earth System Science to students of all ages. This 30-inch diameter globe is

the same version that is used in many educational facilities and museums.

Unpacking the Magic Planet. L to R: Brandon Tamondong, Chris Krugh, Sue Holt and Sarah Hughes.

The addition of the Magic Planet to Science I provides CSUB with exciting, new technology to help students and visitors of all ages understand the past, present and future of the world in which we live. Using engaging, 3-D content, the Magic Planet can convey a multitude of Earth System processes, and students can more easily make the connections between dynamic processes and Earth's many "spheres" (biosphere, atmosphere, etc.). The Magic Planet can also show data-driven images of remote planets, as well local field trips in 3-D. Faculty will be able to incorporate the Magic Planet in classroom and lab activities, and students will be able to choose the content and self-discover visual Earth Systems in 3-D and 4-D (time), in class and outside of class time. Be sure to come by and try out this dynamic, Magic Planet.

The Magic Planet and kiosk are demonstrated in the Headless Room of Science I. On hand (L to R) are Kate O'Sullivan, Sue Holt, Mike Foody (from Global Imagination, the manufacturer of the Magic Planet), John Yu, Bob Crewdson, and Bill Whitaker.

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.

Donation of geode. Robert (Bob) Hoffman donated a large geode to the California Well Sample Repository, and this beautiful rock laden with amethyst crystals is now proudly on display on the third floor of the Science II building (home of CSUB Geology).

After attaining a degree in Mineral Science from Stanford University, Bob initially worked for an oil company before becoming an independent consulting geologist in Bakersfield. He was active in AAPG and became Bakersfield's first commissioner for the American Youth Soccer Organization. Bob passed away in November, 2019, and he is sorely missed.

In Remembrance of John (Jack) Coash. In March 2019 John Coash passed away at the age of 96. John earned his Master's Degree at the University of Colorado, Boulder and his PhD. From Yale University. After working at Bowling Green State University as Professor of Geology, then Chair of the Dept., and then Assistant Provost, John and his family moved to India where he was supervisor for the National Science Foundation. He later accepted a position at NSF in Washington DC. Two years later John and his family moved to Bakersfield to help start a new state college in California, where John served as founding Dean of Science and, later, as Dean of the School of Arts and Sciences at California State University, Bakersfield, until his retirement in 1987. John loved field trips and working with students, and he kept in close contact with CSUB Geology. We miss him. John and his wife established the Dr. John & Emily Coash Scholarship Endowment Fund to help students. Please consider contributing to this or other geology scholarships. See the last page of this newsletter for details.

How many folks can you recognize in this photo with Jack Coash? Please let us know.

FACULTY AND STAFF NEWS

How well do you know the CSUB Geology faculty? See if you can guess which faculty are associated with the story lines listed below. The answers are included later in the newsletter. Be sure to follow up and find out the details about each story from the faculty member with first-hand knowledge.

Which faculty member got stuck in quicksand while working solo in remote Venezuela?

Which faculty member hit an iceberg while working along the coast of Alaska?

Which faculty member experienced the infamous Crossing Equator/King Neptune Ceremony while at sea on an IODP Expedition?

On multiple occasions wild elephants charged at which faculty member?

Which faculty member has worked on materials regarded as national treasures?

Which faculty member, while conducting field work, was surrounded by Argentinian police with guns drawn?

Which faculty member lived in Antarctica for a year?

During an annual Geology Club BBQ, which faculty member received the "cheesy joker" trophy award?

Which faculty member has traveled almost 3 miles to the bottom of the ocean in a manned submersible?

Which faculty member studies the pore structure of shales?

CSUB Emeritus Geology Professor, Bob Horton, Receives Award

April 23, 2019 At the 2019 Pacific Section of the American Association of Petroleum Geologists (PSAAPG) Conference in Long Beach, Calif., Emeritus Geology Professor, Dr. **Robert Horton**, at CSU Bakersfield, was awarded the prestigious Distinguished Service Award. The PSAAPG was founded in 1924 and is one of the regional divisions of the American Association of Petroleum Geologists.

"This is a significant, well-deserved award. It is great that Bob's dedication to the community and his impactful career as a teacher, researcher and leader is being recognized by PSAAPG," said Chair of CSUB Department of Geological Sciences, Dr. Tony Rathburn.

CSUB Emeritus Geology Professor, Dr. Robert Horton, was awarded the Distinguished Service Award from PSAAPG.

The Distinguished Service Award is presented to members who have distinguished themselves in singular and beneficial long-term service to the Pacific Section AAPG.

Bob has been a member of the AAPG since 1986, is an active member of the San Joaquin Geological Society and has been part of the local affiliate of the Pacific Section AAPG since 1984. He held three different offices in the SJGS from 1986-1991. He was also a Delegate for the SJGS to the national AAPG from 1991-2003 and 2012-2015. He participated in most of the PSAAPG conventions and many of the AAPG conventions as a committee member, a speaker, or both.

Dr. Horton earned his Bachelor of Science degree in geology in 1973 at the State University of New York at Binghamton. Following that, he received his Master of Science degree in geology from the University of Tennessee in 1977. Dr. Horton then earned his Ph.D in geology with a minor in geochemistry in 1985.

In 1984, Dr. Horton accepted a position with the geology department at CSUB. While at CSUB, Bob was also the Director of the California Well Sample Repository. Dr. Horton spent much of his time on obtaining funding and equipment for the Department and was invaluable as Dean of Research. He also piloted the geology department, including physics at the time, through budget cuts and not only helped them survive, but they went on to thrive.

Announcement of Bob's award was featured on TV—here is the link:

https://www.turnto23.com/news/local-news/csub-emeritus-geology-professor-receives-prestigious-award

Chandranath Basak As we are becoming more aware of the impending climate crisis, we are also realizing the importance of scientific studies that inform us about the past climate. Last summer (June-July, 2019) I sailed with a multi-national group of scientists to remote regions of the south Pacific to collect ocean sediments that can help us solve Earth's past climate mysteries. I was one of the designated inorganic geochemists for this expedition.

This expedition was part of an international program called the *International Ocean Discovery Program (*http://www.iodp.org/*)*. This voyage was unique as it planned to drill through ocean sediments in regions which are known for rough weather and high seas. So when the first two weeks went without a whiff of storm, we were a bit surprised. But since all good things come to an end, so did our fair-weather days. We were soon surrounded by strong storm systems that covered the entire south Pacific and anticipated wave heights were in tens of feet. In the middle of the vast open ocean, there was no place to hide, so we ran. We ran for more than a week to get out of that storm system.

While we were running away, we crossed *Point Nemo*. This is also known as the oceanic pole of inaccessibility. Once you are at Point Nemo, you are so far away from land, that sometimes the nearest human beings are the astronauts onboard the international space station. Due to its remote nature, hundreds of decommissioned satellites, spacecraft, and space stations are put there.

In spite of all these weather delays, we did collect an impressive set of sediment cores that are now stored in Texas A&M University. My students and I will be working on these samples for the next 8-10 years trying to unravel deep oceanic conditions during times of past climate change. The hope is that the past will inform us to predict future climate

better and we can be prepared to mitigate challenges.

In the future, we want our students to participate in these types of expeditions and be at the forefront of cutting edge science. However, they need adequate training so that they are competitive with the rest of the applicants. Last year, we were successful in securing funding from the KECK Foundation to renovate teaching labs at CSUB so that undergraduate students can perform marine research. If you are in the area please stop by to see the new facilities and meet our students.

I also want to let you all know that I have accepted a faculty job at the University of Delaware (UD), where my wife works, and I moved to Delaware late last summer. Currently, I am trying to set up my laboratory here at UD and hoping to be fully operational in the next few months. It was a difficult decision to leave CSUB, I will fondly remember the time that I spent with wonderful students and colleagues.

No whining! Geology faculty conduct field work at a local establishment. Clockwise from the left: Pinki, Chris, Anna, Snow, Liaosha Song and Chandranath Basak. The photographer is obviously going for refills!

Join us on Facebook on the CSUB Geology Club page.

John Yu welcomes one of our many special visitors to the third floor

Bob Crewdson I joined the full-time geology faculty as a lecturer in August, 2019. I am enjoying this new turn in my career path after working since 2002 as a groundwater hydrogeologist and water resources analyst for two local water districts where I helped develop water banking programs. This is not my first affiliation with CSUB Geology; Rob Negrini approached me out of the clear blue in 1991 to teach Astronomy of all things and, over the next ten years, I collaborated with Rob on a few

geophysical studies and taught several more courses as an adjunct professor and research associate.

Best moment so far: I was recently invited to be a guest speaker to the NSME Pathways Community Program to help STEM students. I was asked to speak about my career experiences that might help the students with their educational and career goals. Every student I met was a first-generation college student; they were polite, eager for career advice, and a pleasure to be around. It is an invigorating challenge as a new faculty member to do what I can to help educate a new generation of future CSUB graduates in the sciences.

Next best moment: I finally got to go on the geology field trip to Zzyzx! Dr. Katie O'Sullivan led the trip to the heart of the Mojave Desert and the trip was every bit as interesting and collegial as I'd ever imagined it to be. Thanks Katie. In my opinion, this is an excellent outreach program for our geology department and STEM in general that is worthy of continuing support.

In my current position, I have been given the opportunity and responsibility to add my own knowledge and experiences to the geochemistry and hydrogeology curricula that were put in place by my predecessor, Professor Emeritus Dirk Baron. I look forward to the challenge, but I am under no illusion, all of the current faculty have warned about how draining is the task of preparing course materials among the many other faculty responsibilities. They were right; my wife is wondering if I'll ever have a free night or weekend again.

I will teach two courses in geochemistry that have been recently promoted to required parts of the core geologic curriculum. I will also teach the hydrogeology, contaminant transport, and flow modeling courses in the Hydrogeology concentration as they come up in the rotation. The geochemistry and hydrogeology courses will keep me busy for a while and there is currently a lot of student interest in hydrogeology. I'd also like to teach an occasional course on topics of interest from my non-academic work including geothermal energy, mineral exploration, and whole-earth geophysics.

I have also been given the opportunity to help direct student research and do research myself. My current research interests related to hydrogeology include: water supply reliability forecasting during climate change; the "equivalence problem" caused by simplified stratigraphy in computer models, groundwater basin impacts from water banking, uncertainty analysis in hydrogeologic processes, and the physical properties of unconsolidated materials. In the longer term, I hope to develop student projects and relevant research programs that generate a collaborative working relationship between CSUB and the Kern County water community. I welcome input and inquiries from our CSUB alumni, local agencies, and community members.

Janice Gillespie Finally retired from CSUB last summer and spent a whole 4 days retired before starting my new job as a senior research scientist for the US Geological Survey—a whole new bureaucracy to learn to deal with. I am also on the California SB 83 committee evaluating the regulatory performance of the administration of the Underground Injection Control Program by the California Dept. of Conservation.

Living in southwest Utah has been a blast—lots of rocks to look at all the time! Been doing a lot of canyoneering, kayaking, mountain biking, cross country skiing and hiking. The highlight of the year was a trip to Scotland to hike around Arran Island and see the legendary unconformity that sparked Hutton's concept of deep time! Another big check off my bucket list was getting to wear the inflatable T-Rex costume for Earth Day (as shown below with my sandwich which contains a small mammal). Yes, it's really me in there and it was like a sauna!

Jan as a meat-eating <u>T. rex</u>.

Junhua "Adam" Guo This year, I taught a few undergraduate and graduate courses in my expertise including Sedimentation/Stratigraphy and Advanced Sedimentology as well as a non-major general course entitled "California Geology and Society." Currently I have a few graduate students working with me on different research subjects. Obeyd Mohammadi defended his Maldives oceanography thesis and now is working on the revisions. Sade Haake, Alex Rodriguez and Karla Lopez are each expected to defend their thesis soon. Cindy Rodriguez kept working on her wildfire thesis project and presented partial results at the 2019 AGU Fall Meeting in San Francisco. The good news for our research team: the XRD machine was recently fixed! Kari Hochstatter will test her XRD samples to investigate kaolinite-dickite diagenesis in the San Joaquin Basin.

In the past year, one graduate student Christine Pyles' research work on Tulare Lake sediments mineralogy was published as a peer-reviewed article in the International Journal of Sediment Research. Two IODP 359 post cruise study articles were published, one in Palaeogeography, Palaeoclimatology, Palaeoecology and one in Earth and Planetary Science Letters, by our IODP 359 scientist party. Now I serve as the Assistant/Associate Editor for a special issue of the journal *Interpretation*. In the department, I still serve as the department seminar series coordinator and AfricaArray CSUB representative.

Adam, along with Toni Ramirez, and Cindy Rodriguez, collecting wildfire burned soil samples.

At home, Yan and all children have been doing well. At school, Angelina took the "GATE" exam again and was enrolled in the GATE class together with Alice. Belinda is liking gymnastics more and more. Ryan started his new adventure K this summer. They enjoy going to school together and chatting with each other about their school stories.

Chris Krugh. This has been quite the exciting year! In the Earth Surface Processes and Tectonics research group, CREST scholars Erin Walter, Toni Ramirez, and Karol Casas continued their work investing landslide susceptibility in the Kern River watershed. Erin Walter is wrapping up her research mapping the distribution of rockfall/debris flow deposits along the lower Kern River and constraining the relative ages of incised fill terraces using Schmidt Hammer rebound values. Erin recently started an internship with the BLM. Toni Ramirez is investigating earthquake-induced landslide susceptibility. She started her research last year and things really started to rock and roll (pun intended) in early July due to the Ridgecrest M 6.4 and M 7.2 earthquake sequence. The M 7.2 earthquake on July 5th generated a small rockfall at the mouth of the Kern Gorge in an area rated to have < 0.2% probability of ground failure by the USGS real-time global hazard models. Toni decided to investigate the impact that shaking scenarios for large-magnitude historic earthquakes have on landslide susceptibility models in the region. Toni was even asked to present her preliminary results as a talk at the 2019 AGU Fall Meeting in San Francisco, CA! Karol Casas has been investigating the impact of tree mortality and its direct (loss of root cohesion, decrease in evapotranspiration, etc…) and indirect (potential increase in occurrence and intensity of wildfires) impacts on hillslope stability. Karol presented her initial work in a poster at AGU. I was awarded a $5000 Provost's Proposal Development grant entitled *Development of Geodetic Research and Teaching Capabilities at CSUB.* This mini grant will fund the acquisition of a consumer-grad UAV and stereophotogrammetry software that will enable creation of detailed digital elevation models (DEM) at decimeter to centimeter resolution. This capability will be used on several projects and is intended to provide initial results in support of upcoming research/equipment proposals currently in the works. And finally, saving the best

for last, Anna Paula Soares Cruz and I were married this past December in San Francisco, CA!

Chris and Anna got married!!

Katie O'Sullivan. This past year has been quite an exciting one for me. I began an exciting new journey as an Assistant Professor and I couldn't be more thrilled. I am working with graduate student Jake Jackson and undergraduates Carrie Williams and Alexandria Garcia on terrestrial projects, while graduate student Craig Hulsey and undergraduate Emily Oliver are working on Lunar meteorites. I was awarded a Research Council of the University grant and Alexandria Garcia was awarded a Student Research Scholars stipend to work on using basalt as a paleo elevation indicator. Jake Jackson is working on applying this method to basalts in the Sierra Nevada and Alexandria Garcia and Carrie Williams are using the method on basalts from the Mojave Desert.

Craig Hulsey, Emily Oliver, and myself are starting a project hunting for mafic pieces of the Moon and, if we're lucky, maybe even a piece of the Moon's mantle. Identifying a piece of the Moon's mantle would provide an important geochemical data point that could be used in many different models regarding the Moon's formation and history. We will begin our search with the lunar meteorite collection. Speaking of Moon rocks, the CSUB geology department had the privilege of hosting lunar thin sections and hand samples as part of the Petrology class this past spring. Collected during the manned Apollo missions to the Moon, these samples are some of the oldest pristine solar system materials ever examined. The event was so exciting that even some non-geologists came out to view the rocks, including CSUB President Lynette Zelezny.

Happy and Katie

I have also made time for mentoring and outreach this past year. I have continued mentoring 5^{th}-7^{th} grade girls who are interested in STEM at Buttonwillow Elementary. This program matches girls with a mentor who works in STEM, with the goal of introducing and fostering interest in science careers. Over the summer I travelled to Egypt to work with Egyptian high school STEM teachers on developing curriculum. And, this past Fall, together with several geology undergraduate students, started the Women in Science Club.

Tony Rathburn Department Chair, This is my third year as Chair, and each year seems to be busier than the previous one! I couldn't begin to do it without much appreciated help from Sue, Elizabeth, Chris, Adam, Chandranath, Liaosha, Katie, Larry, Anna, Pam, John, Bob C., Dirk, Jan, Rob, and Bob H.

In addition to my regular duties, I accepted the role of Interim Director of the California Energy

Research Center. Alan Fuchs left in August for a new position elsewhere, and we are conducting a search for a new Director.

As part of the NSF-funded Geopaths Project, we again took majors and non-majors out to sea to collect research samples (seafloor multicores, grabs and gravity cores) during three research voyages off the coast of San Diego. These cruises focus on living and fossil foraminifera (single-celled microfauna) from organic-rich, oxygen-poor seafloor environments. One voyage was in the summer (see the student section for a description of the experience), and two were in the fall. For the autumn cruises, we partnered with the CSUB Pathways Program, and were able to take a number of non-major freshman out to sea. For each of these expeditions we worked closely with colleagues from the University of San Diego, Oklahoma State University and Scripps Institution of Oceanography.

I continue to work with Chandranath Basak on collaborative research conducted on seafoor sediment cores off the coasts of Brazil and California. I also continued working on a seafloor experiment project in collaboration with Ashley Burkett, at Oklahoma State University, Maria Holzmann at the University of Geneva in Switzerland, Brandon Pratt in the Biology Department at CSUB, and Ken Smith at Monterey Bay Research Institute (MBARI). With the help of MBARI's remotely operated vehicle, we recovered our second set of colonization experiments that had been on the seafloor off the Californian coast at 4000 m for two years. We also deployed another array of experiments. We published some of the interesting results based on colonizing foraminifera from the first set of experiments. Analyses of these single-celled creatures included those from the new Micro-CT Scanner at CSUB. We look forward to the results of our analyses of this second set.

I published 2 research papers in 2019. One of these papers, published in *Earth and Planetary Science Letters*, compares three new methods to assess paleo-oxygen levels in ancient oceans, while another, published in *Deep-Sea Research*, focuses on results from our seafloor experiments off California (described above).

My teaching duties included historical geology and a course entitled "Research Methods and Strategies." Please let me know if you have suggestions for field trips to local fossiliferous outcrops.

Tony Rathburn (sitting, center), Anna Cruz (to his right), Chris Chavez (to his left), and several CSUB freshman on a research voyage off San Diego

Liaosha Song This is my second year at CSUB as an assistant professor. Things get better and better as I become more and more familiar with this university and with this city. I have taught several courses, namely Geophysics lab, Senior Field Seminar (co-taught), Petroleum Geology, and Petroleum Prospecting. I created a new course entitled "Well Log Analysis," and I will teach Sequence Stratigraphy and lead the CSUB IBA team in the 2020 Spring semester.

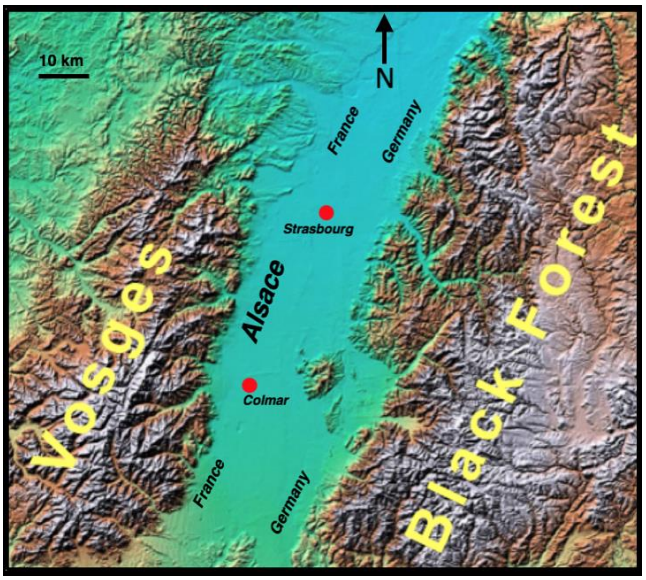
My own ongoing research involves carbon dioxide sequestration, pyrite-hosted porosity and organic matter-hosted porosity in organic-rich shales, Hue Shale Gamma Ray Zone on the North Slope of Alaska, and characterization of unconventional reservoirs. I published three peer-reviewed papers in *Fuel*, *AAPG Bulletin*, and *Interpretation*. I also have two papers under revision. I received funding for two research projects. One is funded by the American Chemical Society Petroleum Research Fund, the other one is funded by the CSUB California Energy Research Center. I was invited to Trona CA to give a talk by the Searles Lake Gem & Mineral Society.

I was invited by PS AAPG and PS SEPM to organize the 2019 West Coast Student Expo. This was the first time CSUB hosting this event. 57 students from 19 universities participated in this event. We couldn't do it without generous donations from our industrial sponsors, including Aera Energy, Chevron, and CRC. We also received donations from DOGGR, PS AAPG, PS SEPM, and PCS SEG. Dr. Kathie Marsaglia from CSU Northridge offered tremendous amount of support. I would also like to express my gratitude to Lisa Alpert and Cynthia Huggins for their efforts to make this event happen. Last but not least, I appreciate the hardworking of all the student volunteers and the support from my colleagues and California Energy Research Center.

I am always looking for new projects to create opportunities for undergraduate and graduate research. Using my knowledge of unconventional reservoirs, the goal is to add to the research productivity and funding at CSUB, and expand on the current research in unconventional and conventional reservoirs.

Rob Negrini, Professor Emeritus.
Rob Negrini has now been retired from teaching for more than 3 years. He continues to publish with two more peer-reviewed articles coming out this year. The papers will appear in the new Geological Society of America Special Paper 536 "From Saline to Freshwater: The Diversity of Western Lakes in Space and Time.

Rob and Jana traveled for their first time to France this past year, spending one week in Paris and one week in the medieval region of Alsace, on the French/German border. Alsace was full of beautiful little villages and is famous for its white wine varietals including some of the best Pinot Gris in the world. Because this is a newsletter for a Geoscience department, the following focuses on the fascinating geology of the area.



The Alsace region is located tucked up against the Vosges Mountains on the west side of the Upper Rhine Graben (see the map in the first figure). The Vosges Mountains have similar geology to that of the mountain range that makes up the better part of the Black Forest in Germany. This is no surprise as the two mountain ranges were separated by the formation of the Rhine Graben during the Paleogene. That is, one would expect to find the same rocks if one drilled below the sedimentary fill of the Rhine Graben. The basement rocks in the Vosges consist of Hercynian crystalline rocks formed during the late Paleozoic, the same mountain building event responsible for the younger crystalline rocks in the Appalachians of North America. The Vosges also contain older, slightly metamorphosed sedimentary rocks, like the Vosges Red Sandstone that's the main building material for the dozens of quaint Medieval villages in Alsace. The second figure is a photo that shows castle ruins made of this sandstone. The view looks down from the edge of the Vosges toward the E/SE at the village of Ribeauville. The main boundary normal fault is basically where the mountains meet the valley.

The last figure is a photo of the Dryas flower found in modern times only above tree level, in in the Vosges Mountains. It's found nestled up
this case at a few thousands of feet above sea level

against Hercynian-aged crystalline rocks. Those of you who have taken Paleoclimatology from Negrini will recognize this as the flower whose pollen is an indicator of glacial climates when found near sea level, for example during the most recent glacial maximum and, then again, during the Younger Dryas, a brief return to glacial conditions about 12,000 years ago. This brief return to glacial climate conditions was famously triggered by the sudden release of fresh water into the Northern Atlantic when Glacial Lake Agassiz drained through the St. Lawrence Seaway after a catastrophic failure of an ice dam at its southern edge. Lake Agassiz was notably nearly as large in area as present-day Hudson Bay.

As a final note, Rob and Jana once again gave a contribution to the Geological Sciences Department (account TR36). The money is earmarked to support student thesis research that will most likely be submitted soon to a peer-reviewed journal. We strongly encourage everyone reading this newsletter to consider doing the same, perhaps earmarking the money to whichever purpose you deem to be most valuable to the Department mission.

Elizabeth Powers I can't believe in September 2020 I will celebrate my 20th anniversary working for the geology department. There have been so many changes during this time and yet I still look forward to the new academic year and the new faculty and students that it brings. I continue to advise the Geology Club and I participate in the many educational outreach activities they provide to

Elizabeth Powers – outreach with local middle school students

local K-12 schools. As well as fulfilling my role as Instructional Support Technician for geology I have for the last 3 years assumed the role of Radiation Safety Officer for the School of Natural Sciences, Mathematics & Engineering. This new assignment has definitely added to my responsibilities. However, I welcome the challenges it brings and the collaboration with others on and off campus. I always enjoy seeing and hearing from our alumni, I hope they all continue to keep our department updated with their success stories and amazing adventures in geology.

Sue Holt My almost 6 years as Administrative Assistant Coordinator at CSUB has flown by. Interacting with and helping students navigate the CSUB labyrinth is the favorite part of my job. Our

students make me very proud - they are securing jobs in industry and putting their degrees to good use. Some are working full time and still pursuing their master's degree; some are married and have kids at home. All are putting all they have into their education.

The department continues to change and grow with the addition of new faculty and adjunct lecturers, as well as an array of courses. We still love to see retired faculty and alumni visit with their latest tales!

Sue Holt on the Rogue River in Oregon

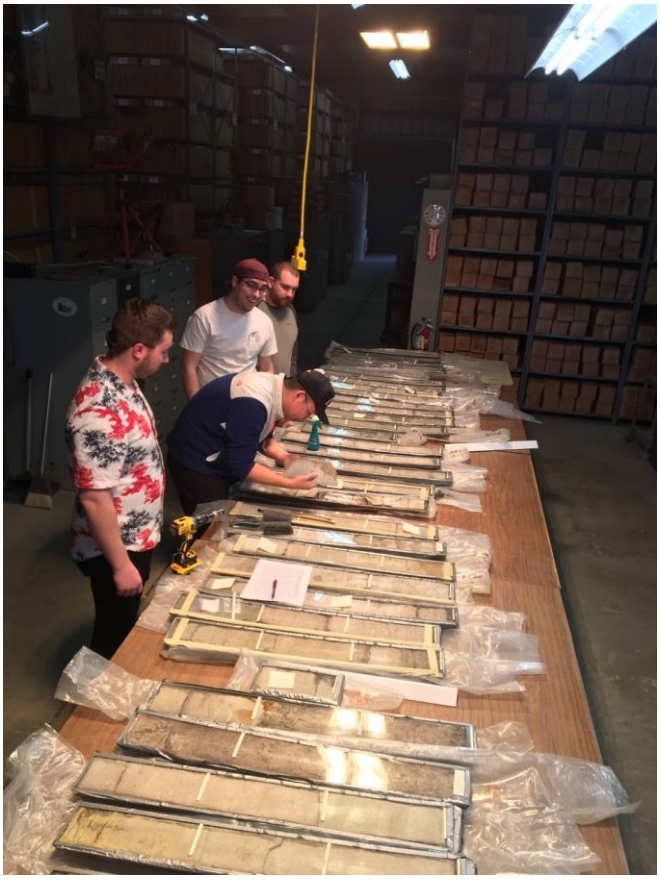
Debra Jackson For over 15 years, the Department of Geology has offered high school students the opportunity to earn college credit through CSU Bakersfield' Dual Enrollment program. High school juniors and seniors are eligible to participate in the program. Students and the appropriate High School coordinator, complete and sign the CSUB Early/Dual Enrollment application forms and the High School districts route the applications to the Office of Academic Programs at CSUB. This spring semester, there are a total of 278 students from Kern High School District and 107 students from Chaffey Joint Union High School District that are enrolled in the Geology 2010, Physical Geology course. The course offered is an early introduction for students to explore more about the "physical and chemical processes operating within the Earth and its surface." For more information, contact Dr. Debra Jackson, Associate Dean of Graduate and Undergraduate Studies, at djackson9@csub.edu.

Debra Jackson, Associate Dean of Graduate and Undergraduate Studies

The California Well Sample Repository (CWSR)

The California Well Sample Repository (CWSR) is located on the south side of the CSUB campus. The facility was constructed in 1975 to be a publicly accessible library of geological data. A second building was added in 1986 immediately behind the first building. The combined 12,000 sq ft are filled with geologic data including cores, well files, paleontological reports, check shot surveys and many other data that are not to be found elsewhere. Some, but not all, of the data in the facility are included on the CWSR website at www.wellsample.com.

Students from all over the country, including Montana, Arkansas, and throughout California, have been making use of the facility in recent months. Of course, CSUB geology graduate students and faculty also take advantage of this unique resource on campus. This year, **Zach Webb, Austin Fowler, Caleb O'Rourke** and **Victoria Lee** are currently using CWSR materials for their research.



CSUB geologists sample cores at the CWSR. Front to back: CSUB graduate student Zach Webb; CSUB Assistant Professor, Liaosha Song; and CSUB graduate students Austin Fowler and Caleb O'Rourke.

Volunteers from the CSUB 60+ Club have been donating their time to organizing the data at the facility since 1987. Enrolled geology students, including **Bradley Squires** and **Ariel Espindola-Mercado**, hired for part time positions, assist with the operation of the facility too.

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).

Charles James surveys earthquake damage at the CWSR.

Charles James holds the curator position overseeing the operation of the CWSR. The telephone number at the CWSR is 661-654-2324.

CERC Interdisciplinary Energy Research Grants

Liaosha Song and **John Yu** of the CSUB Geological Sciences Department were among the recipients of California Energy Research Center's (CERC) Interdisciplinary Energy Research Program grants. Through generous funding from Chevron and other research partners, including California Bioenergy, CERC offered competitive grant opportunities for teams of faculty, students and industry partners to conduct funded, interdisciplinary research at CSUB. Liaosha Song along with Tathagata (Tat) Acharya (CSUB Dept. of Physics and Engineering), was funded for their proposal entitled: "Pore-scale Reservoir Modeling of Sandstones using Computational Fluid Dynamics." The proposal entitled" Blockchain database for Underground Aquifer Protection in Oilfields" was awarded to Chengwei Lei (Dept. of computer and electrical engineering) and **John Yu**. Interdisciplinary energy research grant funding is provided to enhance research capabilities, promote collaborations, and generate results that form the foundation for future research proposals to external funding sources.

California Energy Research Center's (CERC) Interdisciplinary Energy Research Program grants awarded in 2019:

Pore-scale Reservoir Modeling of Sandstones using Computational Fluid Dynamics; PIs: Tathagata (Tat) Acharya, and **Liaosha Song**.

Synthesis and electrochemical investigation of cobalt (II) complexes for potential use in energy storage – PIs: Dr. Jesse Bergkamp, Dr. Yize Li, Dr. Swarnalatha Bomma.

Blockchain database for Underground Aquifer Protection in Oilfields; PIs: Chengwei Lei and **John Yu**.

Electrochemical oxidation of organic compounds in water; PIs: Luis Cabrales and Sumita Sarma.

Hyper-Scale Data Centers Powered by Renewable Energies; PIs: Saeed Jafarzadeh and Anthony Bianchi.

Enhancing Energy and Resource Recovery from Agricultural Wastes: PIs: Zhongzhe Liu and Isolde Francis.

Annual CSUB Research Excellence Awards

At the annual CSUB Research Excellence Awards Dinner held at Hodell's Restaurant **Chris Krugh** and **Tony Rathburn** received Gold Awards for acquisition of research grant funds. Geology's **Sue Holt** and **Dodie Hyatt** (exclusive geology student advisor) also received awards.

Answers to: How well do you know the CSUB Geology faculty?

Which faculty member got stuck in quicksand while working solo in remote Venezuela?
Bob Crewdson

Which faculty member hit an iceberg while working along the coast of Alaska?
Chris Krugh

Which faculty member experienced the infamous Crossing Equator/King Neptune Ceremony while at sea on an IODP Expedition?
Adam Guo

On multiple occasions wild elephants charged at which faculty member?
Tony Rathburn

Which faculty member has worked on materials regarded as national treasures?
Katie O'Sullivan

Which faculty member, while conducting field work, was surrounded by Argentinian police with guns drawn?
Chris Krugh

Which faculty member lived in Antarctica for a year?
Tony Rathburn

During the annual Geology Club BBQ, which faculty member received the "cheesy joker" trophy award?
Adam Guo

Which faculty member has traveled almost 3 miles to the bottom of the ocean in a manned submersible?
Tony Rathburn

Which faculty member studies the pore structure of shales?
Liaosha Song

DONATIONS

SPE Donates Research Computer

To help with the need for increased research computer access for CSUB geology students, the San Joaquin Valley Section of the Society of Petroleum Engineers (SPE) donated a new research computer worth $4,150 to The Geological Sciences Department. Gwyn Mali, Treasurer of SPE, and Chapter President, Jared Paddock presented the donation which will be housed in the Department's new computer facility room. "Having access to state-of-the-art computing capabilities and software is critical for our students to conduct cutting-edge research and gain applied skills for the job market," said Tony Rathburn, Chair of the Department of Geological Sciences. "We sincerely appreciate work by **John Yu** and Gwyn Mali for making this donation a reality."

Jared Paddock, Chapter President of the San Joaquin Valley Section of SPE, with geology major Emily Oliver.

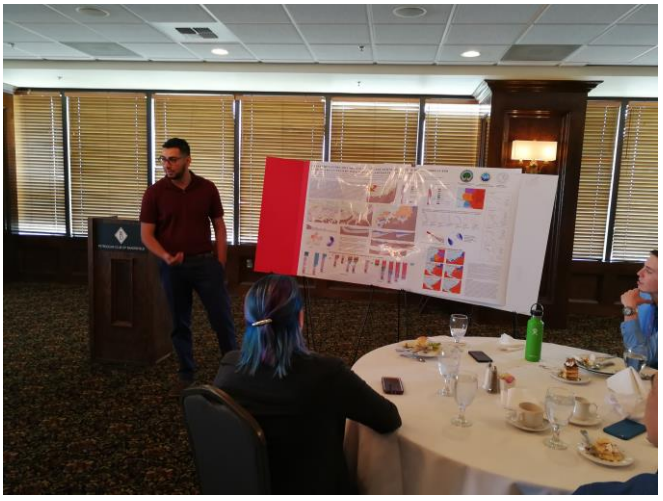
SEG establishes a new Geology Student Award

A new award has been established by the Pacific Coast Section of the Society of Exploration Geophysicists (PCS-SEG) to recognize an outstanding CSUB geology major and to help the student cover the costs of the required summer field camp course. Last spring, Zachary Webb was announced as the 2019 recipient of the $500 PCS-SEG Student Award, in recognition of his achievements and in support of his summer field camp studies in the geological sciences. “The Pacific Coast Section of the Society of Exploration Geophysicists is proud to sponsor this scholarship for an undergraduate geology student at CSU Bakersfield to help support their geology field camp course, said Catherine Thacher, Treasurer of PCS-SEG. “We recognize the critical skills that field camp provides, from technical knowledge to professional networking, and we are pleased to encourage the educational and practical development of high-performing students in the CSUB Department of Geological Sciences.”

Zach Webb during field camp through Southern Utah University

CSUB geology major, Zach Webb receives the first PCS-SEG student award from Catherine Thacher, Treasurer of PCS-SEG. Photo by Adam Guo.

The award was presented at a CSUB geology student research event hosted by PCS-SEG at the Petroleum Club Building. A number of CSUB geology students gave poster presentations at the event, including undergraduates Eneas Torres-Andrade, Bradley Squires, Sarah Hughes, and Brandon Tamondong, and graduate students Erin Walter and Alejandro Rodriguez.



CSUB geology major, Eneas Torres Andrade presents his research poster at the 2019 PCS-SEG student research event. Photo by Adam Guo.

As noted by Gary Meyer, President of PCS-SEG, “The PCS-SEG is a section of the Society of Exploration Geophysicists, with members located

from California to Texas, including student members. We host monthly technical talk luncheons during the academic year, which student members can attend for free." Both the local section (PCS-SEG) and the broader international society have goals that include inspiring the geophysicists of today and help enable and facilitate those of tomorrow. President Meyer continued, "Through the society's various events, forums and foundations, the SEG has a long-standing tradition of excellence in education, professional development, new business generation, and engagement that encourages collaboration and thought leadership for the advancement of geophysical science around the world."

The Kern County Mineral Society's second year of CSUB Geology Student Awards Kern County Mineral Society (KCMS) presented two CSUB Geology students, Zach Webb and Megan Varga, with awards of $1500 each to help cover the costs of their required summer field camp. CSUB Geology majors are required to attend an approved field camp during the summer of their junior or senior year. These five- to six-week long field course experiences enable students to apply and hone their skills in remote regions to map geological features and determine the geologic history of these secluded environments. Field camps are coordinated and taught by experienced field geologists and often take place in isolated places in Utah or Montana, or in other countries. Required summer field camp course experiences are not covered by CSUB tuition, and cost thousands of dollars beyond the cost of a student's 4-year education.

The Kern County Mineral Society was established in 1935, by individuals who shared a common interest in collecting, displaying, and sharing their knowledge of rocks and minerals. "Supporting CSUB geology students is now the most important thing that Kern County Mineral Society does…" said Steve Collett, a member of KCMS. David Schaad, Educational Chairman of the KCMS said, "We at Kern County Mineral Society are excited to be able to support CSUB Geology Students towards their goal of work in some field of Geology."

Join us on Facebook on the CSUB Geology Club page.

Zach Webb, CSUB Geology major receiving his Kern County Mineral Society award from David Schaad, Educational Chairman of the KCMS.

Megan Varga, CSUB Geology major receiving her award from Ken Baird, President of the Kern County Mineral Society.

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; **costing students several thousand dollars**)

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 petrographic microscopes and specimen storage cabinets, and also plan to continue to resurrect our computer and teaching laboratory facilities. **Recognition opportunities are available at CSUB. Talk with us about naming items, rooms or facilities in recognition of donors or businesses or 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, Schlumberger, Penn State/Africa Array, Pacific Section APPG, the San Joaquin Geological Society, the Kern County Mineral Society, the San Joaquin Valley Section of SPE, and the Pacific Section SEG.

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.

STUDENT NEWS

CSUB Geology Students Receive National Research Awards

Three CSUB Geology Graduate students received 2019 Graduate Student Research Grant awards from the Geological Society of America (GSA), facilitating research related to landslides, fire-impacted soils, and climate change. **Toni Ramirez, Cindy Rodriguez** and **Jesus Robles** each received research award funds to help support their master's thesis research at CSUB. These are competitive, prestigious awards given to geological science graduate students enrolled in universities in the United States, Canada, Mexico and Central America.

Cindy Rodriguez, Karol Casas, Anna Cruz, and Toni Ramirez at the AGU Conference in San Francisco in December

Toni Ramirez is working with Geology Associate Professor, Dr. W. **Chris Krugh**, and her thesis research is entitled "Earthquake-induced landslide susceptibility of the lower Kern River watershed." Cindy Rodriquez's research project is entitled "Wildfire impacts on soil physical properties: A 3-year recovery assessment for the 2016 Erskine Fire." Her thesis advisor, Geology Assistant Professor, Dr. **Junhua Adam Guo**, said that results from Cindy's study "…will reveal the changes in soil properties that are influenced by fires, and may help generate a plan to mitigate future debris flow events."

Cindy Rodriquez works on soils impacted by wildfire.

Jesus Robles was chosen to receive a Charles A. and June R. P. Ross Research Specialized Award. The

GSA Committee on Research Grants selects recipients for specialized awards from the general pool of applicants. The thesis research that Jesus is working on is entitled "Understanding the Subarctic North Pacific Paleo-Circulation: Neodymium Isotope Approach." The Charles A. and June R. P. Ross Research Award is awarded to outstanding graduate students conducting research in a number of topics, including interpreting past environments of deposition and their biological significance, and the integration of these research areas into a better global understanding of climate change. "Jesus is working on an important problem related to deep ocean circulation of the past," said his advisor, Geology Assistant Professor, Dr. **Chandranath Basak**. "Results from this project can be used by climate scientists to improve climate models and ultimately tell us about climate change."

Jesus Robles looking serious while on a research voyage. Jesus received the The Charles A. and June R. P. Ross Research Award for his thesis work in marine science.

This is the first time that CSUB geology has received 3 GSA graduate student research awards in one year. In the CSU system, only CSU Northridge received as many GSA graduate student awards this year. Many universities with larger geology programs received fewer GSA student awards. It is also noteworthy that **Zach Levinson**, a recent CSUB geology undergraduate, also received a 2019 GSA student research award as a graduate student at CSU Sacramento.

CSUB geology students Carlos Montejo and Virginia Rodriguez received PROUD awards from the LSAMP Program Recognition by PROUD (Program Recognizing Outstanding Undergraduate Distinction) through LSAMP (Louis Stokes Alliance for Minority Participation Program) is a distinct honor, and to have two geology students honored in this way is doubly special. **Carlos Montejo** was recognized for Outstanding Academics. Carlos was a dual major in geology and mathematics and maintained a high GPA while actively participating in a multi-year research project investigating the petrography and stratigraphic provenance of sedimentary units within the southern San Joaquin Basin. He is co-author on several published abstracts and presentations related to this research from 2016-2019. As a result of his interest, maturity and competency in geology, Carlos was chosen for the rare opportunity to serve as an undergraduate lab teaching assistant for two courses in mineralogy and petrology. As a summer intern in a new community program with the Tejon Ranch Conservancy, Carlos has also participated in community outreach activities, helping to identify and document geologic resources for future public outreach events. Carlos accepted a scholarship from Montana Tech for a master's degree in geology.

Virginia Rodriguez was recognized as an Outstanding Alumna, and her graduation picture was included on the cover of the 2019 PROUD magazine announcing award winners. Virginia completed her BS degree in geology at CSUB in 2018. As an American Guatemalan Mexican, first-generation born in the USA, and a young mother, Virginia faced a number of obstacles to achieve her goals. She is the first in her family to attend a university, and first to seek a science degree and profession. Virginia maintained a high GPA, graduated Magna Cum Laude, and received several competitive scholarships and awards, including an Africa Array Scholarship (a Penn State geoscience research program) and the Kern County Mineral Society Award. Virginia is co-author of several published abstracts from her 2016-2017 field-based geological research. In 2018, mentored by Dr. Katie O'Sullivan, Virginia designed and implemented a different research project that culminated in a prestigious oral presentation at the annual GSA National Conference in Indianapolis. With a perpetual positive attitude, a natural inquisitiveness, persistence, a sincere interest in science, and a willingness to learn new skills outside of her comfort zone, Virginia is an inspiration for those around her. She has been active in the Boys and

Girls Club of Kern County and the Bakersfield College Child Development Center. She wants to be a role model for other Latina, first-generation students. Virginia was offered two full scholarships by graduate school programs, and she decided to accept the offer to enter a geology PhD program at the University of Notre Dame.

Student Internships
CSUB students have been more successful than ever in obtaining geoscience internships. We have a significant number of undergraduate and graduate students that have/had internships. Here are a few summer internship stories from CSUB Geology undergraduates:

Brandon Tamondong: internship with Penn State AfricaArray Program Being involved in the geology department at CSU Bakersfield has opened many doors. For example, this summer I was chosen to be part of an internship program that allowed me to study the geology of the Appalachian Mountains and its Marcellus Shale formation.

For weeks, I got to travel alongside other undergraduates who joined the Program from all over the country. Together we worked hard collecting, analyzing and interpreting various outcrops throughout the states of Pennsylvania and New York.

As we traveled and mapped our areas, we learned about the geology of the Appalachian Basin. We also learned how to efficiently analyze well logs and seismic reflections to provide key observations of the subsurface. We gained valuable information about the Basin's sedimentary and structural formations, and were taught how to construct a 3-D geometry with regional variations inside the Basin. This program provided me with additional skills and experience, and gave me great memories that will last a lifetime.

Eneas Torre-Andrade Tejon Ranch Internship and University of Missouri Kansas City International Research Experience for Students Well, it has been another busy year and an even busier summer. I am partly to blame for this, as it seems I am incapable of saying no to an opportunity to learn and find out what my interests are. I have in the time span of one summer finished two Internships: one through the Tejon Ranch Conservancy and the other The Baja Basins International Research Experiences for Students at UMKC. My work with the Tejon Ranch Conservancy dealt with integrating Geology into popular long running tours as well as running a

geology field trip for Ridgeview High school geology class. Then I was on plane to Kansas City to be greeted with thin sections, Ar/Ar dates, and whole rock geochemistry of rocks I helped collect in Baja California Sur. In reflection I have often struggled with the difficulties of dealing with my time. However, I am in now in my last semester here in the CSUB Geological Sciences Department, and if I have learned anything is that geology, is the study of the earth, but it also is the study of time.

Ariel Espindola-Mercado: internship at the Rio Tinto Borax mine Last summer I was hired on as an intern at the Rio Tinto Borax mine in Boron California. My primary objectives were to catalog a collection of core boxes and assay materials that were gathered at their large core repository warehouses, and reorganize the assay material for permanent storage. Additionally, when needed, I assisted an ore control geologist with sample collection runs within the mine and at pond-borate drying fields. That was definitely the most exciting part. While in the mine I was able to admire the complicated structure developed over the ore deposit's 19-million-year history. I had to do that while dodging 24 feet tall haul trucks driving about.

Blast hole drill site at the Rio Tinto Borax mine.

It was quite an honor to be within the largest borate deposit in the U.S. and the only location where fiber optic Ulexite could be found (I made sure to add that to the collection I was bringing home). I also used my time there to get to talk to the contract geologists and hourly crew about their experiences working at several mine sites. Overall, my employment there has got me motivated to hone in my attention to pursuing a career as a mining geologist.

CSUB Geology Club and Women in Science Club With guidance from **Elizabeth Powers**, **Chris Krugh** and **Liaosha Song**, students in the Geology Club were very active again this year. The new Women in Science Club (with mentoring from founding faculty advisor, **Katie O'Sullivan**) was initiated this year by geology students, and also became active in outreach. Students worked in a variety of settings, including CSUB outreach events and educational demonstrations in K-12 classrooms.

Photo by Carrie Williams

Geology Club Field trip to Dome Rock in the Sequoia National Forest, Sierra Nevada. From left to right: Dancie Grumbles, Paradise Pelzer, Ariel Espindola, Eneas Andrade, Brandon Schmidt, Kimberlee Dorado, Cassondra Lundy-Lyday, Bradley Squires, Carrie Williams, Brandon Ide, Franz Ebert, Brandon Tamondong, Jared Hansen, Brian Aguilar.

Geology Club: The Geology Club at CSUB is a student-led organization that aims to educate and involve students and members in the geological sciences. We do this through volunteering, field trips to geologically interesting places, hosting guest speakers from industry and academia, attending events such as local geological society meetings, and more. Many current and former Geology Club members have become professionals in the local petroleum and regulatory industries, maintaining close connections with the Club and CSUB geology. Over the last year, we have been busy with field trips, helping with the first ever CSUB-hosted PSAAPG student expo, designing "the best looking shirts yet" (according to one staff member), volunteering for numerous K-12 educational events – as well as industry events – and hosting several guest speakers. The club is also busy organizing the annual Spring BBQ fundraiser; this event is "quintessential" Geology Club, and last Spring's BBQ was our biggest ever. We hope to have an even bigger BBQ celebration this spring, and are planning many more events, volunteering and networking opportunities, and exciting field trips. We look forward to seeing you at the BBQ, and other events as well.

Women in Science Club Women in Science at CSUB is a new club founded this year by four geology seniors, **Carrie Williams, Alex Garcia, Emily Oliver**, and **Cassi Lyday**, with **Dr. Katie O'Sullivan** as club advisor. Their main goal as a club is to facilitate communication between STEM students and clubs at CSUB so they can talk about situations they encounter in school or at work, and provide resources and mentors to help students overcome problems. At their meetings they have discussed difficulties that women in particular can encounter in graduate school and while camping or hiking, and hosted a practice networking session. During the fall semester, Cub members volunteered at a Women in STEM event for the Girl Scouts hosted by Dr. Andrea Medina, joined the Geology Club on a group hike to Sequoia National Forest, and volunteered with the Chemistry Club to judge a VEX robotics competition at Centennial High School. Plans include visiting science museums in the San Francisco and Los Angeles areas members, rock hounding in the Mojave Desert, hosting guest speakers, assisting Bakersfield City School District students with building their own AR sandbox, participating in education outreach events, and fundraising so that we can purchase our own science outreach materials and banner. Please like and follow the Club on Facebook at www.facebook.com/WomenInScienceCSUB

Founding members of the Women in Science Club, from L to R: geology majors Alex Garcia, Cassi Lyday, Emily Oliver, and Carrie Williams.

Join us on Facebook on the CSUB Geology Club page.

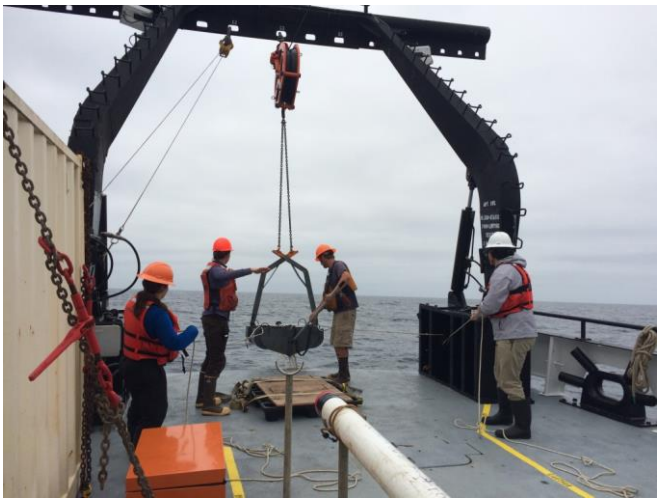
CSUB students explore the deep sea off California and discover STEM career opportunities

During their summer break, a team of California State University Bakersfield students became marine scientists on a 4-day expedition off the coast of San Diego. Students were trained to use high-tech equipment to sample water, rocks and seafloor sediment from depths as great as 6,824 feet. Their samples will increase our understanding of ocean and climate changes over time. Funded by the National Science Foundation and the W. M. Keck Foundation, the expedition is part of a larger effort to pique student interest in geoscience, including at CSUB and high schools throughout Kern County.

Chris Chavez, an expedition participant and CSUB geology student, had never been on a boat before. Marine research wasn't on his radar. "Now I'm seriously considering a marine science related field for graduate school," said Chavez.

Marine technician Kristin Beem discusses the echo sounder technology on board with scientists and students as the ship's winch operator looks on. Clockwise from the left: Oklahoma State University Assistant Professor Ashley Burkett, CSUB lecturer and research scientist Anna Cruz, Kristin Beem, CSUB undergraduate geology major Chris Chavez, and CSUB Biology graduate student, Jenny Grayson.

The research expedition, took place from July 19th to 22nd aboard the *R/V Oceanus*, a 177-foot research vessel operated by Oregon State University. Students were mentored by CSUB Geology Professor and Chief Scientist **Tony Rathburn** as well as a team of marine geology professors and scientists from CSUB, the University of San Diego (USD), Oklahoma State University, and Scripps Institution of Oceanography at UCSD (SIO).



CSUB graduate student Jenny Grayson and CSUB undergraduate Chris Chavez hold the tag lines to help steady the grab sampler while working with marine technicians (Kristin Beem and Paul Walczak) to recover seafloor sediments.

Back at CSUB, student scientists will continue their work in the lab studying foraminifera ("forams"), a tiny marine organism found on and within marine sediments. Using this organism as a proxy, they can track biological and geochemical responses to oxygen stress in the deep ocean. By working alongside a diverse team of scientists at sea and in the lab, students are being exposed to a variety of career paths in marine science, paleontology, and geochemistry.

On the research vessel, student participants Bibi Renssen (USD) and Austin Saenz (CSUB) use microscopes to view forams, tiny marine organisms they collected from deep ocean sediments. Photo by Jenny Grayson.

Rathburn explained that there are numerous opportunities at CSUB for students interested in geology. “You don’t need to live next to the ocean to participate in marine geoscience.” Rathburn is expanding CSUB’s geology program to expose students to areas within geoscience they might not have been aware of. “These research expeditions are about learning what it’s like to be a geoscientist and exploring career opportunities that aren’t as well known in the central valley. Going on a research expedition is transformative. Most student participants come back with a different perspective of scientific research and the career possibilities in geoscience, and some adopt a new career path,” Rathburn said.

Dr. Anna Cruz, CSUB Lecturer and research scientist (left), and USD undergraduate Chelsea Nelson work with CSUB geology undergraduate Austin Saenz and USD geology professor Sarah Gray to subsample multicore sediments at night during 24-hour operations on the ship.

Three more voyages are planned over the next two years, and each trip will take many more CSUB undergraduates and local teachers out to sea. Active participation on a marine research ship is one way to find out if a career in geoscience is right for you.

Dr. Rathburn is recruiting for expedition participants including CSUB students and high school science teachers who will bring cutting-edge geoscience curriculum, and deep-sea samples, back to classrooms across Kern County.

To learn more about the Geopaths project go to: https://scripps.ucsd.edu/projects/geopaths/

Sunset on the ship.

Fourteen scientists and student scientists participated in an expedition aboard the research vessel R/V Oceanus in July 2019. From left to right, the science party included Dr. Ashley Burkett (Oklahoma State University), Austin Saenz (CSUB), Kristin Beem (Oregon State University), Rachel Sarner (USD), Dr. Anthony Rathburn (CSUB), Dr. Anna Cruz (CSUB), Chris Chavez (CSUB), Dr. Sarah Gray (USD), Bibi Renssen (USD), Henry Arbaugh (USD), Jenny Grayson (CSUB), Alexandra Hangsterfer (Scripps Institution of Oceanography, UCSD), Chelsea Nelson (USD), and Paul Walczak (Oregon State University).

For more information: contact Tony Rathburn, CSUB Dept. of Geological Sciences, arathburn@csub.edu.

(written by CSUB graduate student Jenny Grayson).

CSUB and BC students and faculty rediscover geologic wonders near ZZYZX

November, 2019

Once again, CSUB and BC geology students and faculty visited a variety of geologic features on a three-day weekend to the former health resort that is now the CSU Fullerton, Desert Studies Center (DSC, aka Zzyzx) in the Mojave National Preserve. The CSUB Geological Sciences Department and community donors sponsored this field expedition that serves as a first-hand introduction to the rich geological history of the region. Led by CSUB Assistant Professor and alumnus **Dr. Katie O'Sullivan**, the group, including students from her physical geology course and historical geology students from Bakersfield College, explored the geology of desert environments through hands-on experiences. Throughout the trip, CSUB geology faculty discussed the geologic features of each field stop, including the faults and landscape evolution of the Kern River Gorge, 300-million-year-old corals in ancient tropical sea deposits, cinder cone volcanoes, lava flows and underground lava tube caves, the singing sands of Kelso Dunes, the history of surface and ground water in the region, and the multicolored layers of Rainbow Basin.

Students completing a lab while on the Zzyzx Field Trip

Join us on Facebook on the CSUB Geology Club page.

Bob Crewdson discusses the hydrology of the region during the ZZYZX trip. Big Horn sheep watched from a distance on the hills.

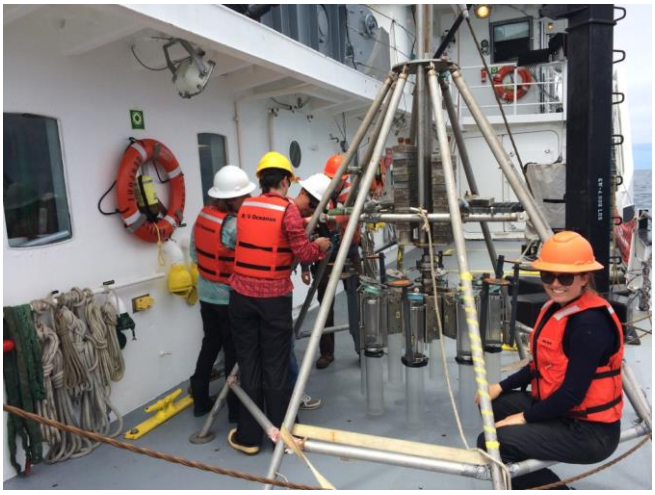
This year, students were treated to a fascinating presentation at ZZYZX by **Thom Davis**, CSUB Lecturer and professional field geologist. He was in the region conducting field work with geologist Korey Harvey, who works for the U.S. Department of Defense. Students learned about career paths in geosciences and the enjoyment of working in the field. Other memorable aspects of the trip included the importance of wearing long pants in the field, and alternative uses of a rock hammer in Rainbow Basin. This trip was funded by an internal Instructionally Related Activities (IRA) grant to **Chris Krugh**, donations, and the Department. We may not be able to continue providing this extraordinary experience next year without additional donations—Please donate and help us to continue to provide field experiences for students. See the last page of this newsletter to learn how to donate.

Students examine ancient lava deposits during the Zzyzx trip.

A packed parking lot at Rainbow Basin

CSUB Geology Geopaths Program Partners with the NSME Pathways Program to Engage Freshman in Marine Geoscience

Through a partnership with the CSUB School of Natural Sciences, Mathematics, and Engineering (NSME) Pathways Program, we engaged freshman STEM majors to participate on our fall 2019 research voyages off San Diego. The Pathways Program is designed to help freshman get a good start to their college career and improve retention in STEM. By involving freshman interested in science, we hope to let them know about exciting marine science research opportunities that can begin as early as their first year at CSUB, expand their career options to include those in marine sciences, and strengthen their resolve to remain in STEM. The two fall voyages off the coast of San Diego were part of a 4-leg, 2-day expedition on the *R/V. R. G. Sproul* operated by Scripps Institution of Oceanography.



At bottom of previous column: CSUB undergraduate Austin Saenez, with help from CSUB research scientist Dr. Anna Cruz and Scripps Institution of Oceanography Geological Collections Manager, Alexandra Hangsterfer, attaches a benthic camera on the frame of the multicorer. The camera will take photos of the sediment collection process on the deep sea floor. University of San Diego undergraduate, Bibi Renssen (sitting) sets up the multicorer tubes to collect short cores of seafloor sediments.

Through active participation, students were trained in safety procedures, and the preparation, deployment and recovery of the multicorer, Van Veen Grab Sampler, gravity corer, and CTD. Students were able to talk with marine science scientists, educators and crew members to gain insight into geoscience job pathways and graduate school opportunities. In the lab students were given safety training and were instructed in processing samples and microscopic examination of samples. Students that were trained in a particular technique helped with the training and mentoring of less experienced individuals. This allowed these younger scientists to develop teaching skills and provided peer mentoring for less experienced students.

Back at CSUB, student scientists continue their work in the lab studying the geochemistry of sediments and foraminifera ("forams"), a tiny marine organism found on and within marine sediments. Using this organism as a proxy, they can track biological and geochemical responses to oxygen stress in the deep ocean. By working along side a diverse team of scientists at sea and in the lab, students are being exposed to a variety of career paths in marine science, paleontology, and geochemistry. These research expeditions are about learning what it's like to be a geoscientist and exploring career opportunities that aren't as well known in the Central Valley. Going on a research expedition is transformative. Most student participants come back with a different perspective of scientific research and the career possibilities in geoscience, and some adopt a new career path.

Geology students and teachers go to Geological Society of America (GSA) meetings CSUB undergraduate geology majors Carlos Montejo and Eneas Torres-Andrade presented first-authored

research posters at the Spring Regional GSA Meeting in Portland, Oregon.

Carlos Montejo (geology undergrad), **Eneas Torres-Andrade** (geology undergraduate), D.E. Miller, **Jesus Eduardo Moreno** (former geology undergrad), and Ellery C Mayence co-authored a poster entitled "Stratigraphy And Petrography Of Early Miocene Synextensional Volcanic Rocks, Western Tehachapi Mtns., Ca**"**

Eneas Torres-Andrade (geology undergraduate), D.E. Miller**, Carlos Montejo** (former geology undergrad), Robert N James**, Jesus Eduardo Moreno** (former geology undergrad), Ellery C Mayence, and Noe A Torres presented a poster entitled "Field Evidence For Early Miocene Synvolcanic Extension North Of The San Andreas And Garlock Faults, Western Tehachapi Mtns. And Eastern San Emigdio Mtns. Ca"

Miller, D.E., **Montejo, Carlos**, **Moreno**, **Jesus** Eduardo, James, **Robert N.**, **Mckinney, Samuel**, **Sarti**, **Ethan**, **Watson**, **Kenneth**, **Buehler**, **Jeffrey**, **Rodriguez**, **Virginia** And **Torres Andrade**, **Eneas** also co-authored a poster entitled "Evidence For Cenozoic Landscape Evolution In The Tehachapi Mtns, Ca From Polycyclic Fluvial Conglomerates"

Geology Dual-Credit Instructors attend and present posters at the Annual GSA Meeting CSUB Geology Dual-Credit instructors, **Teri Madewell** (South High School) , **Karen Blount** (Highland High School), **Marc Halling** (Frontier High School), **Jonathan Walker** (North High School), **Chris Carrisalez** (Arvin High School) and **Argy Leyton** (Montclair High School) attended the September 2019 International, Annual GSA Meeting held in Phoenix Arizona.

Terri Madewell and **Karen Blount** presented a poster that was identified as a "standout" by meeting attendees. Their poster was entitled, "The Art And Science Of Teaching Field Sketching In A High School Classroom."

Marc Halling and **Jonathan Walker** presented a poster entitled "Collaborative Group Assessments In The Science Classroom Using The 1/3 Model."

Argy Leyton and **Tony Rathburn** were co-authors on a poster entitled "Establishing A Dual Credit Curriculum: How We Developed A Successful Dual Credit Geology Course."

Argy Leyton also presented another GSA poster entitled "The Emerging Role Of 3d Printers In A Geology Classroom.**"**

CSUB geology faculty and students attend AGU Four CSUB geology faculty and 5 students attended the international American Geophysical Union (AGU) fall meeting conference in San Francisco this week. *AGU's Fall Meeting* is the largest international Earth and space science meeting in the world. Last year, this conference had over 25,000 attendees. It is noteworthy that 1) **Toni Ramirez**, CSUB grad student (**W. Chris Krugh**, advisor) was invited to give a research talk at a special session entitled "Advances in analysis and prediction of rock falls, rock slides, and rock avalanches" at AGU; and 2) undergraduate **Eneas Torres-Andrade** was the lead author of a research poster that he presented.

Here are the titles of the 2019 AGU research presentations by CSUB geologists:

Earthquake-induced landslide susceptibility of hillslopes along the lower Kern River, CA; **Toni Ramirez** (geology grad student) and **William C Krugh.**

Tree mortality, wildfire hazards, and landslide susceptibility in the Kern River watershed of California**; Karol Casas** (geology grad student) and **William C Krugh.**

Wildfire Impacts on Soil Physical Properties: Results from the Samples of the 2016 Erskine Fire, California; **Cindy Rodriguez** (geology grad student)**, Junhua Guo and Sade Haake** (geology grad student).

Late Oligocene -Early Miocene Kinematics, Volcanism, and Coarse Clastic Sedimentation During the Transition from Margin-Normal Extension to Margin-Parallel Dextral Strike-Slip, Eastern San Emidigo-Western Tehachapi Mountains, Southern California; **Eneas Torres-Andrade** (geology undergraduate), D.E. Miller, **Carlos Montejo** (former geology undergrad), **Jesus Eduardo Moreno**[1](former geology undergrad),

Robert N James, Noe A Torres and Ellery C Mayence.

Reconstruction of Antarctic Intermediate Water Geometry in the Mid-latitude South Atlantic During the Last 40 kyr; **Anna Paula Soares Cruz** (geology faculty and postdoc), **Chandranath Basak**, Rodrigo da Costa Portilho-Ramos[3], **Anthony Rathburn** and Catia Fernandes Barbosa.

Lipid biomarkers as fingerprints of modern dolomite formation in hypersaline coastal lagoons, Rio de Janeiro, Brazil; Camila Oliveira, Catia Fernandes Barbosa, **Anna Paula Soares Cruz**, Crisogono Vasconcelos, Timothy I Eglinton and Daniel Ariztegui. CSUB graduate student Craig Hulsey and Geologist **Katie O'Sullivan** also attended AGU to meet with NASA and NSF program managers and colleagues.

CSUB Geology students win the People's Choice Award for their presentation of the educational attributes of the Augmented Reality Sandbox and stream table at the 2019 Division of Oil, Gas and Geothermal Resources (DOGGR) Statewide Symposium. Note that DOGGR is now known as "The Geologic Energy Management Division" (CalGEM). DOGGR employees attending the symposium voted for their favorite poster, and the presentation by **Zach Webb**, **Mario Ortiz**, Ernesto Hipolito and **Jeff Kimber** won the award overwhelmingly. The presentation discussed the design and functionality of the AR Sandbox, from creation to implementation of it as a tool to model geologic surfaces (both surface and subsurface). The presentation also explained how the stream table is used to model fluvial processes and associated erosional and depositional landforms. The award is now proudly mounted on the wall in the student tutoring room.

CSUB Geology Students Honored by Professional Organizations

CSUB geology students were recognized at the San Joaquin Geological Society's 2019 "CSUB Night" last spring. The event started with CSUB Geological Sciences students presenting research posters on a wide variety of topics to local geologists and engineers. Later, several students were presented with merit-based, summer field camp assistantship 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 a required, 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 transformative experience. It bears repeating that fees for field camps (several thousand dollars) are not included in CSUB tuition, and geology students must pay these fees above the cost of their 4-year degree expenses. Scholarships and field camp awards make a significant difference for geology students.

The following CSUB students each received $1000 field camp reimbursement awards from SJGS and AAPG for 2019:

Favour Epuna
Austin Fowler
Gabe Gaeta
Mary Guenette
Daniel Martinez
Sam McKinney
Carlos Montejo
Megan Varga
Zachary Webb

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. ($1,650)

2019 Award Winner:
Mario Ortiz

The Pacific Coast Section of the Society of Exploration Geophysicists (PCS-SEG) Outstanding CSUB Geology Major Award ($500)

2019 Award Winner:
Zachary Webb

GSA Graduate Student Research Grant Recipients

2019 Award Winners:
Toni Ramirez
Jesus Robles
Cindy Rodriguez

Kern County Mineral Society Field Camp Award ($1500 each)

2019 Award Winners:
Megan Varga
Zachary Webb

California State University Foundation/Trustees Scholarship ($1000)

2019 Award Winner:
Carrie Williams

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.

The following describes awards and awardees for 2019:

James Weddle Scholarship: (650 each)
2019 Award Winners:
Bradley Squires and Ariel Espindola

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.
2019 Award Winners ($1,391):
Alexandria Haylee Garcia

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.
2019 Award Winners: ($620 each):
Eneas Torres-Andrade
Christopher Chavez
Alexandria Garcia
Cassandra Lundy-Lyday
Emily Oliver
Karen Perger
Anita Squalls
Brandon Schmidt
Brandon Tamondong
Carrie Williams

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.
2019 Award Winners: ($750 each)
Briana Acevedo
Hector Zavala

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.
2019 Award Winner:
Bradley Squires

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**. ($3,000)**
2019 Award Winner:
Brandon Tamondong

CSUB AM Petro Inst. (API) Scholarship ($1,666.50)
2019 Award Winner
Mario Ortiz

Chevron Scholarship for Outstanding Students in the Department:
2019 Award Winners: ($2,500 each)
Megan Varga
Zachary Webb

Outstanding Graduate thesis in Geological Sciences: Given to the graduating student whose graduate thesis was exceptional.
2019 Award Winner: Jason Cotton

Outstanding Graduate Student in CSUB School of Natural Sciences, Mathematics, and Engineering (NSME): Presented to the most outstanding graduate student in the School.
2019 Award Winner: Jason Cotton
Outstanding Undergraduate Student in CSUB School of Natural Sciences, Mathematics, and Engineering by Program: Presented to the most outstanding undergraduate student in each Department.
2019 Award Winner: Zachary Webb

Crankstart Scholarship ($2,500):
2019-2020 Brandon Tamondong

Zach Webb (circled left) and Jason Cotton (circled right) pose with other 2019 NSME award winners.

Student Research Poster Competition Award CSUB School of Natural Sciences, Mathematics, and Engineering: Presented to the most outstanding undergraduate student in the School.
2019 Award Winner:
Alejandro Rodriguez (Faculty Mentor: Junhua Guo)

Phi Beta Delta Marian Beane/Charles Gliozzo Domestic Student Award for International Achievement.
2019 Award Winner Grant Obenshain

Join the CSUB Geology Club site on Facebook to keep up on club activities, and job and scholarship opportunities.

2018-2019 ROADRUNNER SOCIETY

Zachary Webb

Roadrunner Society is a program designed to recognize our outstanding graduating seniors at CSUB. Seniors are selected for induction into the Roadrunner Society in one of three ways: 1. You have been nominated by an academic department for the Outstanding Student Award in the school; 2. CSUB Department of Athletics has selected you as a member of the Golden Circle or 3. Student Union and Organizational Governance has selected you for membership in the Student Leadership Hall of Fame.

Join us on Facebook on the CSUB Geology Club page.

CLASS OF 2019 BS

Sean Acord, Andrew Alexis, Ulises Beltran, Jeffrey Buehler, Brian Clough, Jerome Couvillion, Carlos Enriquez Villegas, Favour Epuna, Rick Fewtrell, Austin Fitch, Austin M. Fowler, Gabriel Gaeta, Mary Guenette, Stewart Harvin, Joshua Herrboldt, Ernesto Hipolito, Jacob Jackson*, Michael Juybari-Johnson, Kalvin Katipunan, Morgan Kayser*, Victoria Lee, Daniel Martinez, Samuel McKinney, Celina Mendoza, Beni Missidimbazi, Carlos Montejo, Jesus Moreno, Gabriela Navarrete*, Grant Obenshain*, Estefania Olaya-Romero, Caleb O'Rourke*, Mario Ortiz*, Jamie Price, Christopher Richardson, Virginia Rodriguez, Ethan Sarti*, Paige Seles, Megan Varga, Salvador Vargas*, Kenneth Watson, Zachary Webb*, and Erika Woods earned their BS degree Those with an *are in the Master's Program at CSUB.

Spring 2019 Undergraduate Commencement participants include l to r: Beni Arcel Missidimbazi, Caleb O'Rourke, Rick Fewtrell, Victoria Lee, Samuel McKinney, Jeff Buehler, Mary Guenette, Carlos Montejo, Austin Fowler, Estefania Olaya-Romero, Kenneth Watson, Favour Epuna, Zachary Webb, Josh Herrboldt, Megan Varga, Jesus Moreno, Ulises Beltran, and Celina Mendoza.

Zach Webb and Austin Fowler have been employed by Chevron USA Inc. since November 2019.

Alumni News

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

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.

Fall 2019 Undergraduate Commencement Participants include Mario Ortiz and Salvador Vargas.

Mario Ortiz has been working at California Geologic Energy Management Division

Salvador Vargas began working at Sentinel Peak as a Geology Analyst.

Class of 2019 MS

Joshua Atkins
Jason Cotton
Sara Freeman
Emmanuel Garcia
Charles Gomes
Kathleen Halle
Kristin Koehler
Samuel Jameson
Maynor Lopez
Anh Luong
Nick Murdoch
Emmanuel Otaru
Jennifer Prosser
Alejandro Rodriguez
Juan Santiago
Erin Walter
Tze Tan

Participants in the Spring 2019 Graduate Hooding— Erin Walter, Jenny Prosser, Emmanuel Garcia, Jason Cotton, Alejandro Rodriguez, Nick Murdoch, Maynor Lopez, and Emmanuel Otaru

Jason Cotton is now working at Berry Petroleum Company, and also teaches night courses at CSUB

Sara Perez nee Freeman works at CRC.

Charlie Gomes and **Grant Obenshain** both work in the Santa Maria office of Division of Oil, Gas, and Geothermal Resources.

Erin Walter works with the Department of Water Resources State of California.

Nick Murdoch is employed with AECOM

Jennifer Prosser and **Gabby Navarrete** are at Envirotech.

Kristen Koehler is employed with Kern County Superintendent of School.

Tze Tan works for E & B Natural Resources.

Alumni Profiles:

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. You can also **help students with field camp expenses (thousands of out-of-pocket dollars not covered by CSUB tuition)** by donating to an established scholarship, starting your own annual scholarship, or specifying what you want donated funds to the Department to be used for (see below).

Thank You!

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

California State University, Bakersfield
Department of Geological Sciences
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9001 Stockdale Highway
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Address Service Requested

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