



DEPARTMENT NEWS

Despite all of the crazy and unusual aspects of 2020, we have a lot of positive news to share with you. We would love to hear from you as well.

Student Success. We are especially gratified by our long-running success in student graduation rates, and take pride in our leadership in the CSU system in graduating geology majors, including women and other minorities. Since 2012, minorities, including women, comprised about 60 % of CSUB geology students that graduated. Based on 2018-19 data, CSUB geology faculty mentor an average of 2.4 graduating graduate students per tenure-track faculty member, and graduated an average of 7.4 students per tenure-track faculty member (the highest ratio of tenure-track faculty to number of graduating students in the sciences at CSUB).

Meet and Greet

We have grown to 7 tenure-track faculty members after **hiring two new geologists this year**. This past year we hired **Matthew Herman**, whose research focusses on seismic hazard assessment and lithospheric geodynamics. Matt received his PhD from Penn State University and did a post-doc at Utrecht University in the Netherlands. We are thrilled that he is joining us as a tenure-track Assistant Professor. We also hired **Anna Cruz** as a tenure-track Assistant Professor who joined us in January 2021. Anna received her PhD from Federal Fluminense University, Niterói, RJ, Brazil and did Postdocs at Federal Fluminense University, CSUB and at the University of Delaware. Anna's research focus is in environmental geochemistry and

paleoceanography, and we are delighted to welcome her back to the Department. See the faculty news section to read more about Matt and Anna.

With the demand for Earth science courses as strong as ever, we are very fortunate to have part-time and full-time instructors helping to cover courses: **Lisa Alpert, Jason Cotton, Bob Crewdson, Thom Davis, Larry Drennan, Greg Gordon, Dodie Hyatt, Alyssa Kaess, Steve Kiouses, Pam Knight, John McCormick, Nick Moreno, Brian Pitts, Jesus Robles, Gregg Wilkerson, and John Yu.**

Two **hydrologists from the United States Geological Society (USGS), Olga Rodriguez and Maryanne Bobbitt, are based at CSUB** in the Department of Geological Sciences. Although they haven't been able to be on campus since the virus protocols were invoked in March, we look forward to the time when they can return to their campus office.

Summary of 2020 Adjustments Due To COVID-19 Protocols

As you may or may not know, CSUB switched to virtual instruction mode in mid-March, 2020. So all spring courses and labs suddenly had to be delivered virtually, and any remaining field trips were cancelled. Summer field camps were also almost entirely virtual. Although this wasn't ideal, geology students stayed safe, and graduated on time. The CSU system also mandated that fall 2020 and spring 2021 semesters also be primarily virtual. Some Departments offered some labs in face-to-face mode, but had to also deliver the labs virtually for those that chose not to be there in person. If someone in these labs got Covid, the lab became

entirely virtual for two weeks. Labs had fewer students in them as distancing protocols had to be maintained. Geology chose to teach all lectures and labs in virtual mode, with one course in both semesters piloting field trips (using masks and distancing protocols). Two geology lab rooms were outfitted with video equipment, Go-Pros, and a laptop so that instructors had the option to use these facilities to conduct virtual labs or lectures (rather than teach from home). Faculty were also provided the option of equipment to help with home-based instruction, including white boards and easels. Students and faculty conducting research were allowed access to research facilities provided that virus protocols could be maintained. Although many challenges and difficulties were encountered, both faculty and students did remarkably well adjusting to virtual instruction. Everyone much prefers face-to-face instruction, but appreciated the virtual learning opportunity that modern technology provides. We are all now much better at operating Zoom for classroom interactions.

Seminar Series The spring seminar series was filled with excellent talks by candidates for the two positions we were hiring for (we brought 7 people to campus). The fall semester portion of our seminar series had to be virtual, but we had a distinguished array of speakers that covered a wide range of topics. Speakers included Dr. Jon Martin, a Birdsall-Dreiss Distinguished Lecturer who talked about his hydrogeology work in Greenland;

Dr. Jon Martin, a Birdsall-Dreiss Distinguished Lecturer spoke about his hydrogeology work in Greenland via Zoom.

Brandon Griffiths, Senior Geologist at the Rio Tinto Boron Operation, who talked about mining geology; Vickie Siegel, who talked about her work exploring and mapping underwater caves and under-the-ice environments; and Ruby McConnell, an award-winning author who spoke about her geoscience career path and environmental writings. We are always looking for speakers to give talks for our seminar series. We will be in virtual mode at least through May, 2021. Please let Liaosha Song, our seminar series organizer, know if you or someone you know might be interested in giving a presentation. Our seminar series offers something for everyone, so please plan to join us. Check out 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. Acquisition of substantial research funding has long been one of the hallmarks of the Department of Geological Sciences. Faculty continue their impressive history of obtaining significant external funding from a broad array of sources such as the National Science Foundation (NSF), the American Chemical Society (ACS) and the W.M. Keck Foundation. Based on a 2020 report from the CSUB Office of Grants, Research and Sponsored Programs (GRaSP), the Department of Geological Sciences (DGS) received an average of \$1.2 million dollars per year over the last 6 years (an average of over \$200,000/year per faculty member), representing up to 15% of all yearly CSUB awards and up to 33% of all yearly NSME awards over that time frame. Over this 6-year period, 4 to 6 geology faculty in the Geological Sciences Department generated an average of about 25% of all NSME awards and 11% of the total CSUB awards each year. Each of these grants were written by faculty (not written by external, contracted agencies). In addition to supporting student and faculty research, these grants continue to provide appreciable indirect funds and faculty release time.

Join us on Facebook on the CSUB Geology Club page.





We will soon install a new iCAP RQ Mass Spectrometer in 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, including the new mass spectrometer, providing more student research opportunities.

Funding highlights include the fourth 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, Gillespie and Guo), and four Biology, Math and Engineering faculty as co-PIs and team members (see later section for more on the CREST grant). Another highlight was the third year of an extended, \$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. The \$150,000 Keck Foundation Grant obtained by Drs. Basak (no longer at CSUB) and Rathburn funded improvements to the geochemistry facilities in the Department, including a new mass spectrometer, and helped students engage 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. Dr. Song also received an Interdisciplinary Energy Research Program grant of \$31,000 from CSUB's California Energy Research

Center (CERC) to work on petroleum reservoir fluid dynamics and modeling. Dr. Yu also received an Interdisciplinary Energy Research Program research grant from CERC to develop a Blockchain database for Kern County aquifers. See full CERC grant story by Kelly Ardis at: www.csub.edu/news/2020-04-24-cerc-interdisciplinary-energy-research-program-awards-grants-csub-professors

Drs. Krugh and Guo received internal IRA education-oriented grants of \$6718 and \$1500 respectively. External and internal proposals are submitted by faculty on a regular basis, and some are still pending.

Papers and Presentations Research productivity is a priority for DGS, and Geological Sciences faculty maintain an excellent record of scholarship. In 2019/2020 DGS tenure-track faculty published nine 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 in which these publications appeared, including two papers in the journal *Earth and Planetary Science Letters* (impact factor 4.581). 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. However, as a result of COVID-19 protocols in the spring, several significant local, regional, and national conferences and potential avenues for student presentations were cancelled. Research opportunities for faculty and students also were reduced in the spring. Nevertheless, several CSUB geology students won research-related awards and regional and national scholarships and internships.

Geology Night Courses and Winter/Summer Classes at CSUB 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.**

We also now offer a limited suite of courses in the summer and winter sessions. Some of these are oriented toward petroleum while others are designed for teachers. Check out our course listings and sign up for a class next semester.



Jason Cotton examines dinosaurs inside and out in front of the student-designed, student-built Mesozoic/Cenozoic display on the third floor of Science II. When he isn't being eaten by dinosaurs, Jason teaches online courses in geology and night courses in GIS at CSUB.

technical delays and COVID-19 shutdown protocols we have not yet been able to have a grand opening or use the globe for courses or educational outreach. But that is the plan once we are able to have groups visit campus again.



The Magic Planet makes its Debut. Facing the camera, Left to Right: Geology Professor Tony Rathburn, Biology Professor Emeritus L. Maynard Moe, and Professor of Chemistry Roy LaFever. Photo by A. Jacobson.

We haven't been idle--visit us once the campus is opened up for visitors again—there are more new things to see—The First and Third Floors of the Science II Building continually get updated. A new student-designed display is planned for the third-floor area near the elevator, and students continue to revise and augment other displays as well. Lab classrooms are all in flux, including one which is scheduled to be entirely renovated in 2021. A new facility for graduate research is also planned. Of course, there is also the new Magic Planet, now in the first-floor foyer of Science Building 1. Once the campus is open to visitors again, please come by and join us for coffee/tea and conversation anytime that is convenient.

Magic Planet After a long delay, we were able this year to introduce the Magic Planet to the newly renovated foyer (formerly the “Head Room”) in Science I. With funding from Chevron, NSME and the Department of Geological Sciences, this interactive, 3-D globe was installed and made operational. Thanks to the custom construction of a plastic dome from a company in the San Francisco area and the much appreciated skills of Bill Whitaker, the globe is encased in an attractive dome with a ventilated oak base that can be separated to liberate the globe if necessary. Through an internal IRA grant, a kiosk to operate the globe was also purchased and installed. Unfortunately, due to a few

We continue to update our 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.

Community Engagement. The Department is very actively engaged in community outreach, and although restrictions due to COVID-19 prevented us from community outreach efforts after early March, significant progress was made on a number of projects, and some of the highlights are included in other sections of this newsletter. In addition, during the shutdown, students created posters, updated displays and put together PowerPoint slides for educational outreach. Our outreach activities, including our seminar series, outreach displays, outreach events and Department tours are typically team efforts by geology faculty, staff and students.

Geology accomplishments are included in “50 Fun Facts About CSUB” As part of CSUB’s 50th Anniversary activities, a list of 50 fun facts was compiled. These fun facts included such things as the only snow day in CSUB history (1999), CSUB was ranked as a top public school in 2019, and 65% of CSUB graduates stay within Kern County to live and work. Geology accomplishments also made the list.

At number 10:

“CSUB students built an augmented reality sandbox, an interactive topographical map and one-of-a-kind educational tool. It is regularly used for community outreach events.” The student builders of the sandbox were geology undergraduates **Zach Webb, Austin Fowler and Calvin Katipunan.**



Geology students Zach Webb and Austin Fowler demonstrate the Augmented Reality Sandbox to community visitors at the Emergency Preparedness Event on campus.

At number 31:

“In 2020, Geology assistant professor Dr. Katie O’Sullivan arranged for NASA to send CSUB moon rock samples for her students to study.” See the story later in this newsletter for Katie’s most recent encounter with an extra-terrestrial rock.



CSUB President Lynnette Zelezny and CSUB geologist Dr. Katie O’Sullivan with moon rocks encased in plastic. Dr. O’Sullivan has conducted research on lunar samples, and NASA loaned these moon rock samples to her for educational purposes. Photo taken by Geology lecturer, Brian Pitts.

At number 32:

“Earlier this year, the School of Natural Sciences, Mathematics, and Engineering unveiled a new Magic Planet installation in its Science I building. The 30-inch diameter globe uses 3D technology and real data to convey concepts of earth science.” The Magic Planet was introduced in last year’s geology newsletter, and is sponsored by Chevron, NSME and the Department of Geological Sciences. See the story earlier in this newsletter to learn more about the Magic Planet.

To read the other 47 fun facts about CSUB, see:

www.csub.edu/50/50-fun-facts-about-csub



The interactive Magic Planet and Kiosk in the Science I foyer.

CSUB Geologists on TV CSUB geologists are frequently asked to provide insight about science topics that are relevant to the Valley. This year, once again, **Chris Krugh** was asked to comment on local earthquakes. This time the topic was the Lone Pine Earthquakes that were felt in Kern County in June 2020. Here is the link of the interview with Chris on KGET:

<https://www.kget.com/news/local-news/earthquake-felt-across-kern-county/>

CSUB geologists **Tony Rathburn** and **Liaosha Song** were also interviewed about petroleum-related topics.

Katie O’Sullivan owns a piece of the Moon

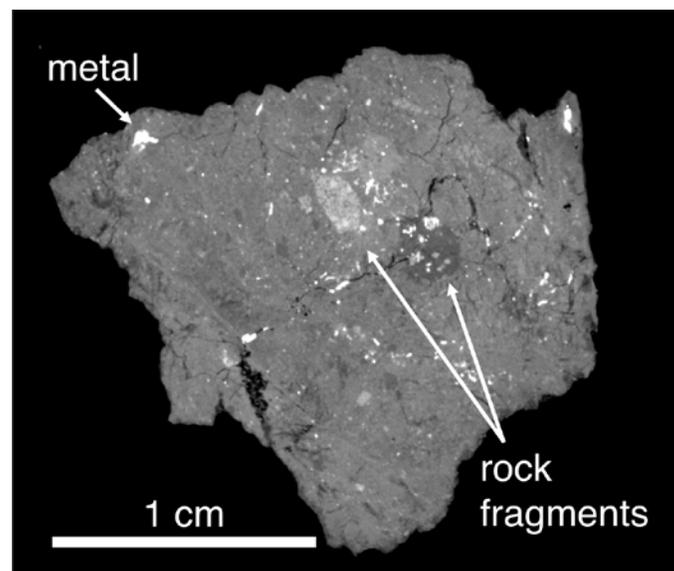
Owning a piece of the rock has taken on a different meaning for CSUB’s Department of Geological Sciences. **Dr. Katie O’Sullivan**, CSUB Assistant Professor of Geology, can’t easily travel to the Moon to collect the lunar rocks she studies, so she decided to let the rocks come to her. With help from fellow CSUB geologist, **Dr. Bob Crewdson**, Dr. O’Sullivan was able to secure a lunar meteorite for her research.

Chunks of lunar rock can get thrown away from the Moon as a result of large impacts. Once ejected, lunar meteoroids can go into orbit around the Earth, eventually being drawn by gravity to Earth’s surface. Meteorites from the moon and mars are the hardest to find (and therefore the most valuable) because they aren’t necessarily dark in color or magnetic. Only a few of these meteorites are

available for private ownership. The lunar rock that **Dr. O’Sullivan** obtained fits in the palm of her hand and doesn’t look like anything special, but this small specimen offers a unique opportunity to study the physical character, mineralogy and geochemistry of a moon rock.



The meteorite acquired for research by Katie O’Sullivan.



An annotated X-ray image of the meteorite that Dr. O’Sullivan is studying.

According to **Dr. O’Sullivan**, “This meteorite contains pieces from the bright, white parts of the moon- which is older than any rock from Earth.” Under Dr. O’Sullivan’s supervision, **Craig Hulsey**,

a geology graduate student, will prepare moon rock samples and conduct some of these analyses as part of his Masters Degree thesis. Craig remarked that “This sample presents a great opportunity to potentially study the side of the moon that has never been visited by humans.”



Katie O’Sullivan now has a lunar meteorite in hand.

A public viewing of the rock was planned, but as a result of COVID-19 protocols, this event has been postponed. Although the CSUB Department of Geological Sciences is home to hundreds of interesting rocks from all of the world, this latest addition to the collection is out of this world—figuratively and literally. Trekking over 238,000 miles and then orbiting for some time, this ancient traveler voyaged through vast amounts of time and space to reside at CSUB and provide valuable clues about its origins.

FACULTY AND STAFF NEWS

This year the Geological Sciences welcomes two new tenure-track faculty members. Read on to learn a bit about each one.

Dr. Anna Soares Cruz Originally from a small town in Brazil, Dr. Anna Cruz has taken her work all over the world. After earning degrees at the Federal Rural University of Rio de Janeiro and Federal Fluminense University, the geochemist worked onboard different research ships and continued her work in Germany’s Center for Marine

Environmental Sciences. Her journey’s next stop is the CSUB Department of Geological Sciences, where she was previously a postdoc researcher and lecturer in 2018-2019.



Anna Cruz joins the Department as an Assistant Professor

“I found the Department of Geological Sciences to be a friendly and supportive place to develop my teaching and research career,” Dr. Cruz said. “As a first-generation student I feel that I can relate to many of the students at CSUB and I look forward to helping them engage in science.”

Through her research, Dr. Cruz studies past climate change using marine sediment cores. She is currently reconstructing intermediate water circulation pathways in different ocean basins over the last 40,000 years. She uses geochemical analyses of microfossils from sediment at the bottom of the ocean to try to understand these changes over time. “In the light of modern changing climate, we must undertake detailed studies to understand how changes in ocean circulation can affect climate in the future,” she said. “This work will help us to better understand ocean circulation and the Earth’s likely response to changing climate.” When she is not working, Dr. Cruz enjoys cooking traditional Brazilian food, traveling, and spending time with her husband, Chris, and their dog, Rigi. This text was excerpted from a story about new CSUB faculty written by Kelly Ardis at: <https://news.csub.edu/csub-welcomes-new-faculty>

Join us on Facebook on the CSUB Geology Club page.





***Matt Herman is a new
Assistant Professor at CSUB***

Dr. Matthew Herman comes to Bakersfield most recently from The Netherlands, though the geophysicist originally hails from the Midwest. After earning degrees from Amherst College and Penn State, Dr. Herman worked as a postdoctoral scientist at Utrecht University in The Netherlands for three years before joining CSUB's Department of Geological Sciences. Bakersfield was the perfect place for Dr. Herman to continue his work studying earthquakes, more generally lithospheric geodynamics, or how the Earth's tectonic plates bend, break, flow, and otherwise deform, he said. "I study the physical properties of tectonic plates and how they interact with each other to produce the world we inhabit," Dr. Herman said. "More practically speaking, I apply my understanding of geodynamic processes to constrain earthquake hazards. The idea is that by helping to understand what drives earthquakes around the world, I can help society to better anticipate and prepare for their effects."

Joining Dr. Herman in Bakersfield is his wife, Kate, and their first child born in the fall of 2020. Matt is a fan of hiking, basketball, volleyball, cooking and science fiction and fantasy. He is already happy to be a part of the CSUB family, noting the geology team's close-knit dynamic. "It was important to me that I found a place where I could continue my

research and at the same time work closely to develop the next generation of geoscientists through courses and student research opportunities," he said. "I feel very optimistic that CSUB is that place!" This text was excerpted from a story about new CSUB faculty written by Kelly Ardis at:

<https://news.csub.edu/csub-welcomes-new-faculty>

How well do you know the CSUB Geology faculty? See if you can guess the University where geology faculty members received their PhD. The answers are included later in the newsletter.

University of Notre Dame

Colorado School of Mines

The Pennsylvania State University

Federal Fluminense University

Duke University

University of Missouri

Swiss Federal Institute of Technology - ETH

West Virginia University

University of Oklahoma

CSUB Emeritus Geology Professors, Bob Horton and Rob Negrini are elected into the CSUB Hall of Fame.

Link for CSUB Hall of Fame induction ceremony video: <https://hrc.csub.edu/2020-ceremony/>

The CSUB Faculty Hall of Fame's Distinguished Faculty Award was established to honor the school's greatest professors. In 2020, the Hall of Fame Committee chose six inductees, including Geology Emeriti Bob Horton and Rob Negrini. Both are very deserving of this honor which has only been bestowed on a total of 17 faculty members. Both Bob and Rob now have a photo and plaque mounted permanently in the library, and a biographical sketch housed on the Faculty Hall of Fame website. Here are excerpts from their biographical sketches:

Bob Horton:

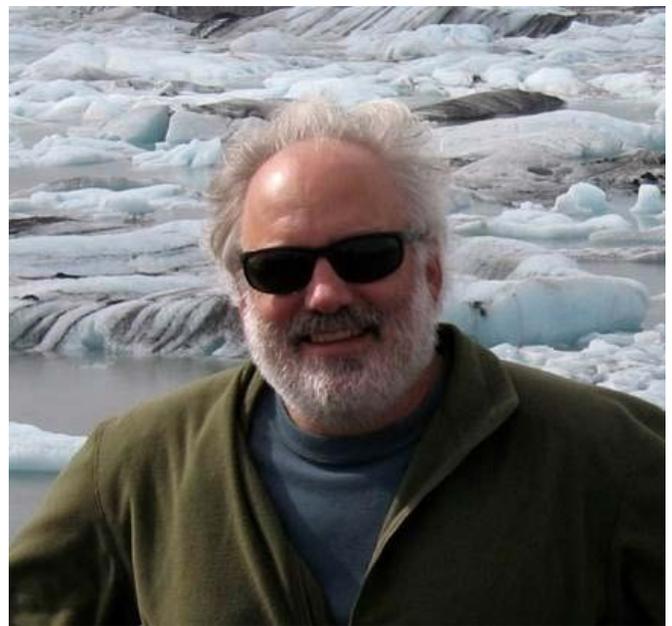
Professor of Geology Emeritus, Dr. Robert Horton, served the university in many ways since 1984 before retiring in 2016. Dr. Horton taught more than 20 different courses and received the Outstanding Educator Award from the Pacific Extension of the American Association of Geologists, the CSUB El Paso Natural Gas Award for Excellence in Teaching, and was named CSUB Outstanding Professor. He also received the CSUB Bautzer Faculty Award for University Advancement and two CSUB Meritorious Performance and Professional Promise Awards. Dr. Horton has been very successful obtaining research funds, totaling over \$8 million. Bob has an equally impressive record in service. He served ten years as department chair and two-and-a-half years as interim assistant vice president for Grants, Research, and Sponsored Programs (GRaSP). Dr. Horton served the community in many other ways as well. For 21 years Bob served as director of the California Well Sample Repository on campus. In addition, Bob was instrumental in developing the geology graduate program, and he served on many CSUB campus and school-wide committees. Bob also has been an active member of 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.



CSUB Emeritus Geology Professor, Dr. Robert Horton, was inducted into the CSUB Hall of Fame.

Rob Negrini

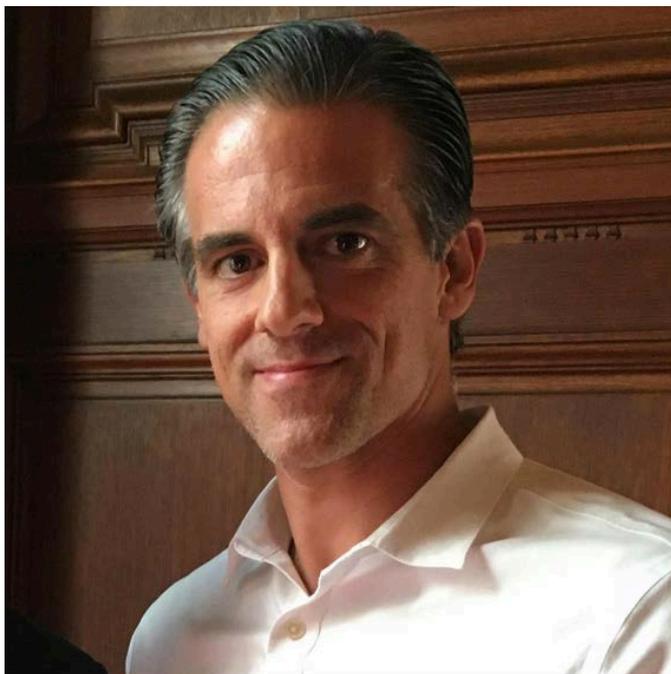
Dr. Robert Negrini arrived at CSUB in 1985 and retired in 2015 as professor of geology emeritus. Dr. Negrini received a number of teaching awards, including the Distinguished Educator Award from the Pacific Section of the American Association of Petroleum Geologists; the “Hall of Fame” Award for Outstanding Teaching from the Kern County Alliance of Business; and CSUB Outstanding Professor. He has a remarkable record of mentoring students and involving them in high quality research. Dr. Negrini has a strong record of publishing with students. Since 2014 Rob has published research papers with eight student coauthors in several highly-regarded, international, peer-reviewed journals. Mentoring undergraduate and graduate students in research takes sincere commitment, especially enabling students to bring their research efforts to publication. Rob’s service to the university included his leadership as founding director of the CSUB California Energy Research Center, as well as establishment and founding director of an NSF-funded center for research excellence in science and technology (CREST) at CSUB. Dr. Negrini was also vice-chair of the Academic Senate at CSUB. He also served as both vice-president and president of the San Joaquin Geological Society and has also been an active member of the Pacific Cell of the Friends of the Pleistocene.



CSUB Emeritus Geology Professor, Dr. Rob Negrini was inducted into the CSUB Hall of Fame.

Greg Gordon receives the 2020 NSME Rising Runner Award The Rising Runner program recognizes CSUB alumni that graduated within the last 10 years excelling in their work and giving back to their community. Each of the 4 schools at CSUB selects a Rising Runner, and these distinguished alumni participate in an awards ceremony and panel discussion with students. This year the School of Natural Sciences, Mathematics and Engineering (NSME) chose geologist Greg Gordon as their Rising Runner Awardee. Greg received his bachelor's degree in geosciences from the University of Texas at Dallas, then earned his master's degree in geology at CSUB in 2009 before obtaining a PhD from the Colorado School of Mines. His focus on stratigraphy and petroleum-related topics at CSUB shaped his dissertation research, career choice and preference to live and work in Bakersfield. Greg is currently an exploration geologist and team leader at Aera Energy in Bakersfield. He also started teaching CSUB geology courses at night. For more about Greg and the award go to:

<https://www.csub.edu/news/2020-02-11-rising-runner-greg-gordon-hunts-next-big-oil-find>



Dr. Greg Gordon receives the 2020 NSME Rising Runner Award

The good thing about science is that it's true whether or not you believe in it. — Neil deGrasse Tyson

Current Faculty News

Anna Cruz It was a challenging year for everyone! I would best describe this year as a big Rollercoaster, with lots of ups and downs. After an incredible fall semester in 2019, I left CSUB for a post-doctoral research position at the University of Delaware (UD) to continue my work using Neodymium (Nd) isotopes to reconstruct changes in ocean circulation. I started at UD in January and applied for an Assistant Professor position at CSUB. In early March, I received the wonderful and exciting news that I got the position at CSUB and was looking forward to starting in Fall 2020. However, in the middle of March we had our first COVID-19 shutdown. All activities at UD were closed and I had to conduct my research from my apartment in Delaware. It was a big struggle, because I had to stop all my lab analyses and I was stuck far away from my husband (Chris) and dog (Rigi). I decided to return home to my family in Bakersfield and work remotely from there. In June, however, UD started to reopen, and I was able to restart my lab work to continue my research. Because CSUB was virtual for Fall 2020, we decided to pack up the family and drive cross-country to Delaware. This journey, albeit scary and stressful during the pandemic, gave me a small glimpse of the incredible geology of the United States. In August, it became clear that delays caused by COVID-19 would require my start date at CSUB to be postponed to January 2021. Because of this, we decided to stay in Delaware for the entire Fall semester.



Anna, Rigi and Chris traveling cross country

Even with all the ups and downs this was a productive year. After all, I got my dream position

as an Assistant Professor! The shutdown gave me the opportunity to finish a paper about the Nd isotope response to hydrologic and water masses changes in the Equatorial Atlantic during the last 40kyr. I also collaborated on a paper, published in conjunction with my colleagues from Federal Fluminense University, Brazil, about the paleohydrological changes in a floodplain lake in central Amazonia during the late Holocene. Thankfully, we are now safely back in Bakersfield and I am looking forward to starting at CSUB and joining the amazing people in the Department of Geological Sciences for the Spring 2021 semester.

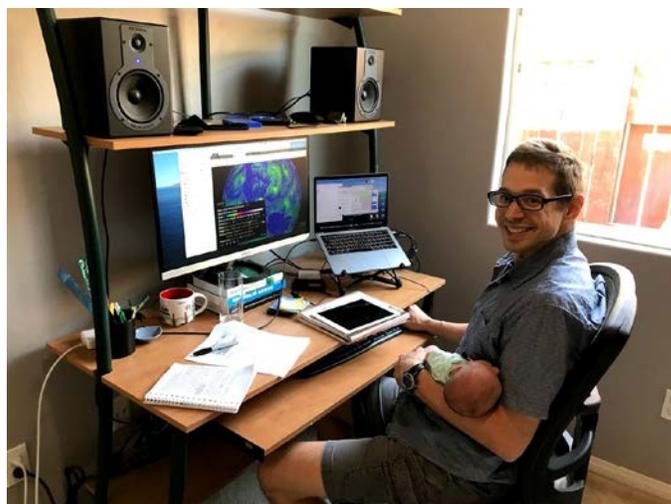
Adam Guo In the Spring and Summer, I mainly taught the non-major general course, California Geology and Society. Two graduate students Sade Haake and Alex Rodriguez defended their graduate thesis work through online Zoom meetings during this COVID-19 pandemic season. And then Alex started his new job adventure at Amazon. Kari Hochstatter and Cindy Rodriguez both have finished their thesis lab work and been working on their thesis. I anticipate they will each defend their thesis work in the Spring of 2021, together with another graduate student, Karla Lopez.



Adam Guo working while assisting his son with his Zoom class.

I started my half-year sabbatical in the fall semester of 2020. At home, Yan is still the busy mom. Angelina began her junior high studies. Due to the pandemic, most of the time I stayed at home sitting together with and helping my kids in front of computers for their daily online classes. They all enjoy this new learning experience; they cannot meet their friends face to face though.

Matt Herman I am so thrilled to be a part of this department! I joined this fall (2020) as an Assistant Professor after spending the past three years working in the Netherlands. My transition to Assistant Professor has not been entirely straightforward; as many in academia can attest, there are growing pains associated with going from an exclusively research-based postdoctoral position to a professorship juggling research, teaching, proposal-writing, and more. On top of that, an international move to a city far from any family in a pandemic with a new baby on the way was not something I had prepared for! Fortunately, folks in the department have helped me pick up the slack, providing meals and virtual social interactions in addition to a dynamic and supportive professional environment.



Matt Herman doing research work in his home office, while holding sleeping Evelyn, born during the pandemic.

At the moment I am working on several different research projects related to my interests in geophysics, geodynamics, and plate tectonics - I am very much looking forward to students joining me in this work! I am especially focusing on the processes that cause earthquakes around the world. I have several sub-projects aimed at the overarching goal of understanding how subduction zone earthquakes (the very largest events that can also cause giant tsunamis) work. I am also trying to push the limits of my research abilities by developing a way to better understand the forces driving deformation and seismicity in the Mediterranean Sea region. I am excited to expand this work to other plate boundary zones, such as the one we live near right here in southern California.

I also look for opportunities to study recent earthquakes that might have significant impacts or reveal new insights about the way the Earth deforms. I have been looking at a few interesting events this past year, such as a swarm of earthquakes on some previously unknown faults in Puerto Rico; a series of earthquakes sandwiched between two previous, larger events in Chile; and a very curious sequence of events in a part of the Aleutian Islands where earthquakes were not expected. I do a lot of this work in collaboration with the U.S. Geological Survey National Earthquake Information Center (NEIC). In January, 2021 I started a formal collaboration with the NEIC, helping with their event response and developing new tools to advance their earthquake analysis capabilities. This collaboration will also open plenty of new opportunities for student research projects and internships!

Although the pandemic prevented me from traveling, I was able to virtually attend several remote meetings this year. I convened a successful session at the European Geosciences Union in May, which was surprising since the meeting went virtual mere weeks earlier. I gave an invited talk at the Geological Society of America meeting, and presented at the American Geophysical Union meeting. Although I missed the in-person aspects of these meetings, like running into people in the halls, chatting at posters, and meeting new colleagues, I still learned a lot and made the most of my meetings.

I am really looking forward to 2021, when we charge out of this pandemic reenergized and ready for a great year of science!

Chris Krugh. This past year has certainly been challenging! The Spring 2020 semester started off with me teaching Geomorphology and looking forward to a class fieldtrip to Owens Valley and the Eastern Sierra. I was also working closely with graduate students (and CSUB CREST scholars) Toni Ramirez and Karol Casas to advance their research focused on the impact of earthquakes, tree mortality, and wildfire on landslide susceptibility in the Kern River watershed. Both Toni and Karol were preparing to give research presentations at the 2020 Cordilleran Section Meeting of the Geological Society of America (GSA) scheduled for May 12-14th in Pasadena, CA. I was also looking forward to involving undergraduate students in a UAV-based

photogrammetry mapping project to resolve normal fault segmentation along the Sierra Nevada Frontal Fault Zone. This pilot project is funded by the CSUB Provost's Proposal Development Program and is intended to provide preliminary data in support of a future proposal to the National Science Foundation (NSF) and/or National Aeronautics and Space Administration (NASA). Unfortunately, COVID-19 arrived and forced everyone to change plans. My Geomorphology course went online and I scrambled to quickly adapt lab activities to Google Earth. The GSA meeting and class field trip were both cancelled and my summer fieldwork was put on hold. Fortunately, Toni and Karol continued making progress on their research through the use of ArcGIS. My wife, Dr. Anna Cruz (now an Assistant Professor at CSUB), was a post-doctoral researcher at the University of Delaware (UD) when things began to shut down. Thankfully, she was able to fly back to CA so we could be together while working remotely.

Plans changed again when the University of Delaware announced the restart of research activities in July. With CSUB committed to virtual delivery for Fall 2020, we decided to load up our dog Rigi and take a leisurely drive across the country. Masks and alcohol helped us to make it safely to Newark Delaware. We arrived just in time for hurricane season and got to experience high humidity and LOTS of rain. Newark was in the direct path of 3 hurricanes/tropical storms and we received at least 2 tornado warnings and numerous severe thunderstorm and flood advisories. For once, I truly missed the "dry heat" of Bakersfield! While Anna had fun in the geochemistry lab, I got to hide out with Rigi in our apartment and prepare to teach Structural Geology online.

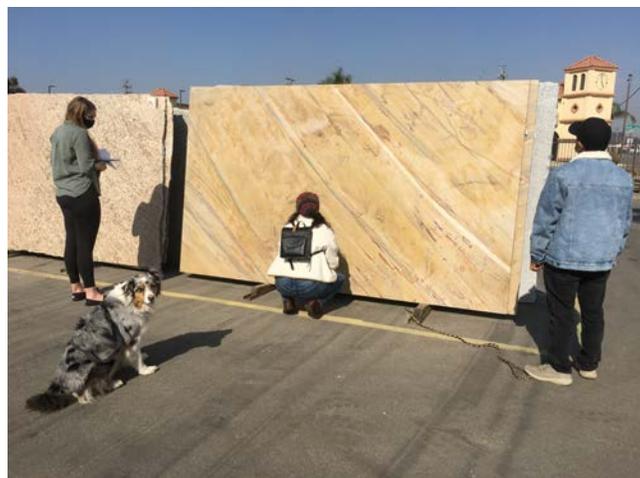


Chris, Rigi and Anna in the great outdoors

The virtual delivery of Structural Geology during the Fall 2020 semester was particularly challenging...for all involved. Thankfully, the hard work and dedication of the students helped to make the course a success in the end. I am also very happy to report that faculty from Geology, Biology, and Math worked together to submit a new proposal to the NSF Centers for Research Excellence in Science and Technology (CREST) Program. The proposed multi-year research project will support Geology student research focused on the terrestrial and marine impacts of vegetation type conversion in the Western Transverse Ranges of California. With the completion of the Fall 2020 semester (Yay!!!), we loaded up, masked up, and made our way back to California in time for Christmas. Hopefully the new year will see us move down the path toward getting together with CSUB colleagues and students on campus... and in the field where geologists belong!

Katie O’Sullivan. It’s been an interesting year. Luckily I had the chance to do some field work in February with undergraduates Briana Acevedo, Brian Aguilar, Franz Ebert, Adrian Montoya, and Carrie Williams. We were out in the Providence Mountains in Mojave National Preserve to collect samples for a project that Master’s student Emily Oliver is now working on.

Master’s student Craig Hulsey and I are investigating rock fragments in a lunar meteorite that we bought last year with the help of Dr. Bob Crewdson. The rock fragments are likely from areas on the moon that were not covered in the Apollo missions, and may be new never-before-seen lithologies.



Mineralogy/Petrology students staying safe while examining “granite” countertops. Happy for scale.

I also had the chance to do some field trips for the Mineralogy/Petrology class. We couldn’t go far because we all had to drive ourselves, but we had a great time looking at “granite” countertops at a local countertop place!

Fully online teaching is a new adventure that I never thought I’d undertake- just goes to show you how your job will take you places you never dreamed of!

I look forward to seeing everyone next year!



Happy – always a welcome sight in the department!

Tony Rathburn Department Chair, Year number four as Chair was the most unusual yet! With so many unprecedented challenges and extra things to organize, I had to rely more than ever on much appreciated support from everyone, including Sue, Elizabeth, Chris, Adam, Liaosha, Katie, Matt, Larry, Anna, Pam, John, Bob C., Brian, Bill, Jan, Rob, and Bob H.

The search last spring to hire a new CERC Director was never completed, so, I remain in the role of Interim Director of the California Energy Research Center.

As a result of Covid-19 restrictions, the research voyages off San Diego scheduled for the summer and fall of 2020 were postponed for at least a year. These expeditions are part of the NSF-funded Geopaths Project and the W. M. Keck Foundation Grant in which we work closely with colleagues from the University of San Diego, Oklahoma State University and Scripps Institution of Oceanography. We decided not to recover our seafloor experiments

that we set out last year, and will leave them sitting at 4000 meters for another 12 months. However, in the fall of 2020 we were able to collect 3 sediment cores adjacent to the experiments. These cores are part of the seafloor experiment project that I work on in collaboration with Ashley Burkett, at Oklahoma State University and Ken Smith at Monterey Bay Research Institute (MBARI). With the help of MBARI's ship and remotely operated vehicle, Ken Smith and a limited number of scientists (due to virus protocols) were able to recover these cores from the seafloor off the Californian coast at 4000 m. Without students to help, I recruited my wife and we met the ship when



Tony Rathburn near the fire extinguisher, ready to put out the next academic fire. Photo by B. Pitts.

it docked at Moss Landing. Because outsiders were not allowed to enter any MBARI buildings or the ship (due to virus protocols), my wife and I immediately processed/sampled the cores in the MBARI parking lot. Using gear that we brought for the purpose, we extruded and sliced the small cores into 1-cm samples of sediment. Then we kept the samples cold as we transported them to the freezer in my lab at CSUB. Together with Ashley Burkett and her students, my lab will compare the living and fossil foraminifera in these samples with those that we have found colonizing our previous (and future) experiments. Results of our previous work on this project were presented virtually at the Fall 2020 GSA Meeting (with four student coauthors).

I published 3 research papers in 2020. The most recent of which focused on deglaciation oxygen levels off the coast of Peru. This paper, published in *Biogeosciences*, was in collaboration with colleagues from Peru, London, and Germany.

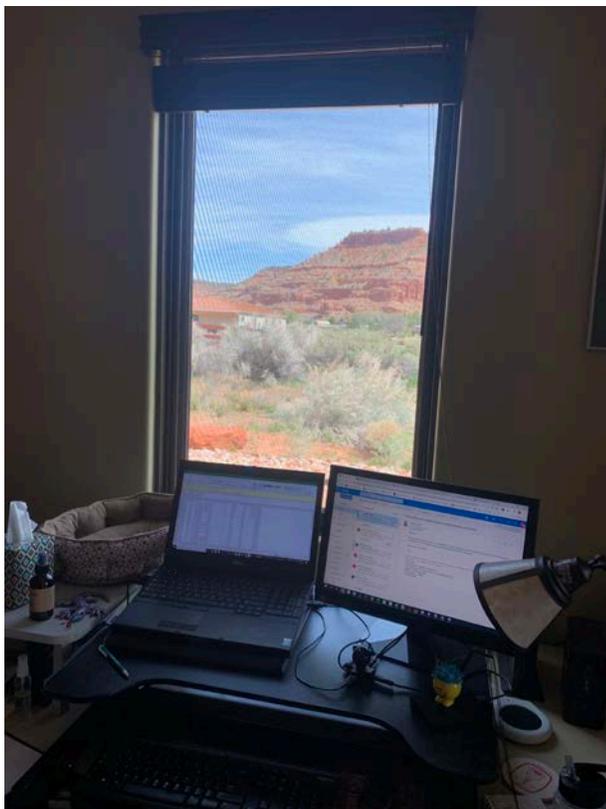
In 2020 my teaching duties included “historical geology”, “geological oceanography” and the grad level course, “early life on Earth”. These are all fun courses to teach, but made more challenging in virtual mode.

Liaosha Song This is my third year at CSUB. This year was unique for me as it was for many people. A global pandemic has made many changes to our daily life. There was a number of events rescheduled, cancelations, meetings online, etc. Results from my research group were presented online at the AAPG Annual Convention and Exhibition 2020, titled *Changes in Organic Carbon and Redox Conditions During Deposition of the Hue Shale-Gamma Ray Zone on the North Slope, Alaska*. Zach Webb, Austin Fowler, and Victoria Lee made contributions to this work and were included in the author list. This research has also been submitted to a peer-reviewed journal and is currently under revision. Teaching classes in my guest bedroom is definitely something new. It took me a while to get used to it. I taught several courses, namely Geophysics lab, Water and the West, Petroleum Geology, and Petroleum Prospecting. Conducting research is also different. Thanks to the effort made by many faculty and staff members on campus, the interruption to research was minimized.



Liaosha Song in the beautiful Santa Monica Mountains.

Jan Gillespie The year began on a high note with a fun trip to Costa Rica...ziplining, cycling, rainforest hikes, sea kayaking...and ended on quarantine for the holidays (fortunately I ended up testing negative!). Typical 2020. Southern Utah wasn't such a bad place to be locked down in. There are not many people here and lots of beautiful places to hike, kayak, mountain bike and camp in solitude. I spent a lot of time getting to know all the stuff in my yard...the quail, deer, chipmunks, roadrunners (go CSUB!) and various bugs. Mainly I worked. I am still working with the California Oil, Gas and Groundwater group at the USGS and, even though I'm not physically in Bakersfield, I feel really close to it as I map aquifers in and around Bakersfield from my home office with a view of the red rock cliffs.



The view from Jan's home office

Sue Holt, Administrative Support This has been a crazy year for us all - teaching, learning, working from home, ordering our groceries, masking up when going to the doctor, trying to get some outdoor time in. But we've pushed on through and are hopefully coming out the other end and will be able to see each other in person by summer.

In a way, it has been business as usual, creating courses, helping students enroll, etc. I miss seeing

everyone everyday, walking around campus, hanging out in the hallway with faculty and students. We will do it again soon enough. Hang in there, everyone!



Sue Holt with newest grandchild, Zara, and daughter, Haley Mehta

At the very beginning of the pandemic, when they were still strictly limiting the number of folks on planes, I shocked even myself, and flew to Tallahassee to be with my daughter and her family as she gave birth to a baby girl, Sarasvati (Zara), I stayed with Siddhartha (Sidd), who just turned 3, while mom and dad were in hospital. It was absolutely terrifying, but I'm so happy I was able to fly while it was still relatively safe.



Dr. John Yu came as Santa at our Zoom Holiday meeting

Dodie Hyatt, Geological Sciences Advisor, I am the designated advisor for Geology and have been advising Geology and science students for over 10 years. As an advisor in the NSME, I have experience in advising first time freshman, transfer and graduate students as well as continuing students. As the designated advisor for Geology, I

provide students with guidance and support to complete their degrees and continue their education in graduate programs. I have served as the LSAMP (Louis Stokes Alliance for Minority Participation) Coordinator which has provided many Geology students opportunities to explore possibilities in graduate programs, support to attend conferences, and support for research. It amazes me at the caliber of our Geology students and the successes they achieve, not just as a student, but in post bac and career opportunities.

I am an alumni of California State University, Bakersfield receiving a Bachelor of Arts in Sociology in 2005, and a Master of Science in Education Counseling in 2012. I returned to CSUB to complete my bachelor's degree after a 22 year absence where my husband Perry and I raised 4 children. I never expected to find my career at CSUB as an academic advisor, but I know I found my passion. I enjoy working working with students and providing support as they navigate through their academic education to ensure a positive and successful experience at CSUB.



Dodie, with her husband, Perry, and their 3 beautiful grandchildren.

I have four children, 3 beautiful grandchildren and enjoy spending as much time with them as

possible. Along with my husband, I love to camp, garden, travel and spend time together.

As a student at CSUB, I enjoyed taking GEOL 100 as a freshman - back in the stone age! I especially enjoyed the field trip to the Kern River Canyon and pointing out the alluvial fans. Another favorite class was Water and the West, it was so informative to know about the history of our water systems, which put food on our table as my husband worked in the water industry. Geology students, staff and faculty are amazing and I am grateful to be part of the team.

Lourdes Nilon, Director of Corporate and Foundation Relations: The Ripple Effect

As a development professional at California State University, Bakersfield, I have had the unique privilege of working with individuals, businesses and foundations to assist them in identifying academic and student support programs and university initiatives that align with their philanthropic values and interests.

Nearly five years ago, I was offered a position as the director of corporate and foundation relations, in the Office of University Advancement. When I tell people what I do, they often wrinkle their nose or shake their heads and tell me, "I would hate to ask people for money."



Lourdes Nilon, Director of Corporate and Foundation Relations

Little do they know that as a child, I couldn't even sell chocolate bars door to door for school fundraisers because I was too embarrassed. Now, I can't imagine not having the one-of-a-kind experience of witnessing the act of giving and how it can have a positive impact beyond what donors originally intended.

One recent experience I had demonstrates exactly this. I had the privilege of assisting the Chair of our Geology Department, Dr. Anthony Rathburn, with a grant application to the W.M. Keck Foundation. I learned more than I ever would have imagined about the Geology Department, the outstanding work of the faculty, and the incredible students we have at CSUB excited about geoscience, discovery, and research.

Since then I have watched as undergraduate students at CSUB (both majors and non-majors) have been exposed to current scientific practices utilized by ocean researchers and gained access to oceanographic equipment, modern scientific laboratories, and have the opportunity to participate in oceanographic research expeditions (all pre-COVID). Many students in the California Central Valley are unable to leave and attend a university out of town. The generous grant from the W.M. Keck Foundation has made it possible for CSUB students to have a transformative experience in the classroom, on the ocean, and in the laboratories, sparking new interests and fueling curiosity and the desire to learn more.

This experience was yet another example of the incredible power of philanthropy and what can be achieved with the simple act of giving. Dreams once thought impossible are fulfilled and the simple act of giving seems to take on a life of its own causing a ripple effect that cannot be stopped, changing the destinies of entire families for generations.

I continue to be deeply touched by the generosity of so many individuals, foundations, and businesses. The act of giving is selfless, filled with vision and promise and, as I attend graduations at the end of each academic year, I receive the gift of watching that promise fulfilled student after student and I know the ripple-effect is only just beginning.

If I am going to drive safely, I can't do geology.

- **John McPhee**

CREST Phases 1 and 2

Eduardo Montoya (current PI for CREST) As our CSUB CREST Center for Climate Science and Natural Resource Solutions for Water-Limited, Paired Mountain/Valley Systems heads into its tenth year, I wanted to share a bit of history and the impact of our CSUB CREST Center. These efforts began in 2011 when CSUB was awarded a \$5 million NSF Phase I CREST grant to conduct research related to water resources in the southern San Joaquin Valley of California as well as to study potential sites and technologies for carbon sequestration in that region (PI/co-PIs: Drs. Baron, Gillespie, Lowey, Mickler, Montoya, and Negrini). The focus of our center expanded when we were awarded a Phase II CREST grant (and another \$5 million) in 2016 to focus on better understanding the role of drought, evaluating potential responses, and assisting with adaptive planning in response to these changes in a Water-Limited, Paired Mountain/Valley System (PI/co-PIs: Drs. Andrews, Baron, Gillespie, Guo, Jacobsen, Krugh, Montoya, Negrini, Saini, and Pratt). Rob Negrini initiated both efforts and served as PI until his retirement in 2016. Shortly thereafter, I began serving as the PI.



CREST student Erin Walter and research advisor Chris Krugh collecting field data in the Kern River Canyon.

Overall, this funding has allowed us to provide support (financial support, strong mentorship, and professional development) for students to work collaboratively with CSUB faculty in carrying out research projects relevant to the San Joaquin Valley and beyond, while allowing them to pursue their degree and potentially move onto a doctoral program. These research projects are designed as a

unique and innovative interdisciplinary partnership between faculty and students from the departments of Geology, Biology, Engineering, and Mathematics to address our goals. To give a sense of the scholarly impact of our center, since 2011 we have had 242 research presentations and 81 research publications by CREST faculty and students. Further, we have provided varying levels of support to 90 undergraduate/graduate students. Having been part of CSUB CREST since 2011, our CREST students continue to impress me with their achievements on a yearly basis.

To read more about the CREST Program, see the story by Kelly Ardis at:

<https://news.csub.edu/crest-program-supports-student-climate-research>



Charles James hard at work at the California Well Sample Repository. Photo by Ashley Burkett.



*Looking up Bubbs Creek towards Forester Pass, along the PCT, King's Canyon National Park
Photo taken by senior Bradley Squires.*

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 available elsewhere. Government agencies, industry, researchers and students from all over the country make use of the facility. Some, but not all, of the data in the facility are included on the CWSR website at www.wellsample.com.



CSUB geologist Caleb O'Rourke removing plastic sleeves of sediment cores to collect samples at the CWSR.

Not pictured here: CSUB Assistant Professor Liaosha Song, instructing students; and CSUB graduate students Zach Webb and Austin Fowler.

Since 1987 volunteers from the CSUB 60+ Club donate their time to organize the data at the facility. Enrolled geology students, including **Bradley Squires** and **Ariel Espindola-Mercado**, hired for

part time positions, assist with the operation of the facility too. However, once virus protocols were invoked last spring, volunteers and student employees were not allowed to work in the CWSR. Nevertheless, requests still keep coming in and **Charles James**, the curator overseeing the operation of the CWSR, continues to provide the community with unique and valuable data and samples.

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 inspecting pallets at the California Well Sample Repository. Photo by Ashley Burkett.

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

University of Notre Dame
Katie O'Sullivan

Colorado School of Mines
Bob Crewdson, Greg Gordon

The Pennsylvania State University
Matt Herman

Federal Fluminense University
Anne Cruz

Duke University
Tony Rathburn

University of Missouri
Adam Guo

Swiss Federal Institute of Technology – ETH
Chris Krugh

West Virginia University
Liaosha Song

University of Oklahoma
John Yu

DONATIONS

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, David Hanley, 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

This year we are conducting surveys of students and alumni (please complete and return your survey if you received one). Here is an example of one of the responses from an alumnus:

Please state three things that benefitted you the most from the CSUB Geology Bachelor's Degree Program.

1) Connections I built with faculty and staff.

2) Quality of field work (senior seminar) was exceptional. Students from CSUB Geology excelled in the Southern Utah University Field Camp because we were strongly prepared thanks to excellent instruction from **Thom Davis**, **Katie O'Sullivan**, and **Liaosha Song**. We were at the very top of student field mapping prep/skills compared with other students from big universities with strong Geoscience programs across the nation.

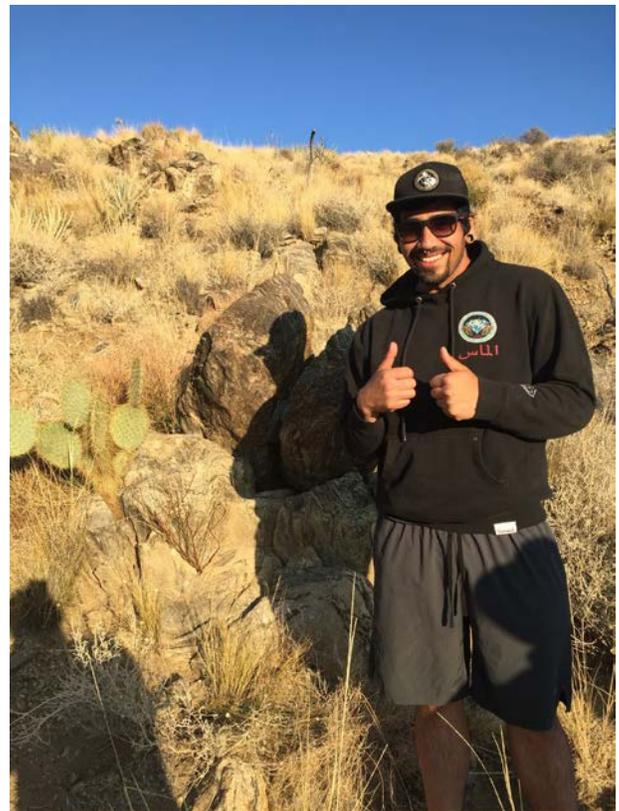
3) Connections with alumni were beneficial in gaining internships and valuable work experience.

Student Internships

Despite Challenges posed by COVID-19, CSUB geology students were successful in obtaining geoscience internships. Here are a few summer internship stories from CSUB Geology undergraduates:

Brian Aguilar: internship with Southern California Earthquake Center SOURCES (Supported Opportunities for Undergraduates and Researchers to Collaborate on Earthquake Science) program. Ever since I transferred to CSU Bakersfield, I have had more opportunities to learn about the different fields within Geology. This internship was challenging in many aspects, primarily conducting everything via zoom, but it was well worth the challenge. The Basin Amplification Seismic Investigation (BASIN Project) is a collaborative effort between Louisiana State University (LSU), Caltech, Cal Poly Pomona and SCEC that is lead by Dr. Robert Clayton and Dr. Patricia Persaud. SCEC was the medium to connecting me with my mentor, Dr. Persaud. The BASIN Project is an ongoing study to identify the basin shape and track the propagation of waves from the San Andreas Fault to the San Bernardino, San Gabriel, and Los Angeles Basins.

Working with Dr. Persaud was great because she understood that I was an undergraduate and that this was my first internship. There were times during the week where we would listen to the professor in the field talk about their path to their career and graduate school tips. My research consisted of many hours behind the laptop plotting my interpretations of a possible sediment-basement, the intracrustal interface, the Mohorovicic Discontinuity using



Brian Aguilar in Rainbow Basin

receiver functions computed from several earthquake events recorded along a profile in the San Bernardino basin. I mainly focused on the Moho and how it changes depth from the beginning to end of the profile, but this was done by going through a list of event data and choosing which event had proper interpretations. I am currently still participating in an extended internship since the summer and will continue with the project for the spring semester. I learned a lot about programs, earthquake data and advice about grad school that has shaped my attitude to embracing whatever opportunities may come.

Ariel Espindola-Mercado: internship at SCEC's SOURCES Program Last summer I was an intern in SCEC's SOURCES program. My team's project was titled Exploratory visualization and analysis of high-resolution GPS data across California. The purpose of the project was to use Python tools on personal computers to analyze large datasets of GPS data which can not ordinarily be done using PCs. While there were many technical hurdles for me, I was able to get a running start on the project because I had previously learned programming fundamentals through my own initiative. I think that the project reached an adequate stage of completion

by the end of the internship, but there were definitely some additional methods of analysis I wanted to pursue that we did not have time for.



Ariel Espindola-Mercado

In addition to the project, there were also talks from professors most weeks where they spoke about their work and their career path. To supplement that, there were also presentations on how to manage a master's degree track, the path toward becoming a professor, or how to conduct research effectively. I am grateful to have been in the Program and having had something that focused my attention productively during the peculiar summer of 2020.

Jared Hansen: Tejon Ranch Conservancy Internship During this past summer, I was able to be a Geology Intern with the Tejon Ranch Conservancy. I worked alongside a Biology Intern and employers from the conservancy. As interns we were helped and guided through our work on the 270,000 sq. acres of land known as Tejon Ranch. The Ranch has a vast assortment of wildlife, plants, and geology. I would like to share two highlights of my internship experiences and how the work benefited me and the Conservancy.

The first highlight was working with streams throughout the Ranch. I traveled in a team to locate these stream destinations. For each stream, we recorded pinpoints on the streams on a virtual map by using a mobile application called "Avenza Maps". We also recorded the types of trees and other plants that occur on the stream on paper data sheets, correlating these data with location data on Avenza Maps. We also determined if the stream was perennial or if the stream was dry. Activities by



Jared Hansen on the Tejon Ranch during his internship last summer

animals, such as cows and wild pigs, destroy stream features, so it was sometimes difficult to determine if we should classify something as a stream or not. Overall, it was an enjoyable experience to visit and characterize streams in various places.

The second highlight was collecting rock and mineral samples for the Conservancy. While working at the office one day, I saw that there were a variety of rocks and minerals that were not identified on their shelves. I asked them if I could assist in identifying mineral samples. I was not confident in my identifications of all the minerals so the conservancy called former Ridgeview Geology teacher and CSUB geology instructor, **Stephen Kiouses** to assist me. Mr. Kiouses generously took the time out of his day to explain and identify these samples with me so that I could improve my mineral identification skills. I identified and labeled most of the available specimens so that future students and visitors can know what minerals occur on the Ranch.



Some of the samples collected by Jared Hansen during his Summer 2020 internship on the Tejon Ranch

I would like to summarize by saying that I am grateful for the opportunity to intern with the Tejon Ranch Conservancy. I have a deeper appreciation for the outdoors and have a better grasp on regional geology. The Tejon Ranch Conservancy Internship program gave me valuable experiences, skills and confidence in my abilities as a geologist.

CSUB Geology Students Honored by Professional Organizations

Several **CSUB geology** students were recognized by the San Joaquin Geological Society and awarded merit-based, summer field camp assistantships designed to help defray the costs of attending a summer field camp. Although field camps were virtual this year, we still require a field camp to graduate and virtual field camps were still quite expensive and over and above the cost of CSUB courses (university tuition, fees and faculty still have to be paid). **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 (several thousand dollars) for field camps 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 2020:

- Christopher Chavez
- Alexandra Garcia
- Emily Oliver
- Karen Perger
- Austin Saenz
- Brandon Tamondong
- Eneas Torres-Andrade
- Carrie Williams



Christopher Chavez

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

The Society of Exploration Geophysicists (PCS-SEG) presented their award to recognize an outstanding CSUB geology major and to help the student cover the costs of the required summer field camp course. The award demonstrates the commitment by PCS-SEG to encourage the educational and practical development of high-performing students in CSUB's Department of Geological Sciences.

2020 Award Winner:
Carrie Williams



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

2020 Award Winner: (\$645)
Briana Acevedo

Herman W. Weddle Scholarship: This memorial scholarship was established by James Weddle in honor of his father, Herman Weddle, a geologist with Standard Oil Company to support CSUB students majoring in geology. Awards are for geology majors who work on well core or well samples and make use of the California Well Sample Repository.

2020 Award Winners (\$685 each):
Bradley Squires
Ariel Espindola

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.

2020 Award Winners: (\$1,294 each):
Briana Acevedo
Kobi Bloomberg
Ariel Espindola Mercado
Brandon Ide
Adrian Montoya
Sydney Robertson
Bradley Squires
Blaine Whitaker



Graduate student Craig Hulsey investigates thin sections of lunar meteorite obtained by Dr. Katie O'Sullivan

Title Vb Graduate Collaborative Research Program Support Recipient

2020 Awardee:
Craig Hulsey

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

Kern County Mineral Society (KCMS) presented two CSUB Geology students with awards to help cover the costs of their required summer field camp. The KCMS was established in 1935, by individuals who shared a common interest in collecting, displaying, and sharing their knowledge of rocks and minerals. Their generous award to CSUB geology students reflects the sincere interest of KCMS in helping young people pursue careers in geology.

2020 Award Winners:
Christopher Chavez
Alexandra Garcia

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 an award committee consisting of CSUB Geological Sciences faculty.

The following describes awards and awardees for 2020:

Claude Fiddler Research Scholar Endowment (\$1,036.00):

2020 Award Winner: Bradley Squires

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.

2020 Award Winner (\$1000):

Alexandria Garcia



Alexandria Garcia

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.

2020 Award Winners: (\$530 each)

Cristian Antoni Gonzalez Acevedo

Angel Rojelio Gonzalez Acevedo

Chevron Scholarship for Outstanding Students in the Department:

2020 Award Winners: (\$2,500 each)

Alejandro Rodriguez

Carrie Williams

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

May 2020 — The School of Natural Sciences, Mathematics and Engineering Scholarships awarded the following 2020 Awards to CSUB Geology Majors:

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. (\$2,086)

2020 Award Winner: Jenny Ezpeleta

Dolores & Victor S. Cerro Scholarship (\$2,255):

2020 Award Winner: Taras Bonas

CSUB CSU Future Scholars Scholarship (\$1,000):

2020 Award Winner: Blaine Whitaker

Dr. Robert W. & Jean L. Sheldon Scholarship (\$1,715):

2020 Award Winner: Tara Bonas

GPS to STEM (\$250):

2020 Award Winner: Erica Kersey

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

2020 Award Winner: Jesus Robles

Outstanding Geology Undergraduate Student in CSUB School of Natural Sciences, Mathematics, and Engineering (NSME): Presented to the most outstanding undergraduate student in the Department.

2020 Award Winner: Carrie Williams

Student Research Poster Competition Award CSUB School of Natural Sciences, Mathematics, and Engineering: Presented to the most outstanding graduate student in the School.

2020 Award Winner: Cindy Rodriguez

(Faculty Mentor: Junhua Guo) Project Title – “Wildfire Impacts on Soil Physical Properties: 2016 Erskine Fire, CA”

Kegley Family Merit Scholarship (\$250):

2020 Award Winner: Bradley Squires

Stockdale Moose Lodge Scholarship (\$500):

2020 Award Winner: Destenie Villegas

Please contact Sue Holt sholt3@csub.edu to update your career and contact information, or if you would like to receive this newsletter via email.

CLASS OF 2020 BS

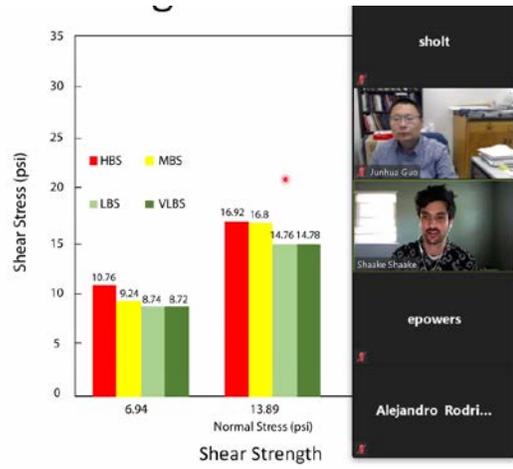
Jana Leigh Marquez
Jovana Salado
Diana Alejandra Salinas
Christopher Chavez
Lee Mason Denning
Cassandra Nicole Lundy-Lyday
Emily Oliver
Anita Margaret Qualls
Austin Saenz
Brandon J Schmidt
Brandon Joseph Tamondong
Eneas Torres-Andrade
Carrie Jeanne Williams

CLASS OF 2020 MS

Sade C Haake
Emmanuel Garcia
Summer Chantille Gibbons
Mena Augusta Moerike
Obeyd Mohammadi
Gabriela Navarrete
Tucker Barnett Plunkett
Jesus Octavio Robles
Alejandro Rodriguez
Ethan Alexander Sarti
Salvador Alexis Vargas
Erin Marie Walter



A portion of the Geological Sciences' Zoom Commencement Ceremony



Sade Haake defending his Master's Thesis via Zoom.



*L to R: Students Jake Jackson, Bradley Squires, Eneas Torres-Andrade
Faculty Drs. Tony Rathburn, Chris Krugh, Bob Crewdson, and Katie O'Sullivan
Photo by Brian Pitts.*

Alumni Profiles:

While plenty has changed over the 50-year history of California State University, Bakersfield, one constant has been its ability to prepare students for the future, even one that looks far different from what anyone could imagine. **Ken Haney** might have graduated in 1984, but the geology degree he earned through CSUB’s School of Natural Sciences, Mathematics, and Engineering (at the time called the School of Arts and Sciences) is still paying off. As a project manager at California Resources Corporation (CRC), his time at the university was key to building a foundation that would serve him well throughout his career.

Alumnus Ken Haney, on why he gives back to his alma mater: “It launched me on the path to where I am today, which has been a pretty successful and rewarding career. I just think it’s an opportunity for me to pay back a little.”



“I look at all the steps I’ve taken in my life, and all the moves I’ve made and all the organizations I’ve been involved in and the people I’ve worked with, and the strongest relationships I’ve had in my life were established at CSUB,” Haney, 59, said. “A lot of them continue to this day.” These are excerpts from an alumni profile story by Kelly Ardis. For the complete story see:

<https://news.csub.edu/1980s-grad-built-strongest-relationships-at-csub>

There are great job opportunities for graduates with a bachelor’s degree in geology. However, a Master’s Degree in geology allows you to increase your salary, improve your promotion potential and expand your employment and career prospects.

Median Salaries with a Master's Degree in Geology *(Source of information: *U.S. Bureau of Labor Statistics)*

Generalized Job Title	Median Salary (2019)	Job Growth (2019-2029)
Geoscientists	\$92,040	5%
Mining and Geological Engineers	\$91,160	4%
Hydrologists	\$81,270	5%
Atmospheric, Earth, Marine and Space Sciences Teachers, Postsecondary	\$92,040	2%

Here Are Some Reasons to Get Your Master's Degree in Geology

❖ Expand Career Options

With a master's degree in geology, you will have a greater diversity of job opportunities with more choices of better positions. Employment of geoscientists is projected by U.S. Bureau of Labor Statistics to grow faster than the average for all occupations. With a master's degree in geology, you can work in positions in government agencies, environmental firms, the oil and gas industry, teaching, mining, academia, paleontology, oceanography, waste management and water management. At CSUB, nearly 100% of our geology master's degree graduates are working in geoscience jobs.

❖ Increase Your Salary

Generally, salaries are about 15% greater for those with a Master's Degree compared to those with a bachelor's degree. For geoscience positions, the salary gap can range from \$10,000 to over \$50,000, depending on the position and how much experience you have. Of course, some positions require a master's degree. CSUB has both thesis and non-thesis options for graduate students.

❖ Magnify Your Knowledge and Experience in Geology

Masters degree educational opportunities enable you to focus on an area of geology you're really interested in. With advanced course work and focused research activities, master's degree students can gain additional skills, knowledge and experience in their field of interest. The master's degree curriculum also encourages students to expand their knowledge in areas other than the student's area of focus. Geology master's degree students choose a faculty advisor who, together with a team of faculty, guides thesis research activities and helps each person reach his/her goals.

❖ Demonstrate Employable Skills

Choosing to complete a master's thesis provides the means to demonstrate to potential employers or PhD graduate schools that you can start and complete a project, have a capacity for research, can work independently, can stay on task over the long term, can analyze data and interpret results, and can present results orally and in writing. Completion of a thesis requires all of these things. These are all skills that employers and graduate schools are looking for and can be difficult to demonstrate as an undergraduate.

❖ Experience More Geology

It is often said that the more geological features you see, the better geologist you will be. Opportunities during a master's degree will provide students with the means to see more geology. In addition to research activities, most advanced geology courses include field and/or lab work. Geology graduate students at CSUB are also encouraged to help with undergraduate field trips and labs.

❖ Get an Education That Pays for Itself

In addition to the added salary potential after graduation, at CSUB graduate students have teaching assistantships (TAs) are available where students get paid for teaching labs. Research assistantships (RAs) are also available on a limited basis. These opportunities are available on a competitive basis. In addition, local industry and government agencies employ students in internships and jobs. Our graduate level courses are taught at night to make it easier for students with jobs/internships. Most CSUB geology graduate students are employed by TAs, RAs or local geoscience employers.

❖ Explore the Latest Technologies and Software

At CSUB we teach geology courses where students use the latest software and mapping programs used in industry and government agencies. We also have state-of-the-art laboratories with sophisticated instruments, including an SEM and XRD. Data collection, analyses and interpretation of results are integral to the geosciences. Learn practical skills from experts that will improve your technical abilities, analytical capabilities and job prospects.

❖ You May Want a Career That Requires a PhD.

Although a master's degree is best for most geoscience jobs, some geoscience careers (university professor, for example) essentially require a PhD. Although students can enter a PhD program directly after graduating with a bachelor's degree, earning a Master's Degree first is a good way to get graduate research training and experience before entering a doctoral program. This is especially true for those who are unsure if they want to commit to earning a PhD. A geology master's program is a good way to help determine if pursuing an even more advanced degree is the right path. A Master's Degree is also helpful in getting accepted into a PhD. program and being more competitive for available scholarships/assistantships that can pay for your advanced education.



Zzyzx Though the Years



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.

Affiliation (if applicable):

Address:

City, State, Zip Code:

Email:

Please indicate the amount you want to donate:

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

Other _____

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

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



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