College of Natural Sciences & Mathematics

FALL 2024

EARTH SCIENCE NEWSLETTER

DEAR ALUMNI AND FRIENDS

It's been a year since our last newsletter, and we have a lot to share! Our students and professors have had a productive year, and this letter summarizes what we've been up to in the Department of Earth Science at CSULB. If you haven't joined our alumni group on LinkedIn yet, you'll want to do that! We use the group cite to foster connections between our alumni and current students and professors. If you haven't seen it yet, we have >100 members, anyone can post information that you think the CSULB Earth Science community will benefit from! (To join, search for "CSULB Geology & Earth Science Alumni" on LinkedIn).

We hope that you and yours are safe and well.

If you have news to share in these eNewsletters, please let us know by emailing Dr. Alyssa Abbey (alyssa.abbey@csulb.edu). We also can print the newsletter if you'd like a hard copy. Just email us the name and address where you'd like to receive the newsletter.

Sincerely, Alyssa Abbey, & Matt Becker

DR. FINNEY AND THE INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

The Second 100 IUGS Geological Heritage Sites were announced on August 27th, 2024, at the 37thInternational Geological Congress held in Busan, Korea. As Secretary General of the International Union of Geological Sciences, Stan Finney promoted, supported, and contributed substantially to this highly visible endeavor of the IUGS International Commission on Geoheritage. At Busan, Stan and Juana Vegas (Secretary General of the Geoheritage Commission) together announced the Second 100 sites of which eleven are in the United States. Stan also co-edited the book "The Second 100 IUGS Geological Heritage Sites", which was released at the time of the announcement of the sites. That book and "The First 100 IUGS Geological Heritage sites", which was released in 2022, can be viewed at, purchased on, and downloaded from www.iugs-geoheritage.org. The program will continue with the announcement in 2026 of the Third 100 IUGS Geological Heritage Sites.

The IUGS geological sites program identifies those sites that are of the highest scientific value. They are sites that served to develop the science of geology. They are the world's best demonstrations of geological features and processess. They are the sites of fabulous discoveries of the Earth and its history. Recognition and visibility of the IUGS Geological Heritage Sites can lead to their further appreciation, to their use as educational resoures, and, most importantly, to their preservation.

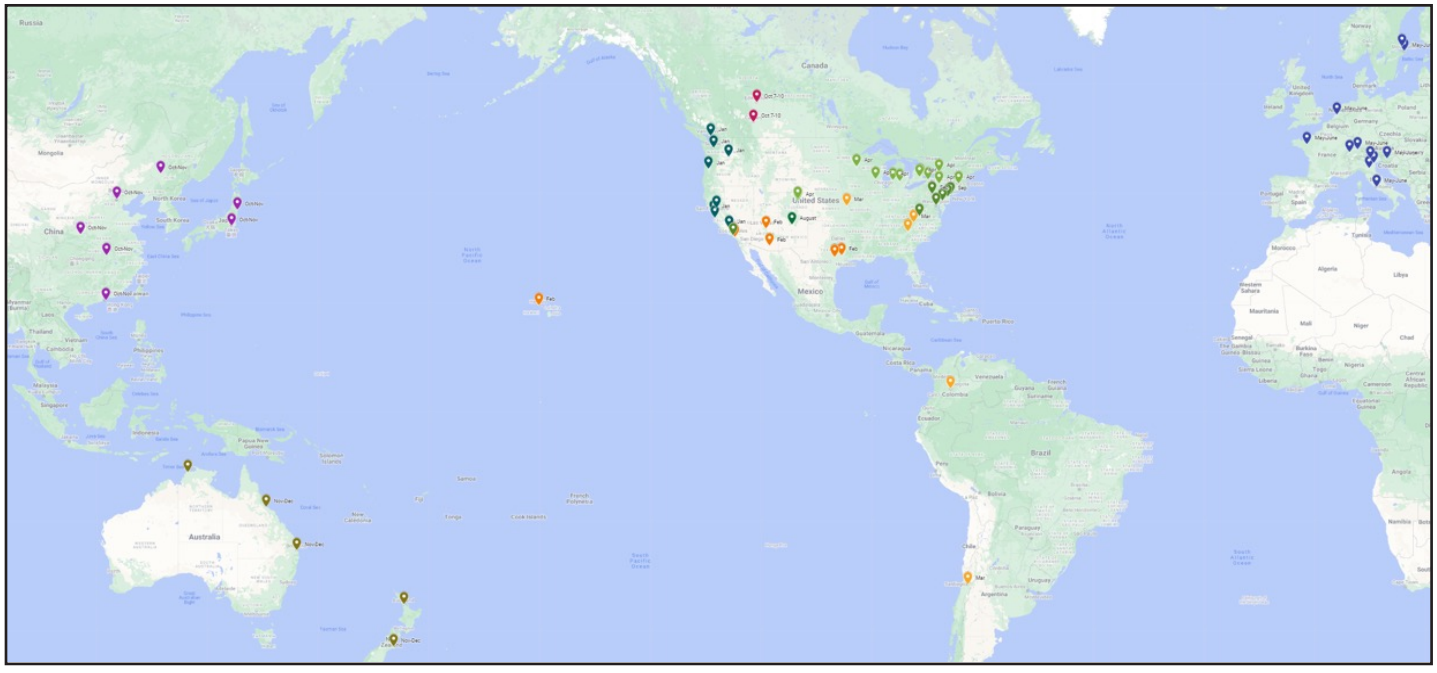
NEWS FROM OUR DEPARTMENT LAB TECHNICIAN

Last year ee welcomed our Lab Technician Thomas Davoren after spending just over a year with us, doing wonderful work, we are sad to see him go. Although, we know he will be amazing in his new position as Museum Specialist in Earth and Planetary Sciences at The American Museum of Natural History!

We are currently in the process of hiring a new lab technician to continue where Thomas left off.

DR. MATT BECKER NAMED AS THE 2024 NATIONAL GROUND WATER ASSOCIATION DARCY DISTINGUISHED LECTURER

Dr. Becker has been traveling about the world giving lectures on groundwater, as the NGWA Darcy Lecturer. The Henry Darcy Distinguished Lecture Series in Groundwater Science fosters interest and excellence in groundwater science and technology. It was established in 1986 and named in honor of Henry Darcy of France for his 1856 investigations that established the physical basis upon which groundwater hydrogeology has been studied ever since. Each year, a panel of scientists and engineers invites an outstanding groundwater professional to share his or her work with their peers and students through this lecture series. The Darcy Lecture Series is most often presented at universities and professional associations throughout the world. Prof. Becker will offer two talks, one on what fiber optic sensing has revealed about groundwater and another on the importance of groundwater to the people and ecosystems of the South Pacific. He will gain a few air miles traveling to over 60 locations in 17 different countries!



LOCATIONS THAT DR. MATT BECKER VISITED DURING HIS 2024 DARCY DISTINGUISHED LECTURE TOUR.

DR. ALYSSA ABBEY RECEIVES NSF CAREER AWARD & AGES DIG AWARD TO FUND REEARCH IN THE TASTE LAB

This spring Dr. Alyssa Abbey and collaborator Dr. Alex Tye (Utah Tech University) received an AGeS DiG award to continue exploring surface processes in contintnetal rifts. Four students from CSULB and 3 students from UTU went to the field for two weeks over the summer to collect field data and samples for geochronologic analyses.

DURING FIELDWORK IN COLORADO, WE ALL GOT MATHCING SWEATERS!

RESEARCH STUDENTS IN THE COHORT LEARNED HOW TO MEASURE STRATIGRAPHIC SECTIONS, SAMPLE SANDSTONES FOR DETRITAL ZIRCON DATING, SAMPLE ASHES FOR AR/AR DATING, AND MEASURE IMBRICATIONS FOR FLOW DIRECTION INFORMATION.

Dr. Alyssa Abbey received an NSF CAREER award this summer! This award funds a 5-year project in the Basin & Range and Walker Lane Provinces. The research will involve MS and undergraduate students from CSULB as well as community college students from Cerritos College and high school students from Jordan HS. New graduate student, Logan, explored some of the field area this summer and will begin mapping and volcanic rock characterization over fall break. New graduate student, Caitlyn, has begun using published gravity data to model the subsurface and will collect her own gravity data in the spring.

THE STEWART VALLEY HAS A RICH FOSSIL RECORD, IS RIGHT ON THE BORDER OF THE WALKER LANE AND BASIN AND RANGE, AND ALL GEOLOGIC MAPS OF THE AREA ARE EITHER LACKING DETAIL, OR DISAGREE WITH EACH OTHER. THIS IS A GREAT PLACE FOR RESEARCH!

GEOTHERMAL ENERGY! SEE WHAT DR. MATT BECKER AND STUDENTS ARE UP TO

Dr. Becker and his graduate student Eduardo Martinez conducted a Pulse Interference Test (PIT) at the Frontier Observatory for Research in Geothermal Energy site (Utah-FORGE) located near Milford, Utah. Utah-FORGE is a project funded by the Department of Energy (DOE), with the goal of demonstrating an economically viable Enhanced Geothermal System (EGS). An EGS is created by stimulating (hydraulically fracturing) hot bedrock to create an artificial hydrothermal system. PITs are hydraulic tests that consist of a series of pressure pulses propagated within an underground reservoir by hydraulic injection. The pressure response is then recorded at an observation well located further away. This information will help provide a greater understanding of the fracture network located underneath the Utah-FORGE site.

EDDY MARTINEZ RUNNING TESTS AT UTAH-FORGE.

CHARLES FAIR WORKS WITH STUDENTS TO EXPLORE THE IMPACTS OF HANDS-ON OUTDOOR EXPERIENCES

Julia Rizkallah, a current student at CSULB and a student who attended Charles ERTH106 - Earth Science for Teachers Class during the Spring 2023 semester is working on completing her Biology Education degree and finishing her Thesis for University Honors Program, with Charles as her thesis advisor. Julia's thesis title, "The Impacts of Hands-on Outdoor Education Experiences on Secondary Students' Concept Retention and Attitudes Towards STEM Topics", is a partial study of the impact of outdoor education (hands on field experience) of STEM topics with regards to students in grades 6th through 12th. Her thesis is in partial fulfillment of the requirements for the university Honors Program Certificate. Julia will be presenting her thesis and finds this December. She has been applying for grad programs at various universities, including the University of Irvine.

DR. NATE ONDERDONK'S RESEACH INVOLVES CURRENT STUDENTS & ALUMNI

Undergraduate students Luis-Enrique Esparza and Samantha Horne-Rivera worked with Dr. Onderdonk last Spring and over the Summer on a project to re-date some key marine terrace localities in Southern California. They collected samples from the Morro Bay area and San Diego where previous Uranium-series dating of corals collected from marine terrace deposits has established the ages of the two lowest marine terrace levels and these locations have served as reference. points for nearby estimates of terrace ages and coastal uplift rates. They are re-dating these sites with Luminescence dating to test the older ages. Preliminary results suggest some of these terraces may be younger than previously thought. This work is being funded by a year-long grant from Ages-DiG.

SAM AND LUIS SAMPLING TERRACES FOR LUMINESCENCE DATING.

Undergraduate student Juan Gonzalez worked with Dr. Onderdonk and Department Tech Thomas Davoren in the central Mojave desert to document late Quaternary uplift of the Mud Hills in the vicinity of Rainbow Basin. They used a differential GPS with a laser range-finder attachment that makes it possible to collect GPS points from locations that would be hard or impossible to access- like the steep vertical slopes that surround Rainbow Basin. Their work shows that a late Quaternary terrace has been warped down across the southern front of the Mud HIlls, most likely due to folding above a blind reverse fault that dips north under the uplifted topography.

JUAN TAKING GPS POINTS. RAINBOW BASIN

UPDATES FROM DR. GREG HOLK

It is hard to believe that this marks Dr. Holk's 25th year at CSULB. He is excited about beginning the retirement process by FERPing next fall. Nevertheless, things have not slowed down, as Dr. Holk has had a very eventful year filled with travelling, teaching courses, and doing research. He continues to teach the mineralogy and petrology courses, along with the intro geology and Earth systems courses. His teaching portfolio is growing this semester with the addition of a general education course about air and water pollution.

With retirement on the horizon, Dr. Holk has been working on finishing up long-term projects. He traveled to Caltech for a week to collect clumped isotope data from carbonate veins related to the detachment fault Dr. Holk has been working on with Dr. Francis for a long time. These new data provide much needed temperature control for carbonate veins that formed during deformation. In addition, Dr. Holk, with Dr. Francis and former graduate students Denitsa Toneva and Derik de Baun, has a paper about hydrothermal systems related to the Currant Gap detachment fault accepted for publication in a Geological Society of America Special Paper in honor of Professor Cathy Busby. This work continues with more recent results having been presented at the Cordilleran Section meeting and the Annual meeting of the Geological Society of America.

Peru research is continuing. Dr. Holk and graduate student Jim Conway traveled to the University of New Mexico to complete the collection of oxygen isotope data from the plutons of the Coastal Batholith of Peru. Both of us were surprised to learn that we got triple oxygen isotope data from these samples, which is a big bonus. Dr. Holk is excited about learning a new method and looking forward to what these data tell us about magmatic and hydrothermal processes. New work done with a group from Loma Linda University is providing insights into hydrothermal systems related to IOCG deposits. Publication of results from this project has begun with our review paper about the geochemistry of the Coastal Batholith of Peru and how it relates to tectonics recently published in Lithos.

Dr. Holk traveled to northwest Argentina for two weeks to collect samples for stable isotope analysis from shear zones with Argentine colleagues. This begins a new project that investigates orogen-scale fluid flow during the Ordovician Famatinian Orogeny. This is a unique opportunity to study an ancient mountain belt that escaped the effects of extension associated with orogenic collapse. Preliminary oxygen isotope data from some of these samples were collected during the University of New Mexico trip for lab work. This field work was accompanied by the consumption of copious quantities of beef at numerous barbeques. Some samples were collected from a region called the Puna, which is the southernmost part of the Andean Altiplano. This region of Argentina is very remote and is at high altitude with volcanoes having summits as high as 6000 meters. This field work was quite an adventure.

Prior to traveling to Argentina, Dr. Holk and Mrs. Holk did a two-week organized tour of Peru with Machu Picchu as the highlight. We visited Lima, Cusco, the Sacred Valley, in addition to Machu Picchu. It was great to have done this trip before Argentina because it resulted in Dr. Holk getting acclimated to high elevations, as Cusco is about about 3000 meters. Another highlight of this trip was eating wonderful Peruvian food for two weeks.

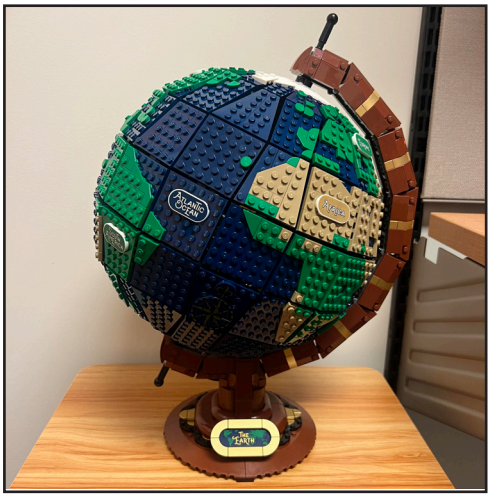
The travel highlight of the year was spending three weeks in Egypt and Jordan over the winter break. This was one of the most amazing trips! It is very hard to believe that the Egyptian civilization was already ancient by the time of the Roman Empire. The desert environment resulted in many of the temples and other ancient sites to remain in an excellent state of preservation. The paintings in the tombs, especially in King Tut's tomb look like they were painted yesterday! Then, we went off to Jordan to follow the traces of Indiana Jones to Petra, another remarkable site. Petra is a geologist's dream because the staining in the sandstone is spectacular. Since we traveled to Jordan after the October 6 attacks, all the tourist sites were deserted and we had them to ourselves.

GAMIFICATION AND PLAY-BASED LEARNING IN EARTH SCIENCE AT THE BEACH

The COVID-19 pandemic made student engagement incredibly challenging, and these challenges persisted as students returned to campus weary and accustomed to several semesters of remote instruction. Having focused on geoscience education and alternative instruction during his thesis work at California State University – Fullerton, Joseph Gutierrez took interest in a new approach to instruction – gamification. Gamification – the use of gaming elements in non-gaming settings – has gained popularity in postsecondary education throughout the 21st century, opening the door to new teaching practices that may be useful as STEM programs struggle with public image and recruitment.

Joseph started with Use Your Brain!, a rotating series of mid-lecture review games that could be implemented in Mentimeter-based presentations. Use Your Brain! was a hit among students throughout the COVID-19 semesters, with student survey responses suggesting they have a positive impact on content retention and overall morale. As such, Use Your Brain! has become a staple in lecture-based courses like Planet Earth (ERTH102) and Natural Disasters (ERTH110). Joseph's Earth Science for Teachers (ERTH106) classes have also started to incorporate gamification as part of the curriculum. Since last year, ERTH 106 students have been competing in self-produced episodes of Game Changer: Earth History Edition, a geologic spin on the popular Dropout TV gameshow where the game changes every show. Students compete in groups as new games test the concepts and skills introduced throughout their earth history unit. This is followed by discussions about gamification, and its place in K-8 curriculum. Now, as we enter a new academic year, Joseph is testing The 49ers League, a far-reaching role-playing game (RPG) that borrows elements from the Pokemon series of video games and an RPG framework developed by Dr. Yan Shi at University of Wisconsin – Platteville.

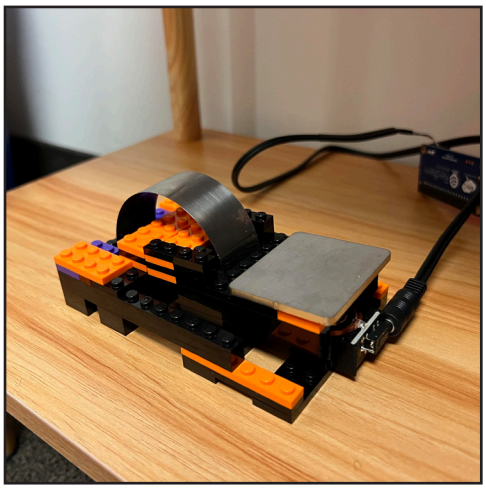
At the beginning of the semester, ERTH 106 students register for The 49ers League – an alliance of students who work together to refine their skills as scientists and educators. After creating a League Card, students have access to 8 challenges that can be pursued in any order outside of class, the completion of which earns gem-based League Badges. Each badge is worth League Points which – when accrued – unlock supplementary resources and credit opportunities that aid students in their quests to become masters of earth science pedagogy. To date, The 49ers League has inspired frequent visits to office hours, participation in career panels such as October's Teaching as a STEM Career: A Discussion with Local Professionals, and a variety of self-guided field trips throughout Southern California.

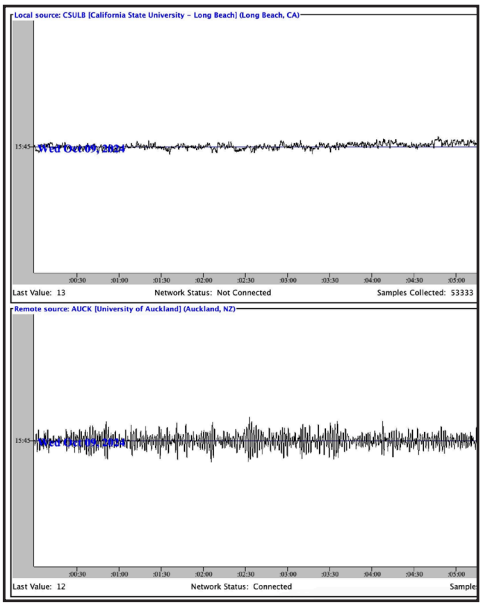


In addition to gamification, play-based learning has made its way into lower-division instruction at The Beach. Whether it be the hard-to-kill Botanical Collection featuring flowers and succulents, the visually striking art sets that pay homage to Vincent van Gogh and Katsushika Hokusai, or highly-coveted collectables based on intellectual properties such as Star Wars, students throughout sections of ERTH102, 106, and 110 have made it apparent that LEGO still has a place in the popular culture, making it a perfect time for Joseph to merge his personal interests with geoscience education.

At the beginning of the semester, Joseph built a functioning LEGO seismometer that has since been installed in his office. The pieces for this seismometer were provided by MindSets, who collaborated with the British Geological Survey's school seismology project to design a compact, easy-to-build set. Once the pieces are acquired, the set can be built in less than 15 minutes, then connected to jAmaSeis via USB-C connections and a SeismicStream seismometer interface. The build can easily be taken to class for demonstrations that showcase the tools used by geologists, real-time seismological data, and a form of play-based learning that can be utilized by our ERTH 106 students as they pursue their teaching credentials and careers in K-8 science education. The LEGO instructional series has expanded with the recent completion of a globe that utilizes LEGO Technic pieces to spin, and by the next Spring semester, the department will be home to an 11,000-piece world map that prominently features mid-ocean ridges and a variety of customization options. Students and faculty alike are invited to Joseph's office to participate in this build, and others, including sets from the Jurassic Park and Botanical Collection series.

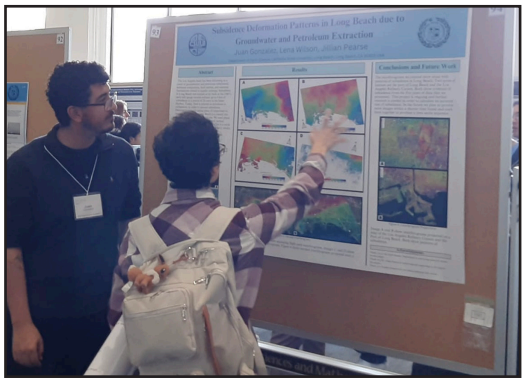
Build Your Own Seismograph!
https://mindsetsonline.co.uk/shop/lego-seismometer-kit/

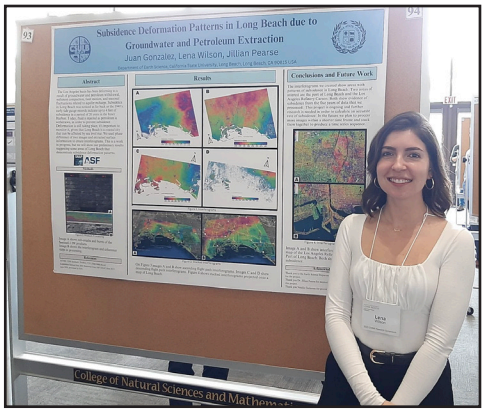




IS LONG BEACH SINKING?

Undergraduate students Juan Gonzalez and Lena Wilson worked with Dr. Jill Pearse to study surface deformation in Long Beach, using geophysical methods! They presented their work at the CNSM research symposium!





UPDATES FROM DR. LORA STEVENS

Lora has received a $500k NSF grant with co-Investigators, AJ White (IIRMES) and Paul Scotton (Classics), to conduct a field training program for geoarchaeologists while studying the environmental evolution of Lechaion Harbor the main port of the ancient city of Corinth for over 1000 years, serving both Greeks and Romans. Over the next three years the award pays for eight students to spend a month in Greece doing research before returning to Long Beach to finish analyses and prepare their data for presentation. This work continues her NSF-funded fecal stanol work that is wrapping up this year.

TRENCH WORK IN GREECE. UNDER THIS OPEN FIELD IS AN UNSTUDIED HARBOR EMBAYMENT WAITING TO REVEAL SECRETS

SUMMER FIELD IN CALIFORNIA & NEVADA

This year our summer field course spanned two weeks in the area near Lake Tahoe and two weeks in western Nevada near the Berlin-Ichthyosaur State Park. Students identified and mapped various types of faults, recorded data from metamorphic rocks to answer questions about the pressure and temperature history experienced in the area, measured stratigraphic sections to assess paleo-environments, researched and presented on the geologic history of the western US, and explored fossil remains of some of the largest underwater creatures in Earth's past. The field classes offered in the Earth Science department pull together all aspects of geology and encourage students to think about the Earth as a whole interconnected system. The field mapping, data collection, and scientific inquiry that occurs in these courses is matched by no other experience at the university. Plus, the inherent teamwork, organization, and communication skill building is universally useful to all our students and is highlighted by their employers who continually reach out to us for interns and new hires.

LEFT: STUDENT FOUND A LARGE MAMMAL TOOTH, HELPING TO SOLIDIFY THEIR HYPOTHESES ABOUT THE PAST LIVING ENVIRONMENT

ABOVE: STUDENTS FOUND A ROCK LAYER MADE ALMOST ENTIRELY OF SNAILS, SUGGESTING A FLOOD OR STORM MUST HAVE OCCURRED TO KILL AND BURY ALL THE SNAILS AT ONCE
LEFT: RANGER AT THE BERLIN-ICHTHYOSAUR STATE PARK SHOWS CLASS FOSSIL BEDS WITH PRESERVED BONES OF THE EXTINCT

LEFT: STUDENT PRESENTING BACKGROUND ON THE BASIN AND RANGE GEOLOGIC PROVINCE

RIGHT: 2024 SUMMER FIELD COHORT

ALUMNI AND FRIENDS ON FIELD TRIPS!

Dr. Onderdonk led two professional field trips this past year. The first was in November of 2023 to the central Mojave for the South Coast Geological Society, which consisted of a group of ~150 professionals and students. The trip covered topics ranging from Quaternary tectonics and climate change to Miocene normal faulting and it's influence on mineral resources in the central Mojave.

SCGS GROUP

CSULB ALUMNI & CURRENT STUDENTS

The second trip was associated with the GSA Annual Meeting in Anaheim in September 2024. That trip focused on recent work by Onderdonk and former MS students to understand the active tectonics and uplift in the Santa Ynez Valley and nearby coastal areas. Former MS student Ian McGregor was a co-leader on the trip. The trip included professors and students from all over the country, and 11 CSULB students from Onderdonk's Tectonic Geomorphology class. They spent one day looking at faulted and folded river terraces along the Santa Ynez River, and a second day visiting lifted and deformed marine terraces along the coast of Vandenberg Space Force Base

GSA CONNECTS FIELD TRIP

The Darren Westby Sprit Award – for enthusiasm, inventiveness, and supporting peers in geoscience

Darren Westby was a beacon of light in the department of Earth Science at California State University Long Beach. Darren showed deep enthusiasm for learning and exploration. He was excited and proactive about doing independent research and showed creativity and ingenuity when solving problems in the lab. He had a profound love for field work and was always in for an adventure. Darren was an influential peer-mentor who was most happy when his class-mates or lab-mates were successful.

The Darren Westby scholarship for enthusiasm, inventiveness, and peer support is awarded annually to a student in the Earth Science department who shows the same qualities and attitude towards geoscience.

This scholarship has been created by family and friends in loving memory of Darren.

DEPARTMENT AWARDS

Mark Pratt awarded the 2024 Outstanding Student Award from the Groundwater Resources Association of California (GRA)

Luis-Enrique Esparza awarded the first Darren Westby Spirit Award, in honor of alumni Darren Westby

Rick Behl awarded A. Eugene Fritsche Lifetime Achievement Award from the Society for Sedimentary Geology, Pacific Section: Conferred yearly on high-profile nominees (professionals in industry and academia) for years of committed service and contributions to PS-SEPM and the geologic community in terms of teaching, research and publications, public service, and field trips.

Rick Behl awarded Grover E. Murray Memorial Distinguished Educator Award from the American Association of Petroleum Geologists: This award annually recognizes and rewards superlativecontributions to geological education. One award given for North America and another for the rest of the world.

MARK PRATT HOLDING THE OUTSTANDING STUDENT AWARD FOR THE GROUNDWATER RESOURCES ASSOCIATION

LUIS-ENRIQUE ESPARZA ACCEPTING DARREN WESTBY SPIRIT AWARD GIVEN BY DR. ALYSSA ABBEY

END OF YEAR DEPARTMENT BANQUET AND AWARDS CEREMONY

CONGRATULATIONS TO OUR MASTER'S STUDENTS WHO FINISHED THIS YEAR

Francine Cason finished her MS with Dr. Matt Becker: Mapping Fresh Water Flow Confined by Reef Flat Plate in a Fringing Reef, Moorea French Polyneisa.

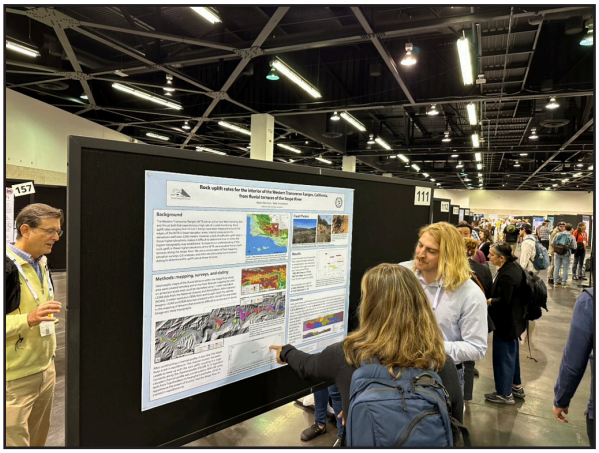
Hannah Paradis finished her MS with Dr. Andrea Balbas: Investigating the Geodynamic Origin of the Voyager Seamount Chain Within the Papahanaumokuakea Marine National Monument

Nader Tavassoli finished his MS with Dr. Lora Stevens: An Early Holocene Shift to Drier Conditions at Lake Maharlou, Southwest Iran: Insights From Isotopic and Mineralogic Analyses

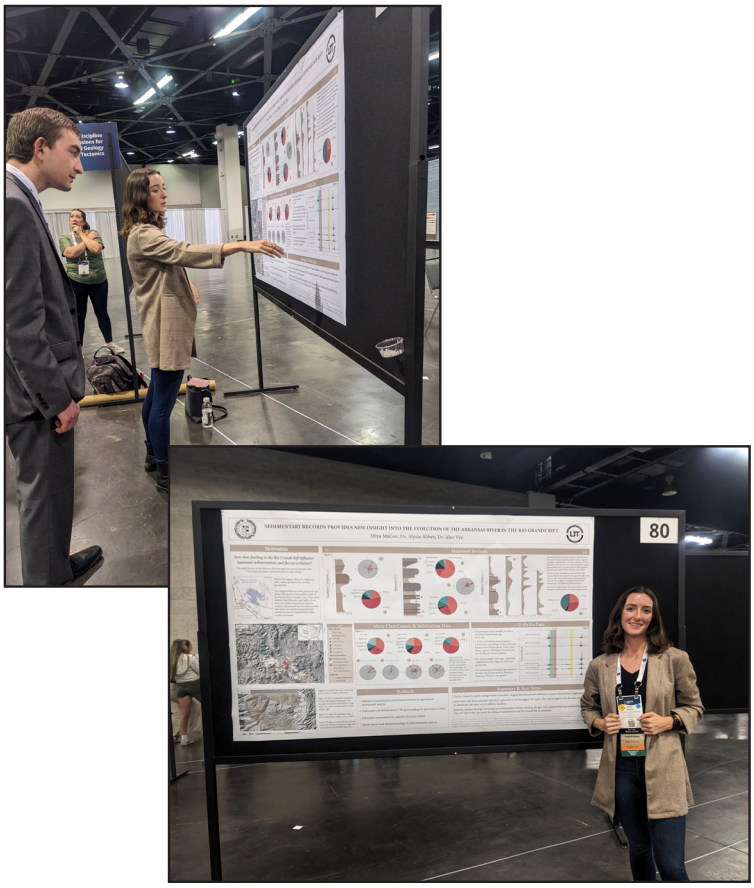
STUDENTS & FACULTY AT CONFERENCES!

Several of our graduate and undergraduate students attended and presented at national conferences this year!

Miya MaGee, Adam Ketcham, Spencer Cooper, & Melony Robinson presented at the GSA annual meeting in Anaheim, CA in September:

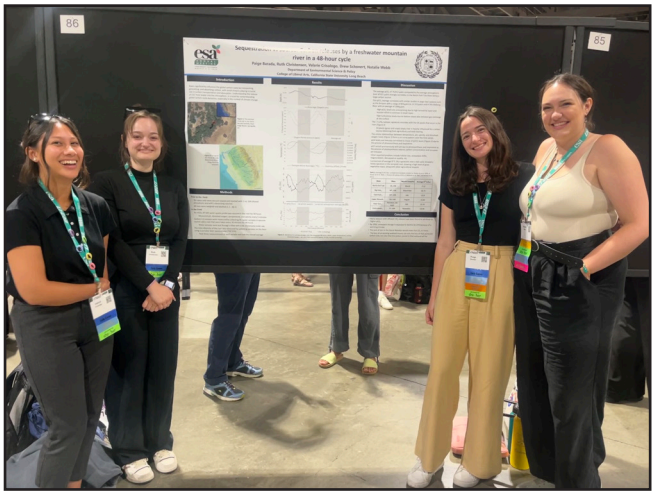


ROCK UPLIFT RATES FOR THE INTERIOR OF THE WESTERN TRANSVERSE RANGES, CALIFORNIA, FROM FLUVIAL TERRACES OF THE SESPE RIVER

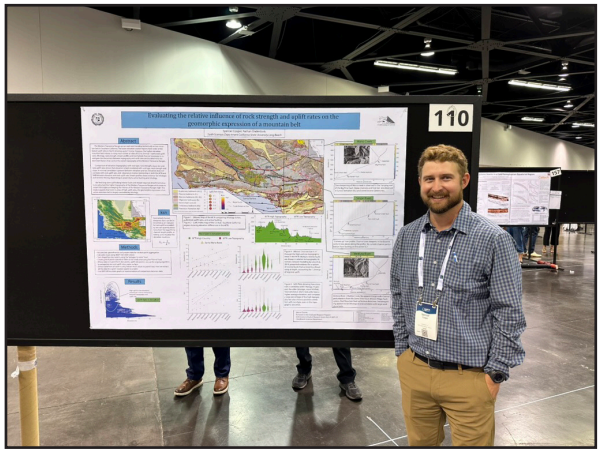


EDIMENTARY RECORDS PROVIDE NEW INSIGHT INTO THE EVOLUTION OF THE ARKANSAS RIVER IN THE RIO GRANDE RIFT

Four students from Dr. Hagedorn's ESP400 class presented at this year's Ecological Society of America meeting.



SEQUESTRATION VS SOURCE: CARBON RELEASES BY A FRESHWATER MOUNTAIN RIVER IN A 48-HOUR CYCLE



EVALUATING THE RELATIVE INFLUENCE OF ROCK STRENGTH AND UPLIFTRATE ON THE GEOMORPHIC EXPRESSION OF A MOUNTAIN BELT: CASE STUDY FROM THE WESTERN TRANSVERSE RANGES OF CALIFORNIA

STUDENTS & FACULTY AT CONFERENCES!

Abbey, A.L., Dozier, S., Gutierrez, J., (2024) Bringing the Focus to Universal Skills in a Geology Field Course. GSA Annual Meeting.

Behl, R.J. ; Blake, G.H., (2024). Development and Evolution of the Tertiary Benthic Foraminiferal Stages of California, PSAAPG 100th Anniversary Meeting, Whittier. Search and Discovery Article #42592.

Behl, R.; Martin, L.; Stevens-Landon, L. (2024). Integrating earth science core concepts into physical and life science classes, Geological Society of America Connect. Abstract ID#: 402715

Charkhutian, D.; Behl, R.J., (2024). Stratigraphy, sedimentology and petrography of the siliceous lithofacies in the upper Modelo turbidite system, eastern Ventura basin, southern Lake Piru, California, Geological Society of America Connect. Abstract ID#: 405116

Francis, R., Altamirano, R., and Holk, G., (2024) Novel "interstitial quartz veins" in silicified carbonates of a detachment fault, White Pine Range, Nye County, Nevada; Implications. Geological Society of America Cordilleran Section Meeting

Francis, R. and Holk, G., (2024) Contrasting styles of silicification in two coalescing, ductile-rooted detachment faults, White Pine Range, East-Central Nevada: Implications for ore genesis. Geological Society of America Annual Meeting.

Francis, R., Walker, C.T., and **Holk, G.,** (2024), A regional (>3000 km2) detachment fault rooted in an upper Paleozoic argillaceous ductile unit: A stratigraphic conduit for ~200C ore-forming hydrothermal fluids in the shallow crust, Great Basin, Nevada. Geological Society of America Annual Meeting.

Garcia, A., **Onderdonk, N.,** (2024) Variations in rates of quaternary denudation in the rainbow basin area, mojave desert, constrained by irsl geochronology on fluvial terrace and fan deposits. GSA Annual Meeting, Abstract 107-T51-17 (poster presentation)

Holk, G., (2024), A massive meteoric-hydrothermal system related to Eocene crustal extension of the southern Canadian Cordillera: One of the largest in the geologic record? Geological Society of America Annual Meeting.

Holk, G. and Francis, R., (2024) Carbonate precipitation from meteoric-hydrothermal fluids at a detachment fault, southern White Pine Range, Nevada: Evidence from clumped isotopes. Geological Society of America Annual Meeting

Holk, G., Hartman, S.M., and **Walters, P.,** 2024, Contrasting fluid systems related to the brittle-ductile transition and shallow brittle crust in two strike-slip faults. Geological Society of America Cordilleran Section Meeting.

McGregor, I., **Onderdonk, N.,** (2024) Quaternary geologic mapping, geochronology, and structural modeling of quaternary active faults in the santa maria basin, san luis obispo and santa barbara counties california. GSA Annual Meeting.

Pereira-Santos, L.E., Martinez-Ardila, A.M., Burbano Munoz, N., Molano Raimeriz, R.S., Molano Mendoza, J.C., Jimenez Diaz, S.D., Moreno Aguilar, G.D., Clausen, B.L., and **Holk, G.,** (2024) Unraveling the origin of hydrothermal alteration zones in an upper-Cretaceous pluton in the Peruvian Coastal Batholith. Geological Society of America Annual Meeting.

Robinson-Williams, M., Onderdonk, N., (2024) Preliminary luminescence dates from the Paso Robles formation in the Santa Maria basin suggest a late quaternary uplift event in the southernost Coast Ranges. Geological Society of America Annual Meeting.

NEW DEPARTMENT PUBLICATIONS

Abbey, A.L. , Randolph-Flagg, N., de Villa, K., Kim, S., Shuster, D., (2024), Tracing short-lived hydrothermal circulation systems and water-rock interactions around small-scale basalt intrusions. Geochimica et Cosmochimica Acta, 366, 113-127.

Abbey, A.L. , Moore, A., (2024), Trees From Thin Air. Teach The Earth Collection. https://serc.carleton.edu/teachearth/activities/284510.html

Abbey, A.L., (2024), The Rock Cycle: building descriptive skills. Teach The Earth Exemplary Collection. https://serc.carleton.edu/teachearth/activities/282572.html

Abbey, A.L. , Wildman, M., Murray, K.E., Stevens Goddard, A.L., (2024), QTQt: Beyond the user manual. Teach The Earth Exemplary Collection. https://serc.carleton.edu/teachearth/activities/284431.html

Balbas, A.; Konrad, K.; **Onderdonk, N.;** Castillo, P.R.; **Behl , R.**, (2024) Oligocene through Miocene Blowtorch Volcanism within the California Borderland Preceded the Neogene Boundary Transition, Geology. DOI: https://doi-org.csulb.idm.oclc.org/10.1130/G52175.1

Hagedorn, B., Becker, M. , Silbiger, N., **Maine, B., Justis, E.,** Barnas, D., & Zeff, M. (2024). Refining submarine groundwater discharge analysis through nonlinear quantile regression of geochemical time series. Journal of Hydrology, 132145.

Holk, G.J., Francis, R.D. (2024) Fault-related mass transfer by crust: Integrated field, petrographic, and stable isotope evidence from East-Central Nevada. In: Riggs, N., Putirka, K., and Wakabayashi, J., eds., The Virtue of Fieldwork in Volcanology, Sedimentology, Structural Geology, and Tectonics – Celebrating the Career of Cathy Busby, Geological Society of America Special Paper 563.

Konrad, K., **Balbas, A.,** Finlayson, V. A., Jackson, M. G., Konter, J. G., Koppers, A. A., ... & Steinberger, B. (2024). Four distinct pulses of volcanism built the Melanesian Border Plateau: Implications for oceanic mid-plate superstructure formation. Earth and Planetary Science Letters, 626, 118549.

Konrad, K., Jackson, M., Steinberger, B., Koppers, A., **Balbas, A.,** Finlayson, V., ... & Price, A. (2024). Toroidal flow around the Tonga slab moved the Samoan plume during the Pliocene. Geology, 52(3), 176-180.

Martinez-Ardila, A.M., Pompe, L., Clausen, B.L., Paterson, S.R., **Holk, G.J. ,** and Luffi, P., (2023) A synthesis of the Peruvian Coastal Batholith: An exploration of temporal histories, causes of compositional diversity, and tectonomagmatic links in arcs. Lithos, v. 456-457, 107298. https://doi.org/10.1016/j.lithos.2023.107298.

Murad, C. A., **Pearse, J. ,** & Huguet, C. (2024). Multitemporal monitoring of paramos as critical water sources in Central Colombia. Scientific Reports, 14(1), 16706.

Quiroga, D. E., Currie, C. A., & **Pearse, J.** (2024). Lithosphere Removal in the Sierra Nevada de Santa Marta, Colombia. Journal of Geophysical Research: Solid Earth, 129(1), e2023JB027646.

Them, T.R., Meier, C.L., Tino, C.J., Knight, M.D., Hancock, L.G., **Behl, R.J.,** & Lyons, T.W. (2024) Organic-rich Shales Reveal Local Controls That Enhanced Mercury Accumulation During a non-LIP Interval of the Miocene: Implications for the Mercury Paleoproxy. American Journal of Science, 324, 15.

FROM THE GENEROSITY OF ALUMNI AND FRIENDS OF THE DEPARTMENT

All of the wonderful opportunities that we can provide for our students come from funding and support by YOU—our partners, followers and alumni!

Kraft Earth Science Endowment. Richard Kraft (MS 1988) has generously provided the money to establish this endowment that will provide money each year to support students in the field and for their research.

Darren Westby Spirit Award. Through the generosity of Darren's family and friends, this award honors students who embody Darrren's spirit of enthusiasm, ingenuity, and support. Darren Westby (BS 2023).

California Resources Corporation has generously provided funding for the **Urban Coast Fund**. This fund provides money for both undergraduate and graduate student to support their research related to the urban coast.

The **Johnson-Conrey Scholarship Fund** continues to provide support for three graduate students each year as they pursue their Masters Degrees. Current scholarship holders are:

Vincent Ruiz & Logan Light (advisor: Alyssa Abbey) | Edgar Villasano (advisor: Ben Hagedorn)

Please consider helping the Department of Earth Science with a contribution.

ALUMNI NEWS

Professor Emeritus Rick Behl must have picked the right time to retire. This year, he has been recognized with 3 major awards. The American Association of Petroleum Geologists (AAPG): the Grover E. Murray Memorial Distinguished Educator Award. The Pacific Section of the Society of Sedimentary (SEPM): the Eugene Fritsche Lifetime Achievement Award. The Pacific Section AAPG: Honorary Life Membership Award, it's highest honor.

Megan Ward-Baranyay, Masters, 2023, is now a PhD student at San Diego State University.

Demetria Lynn, Bachelors, 2023, is now an MS student at CSULB

Yousuf Al Sukaiti, Bachelors, 2023, is now a Masters student at Imperial College London.

Kenton Crabtree, Masters, 2023, Geologist for Berry Corporation, Bakersfield, was recognized with the Young Professional Distinguished Service Award by the Pacific Section AAPG.

Daniel Rice, Bachelors, 2024, is now the Treasurer of the Los Angeles Basin Geological Society.

Nader Tavassoli, Masters, 2024 is now Engineering Geologist Associate I for the City of Los Angeles. He was also named one of the top 45 outstanding Iranian graduates in 2024 by the Association of Professors and Scholars of Iranian Heritage (APSIH)

Save the dates for the **2025 Pacific Section SEPM Spring Field Trip**

March 7-9, 2025; Friday evening through Sunday ~noon

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FROM THE LAB & FIELD

POSTCARDS

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