

# The Dirt

*Dig into it...*

## Faculty & Staff Highlights

I am sure everyone recalls from their undergraduate days that Spring is an exciting time at CSUF Geological Sciences: Research Day, final exams, Graduation (May 18<sup>th</sup>) and field camp in June. We had a great Research Day in April. Special thanks to the South Coast Geological Society for providing awards and for President Fram Virjee (wife Julie) and Dean Marie Johnson for attending and their kind words. From a number of nominees, the faculty selected Janis Hernandez (B.S. '95) as the 2019 Geological Sciences Alumni of the Year. Put October 4<sup>th</sup> on your calendars for the Alumni Dinner and your chance to congratulate Janis.

Because of all of the ongoing and forthcoming changes, this last newsletter of 2018-19 is a faculty update. As mentioned earlier, Dr. Armstrong (and Tish Butcher) is retiring in August and moving out of state. Dr. Clemens-Knott and I will enter the early retirement program next year. See the photos below of students and Drs. Armstrong, Clemens-Knott and Knott at the Research Day farewell.

The search for a tectonophysicist was successful and we are happy to announce that Dr. Kathryn Metzger accepted the position. Kate will begin in August 2019 and teach geophysics, field techniques and field camp. Kate earned a B.S. from the University of North Carolina and a M.S. and Ph.D. from University of Arizona. We are excited to have her join the faculty.

It is not a change, but the College of Natural Sciences and Mathematics selected Dr. Sean Loyd as the 2018-19 Outstanding Untenured Professor. Well done and well deserved Sean.

Many people ask me: How many students are in the Department now? Officially, there are 106 undergraduate students along with 20 graduate students. Sixty-seven students are studying toward a B.S. in Geology and 39 students seeking a B.A. in Earth Science. In 2018, the Department had 13 first-time freshman enroll as majors, which is the most that any of us can recall. Recently I cleaned out the Chair's office and found a note from 2002 that there were 41 majors.

This year's field camp will be 24 students. The generosity of our alumni, faculty and friends allowed the awarding of five field camp scholarships from the Woyski, Cooper, Willoughby (2) and Alumni Field Camp funds that cover the entire field camp fee. Thank you all for your generosity. In addition, as part of the CSUF effort to decrease the time to graduation, seven students received CSUF summer completion scholarships that pays the field camp tuition. These students are either 1<sup>st</sup> time freshman who will complete their degree in four years or transfer students who will finish in two years.

Many thanks to the friends of the Department who generously donated in support of the students between December 1, 2018 and March 15, 2019:

Mr. Carlos Landaverde '08	Dr. Brady Rhodes
Mr. Steven Turner '05	Dr. Prem Saint
The Searchers Gem & Mineral Society, Inc.	
Mr. Thomas Kartrude '76	Dr. Sanjay Saint
Dr. Merri Lynn Casem	Ms. Mary Lacey
Dr. Jeffrey Knott and Dr. Diane Clemens-Knott	

I hope to see many of you at Graduation, or the Alumni Dinner in the Fall.

Jeffrey Knott, Chair



2019 Pacific Section AAPG field trip (l to r): Eddie Reyes ('19), Wayne Henderson, Lindsey Langer ('19), Priscilla Martinez ('20), Jeff Knott, Dan Loera ('03).

# Phil Armstrong...

This semester (Spring 2019) marks the end of my 20<sup>th</sup> year teaching at CSUF. And it is my last year – Tish and I are retiring after this semester. We've had a wonderful ride in the Department of Geological Sciences and will forever cherish the interactions with colleagues and especially our students. I came to CSUF because of the opportunities to work with students on high-quality research projects, which I've said many times has been and continues to be the best and most rewarding part of my job. I've advised/mentored 33 undergraduate and six graduate students on thesis projects that range from field intensive projects in Joshua Tree NP, Owens Valley, central Nevada, Utah, Baja, and Alaska. To lab intensive projects to determine cooling ages that led to understanding of mountain uplift in California, Alaska, and Utah. In the last few years I've been fortunate to work with nine undergrad students on a cool project along the Sierra Nevada Frontal Fault System in Owens Valley and below the highest peaks of the Sierra. All of these projects had incredible contributions from our students. Thinking about the times with y'all in the field and in the lab brings both tears and smiles at the same time.

The picture below shows my last three students (Joey Hernandez, Eric Fregoso, and Jackson Flanagan) and I hamming it up below Mt. Whitney near Lone Pine last spring. This was at start of their projects and before they realized how much work was ahead of them!

Tish and I are moving to Bend in central Oregon this summer. Bend has incredible hiking, biking, skiing (alpine and Nordic), beer drinking (22 breweries), and is ground zero for killer fly fishing. If you're ever in the area, give us a holler and stop in for a visit and some adventure.

*Cheers, Phil*



# Sinan Akciz...

After settling down to my new position in 2016, I accepted my first MS student, Nick Inserra in 2017 and started working on a USGS funded project along the San Andreas Fault in the Carrizo Plain. Nick did a great job in making the most of a network of trenches with a discontinuous paleoseismic record. He is getting ready to defend his thesis this summer after summer field camp and is looking for a job opportunity in the consulting world.

Since Nick, I have accepted 3 other MS students: Joey Hawkins who is working on the recency of surface ruptures along the Transmission Line Fault; John Eggers who is working on the surface slip distribution along the Santa Cruz Island Fault; and Joseph Gutierrez, whom I co-advise with my colleague Natalie Bursztyn, who is working on assessing the impact of 3D-printed geologic block models in improving spatial thinking skills.

All of this could not have been possible without the dedicated efforts of numerous undergraduate students who worked hard on their senior thesis projects and contributed to different components of these big projects.

On the teaching front, Quaternary Tectonics is back in the curriculum, and I am looking forward to my first paleoseismology class next Spring.

2019 will be the second time summer field camp will be mapping at Poleta Folds during the first two weeks of June. It has been quite an effort to transition into a course where we camp the whole time. But last year was a success, and I am looking forward to many more in the future.



## Nicole Bonuso...

The Evolutionary Paleocology Lab had a successful field season last summer. Our team consisted of three undergraduate students, Dr. Silvia Danise from the University of Florence and my trusty field assistant Kyle Williamson. We logged over 1000 meters of stratigraphic section in Central Nevada and counted and identified hundreds of invertebrate fossils. Eventually these sections will tell a story about how Middle Triassic marine communities respond to sea level changes.

This summer we plan to head back to our field sites to finish what we started. Can't wait to put the entire story together. On a personal note, our family has really taken advantage of the free National Park pass for fourth graders. We managed to hit 6 parks this year: Yosemite, Zion, Grand Canyon, Grand Teton, Yellowstone, and Joshua Tree.

Last but not least, the Kirbuso family added one new family member: Luna which brings our cat count to 3! We are ridiculously close to becoming a crazy cat family.



## Joe Carlin...

Dr. Joe Carlin and students in the Coastal and Marine Geology Lab (CMGL) have been busy the past couple of years, working both offshore and on land. Since 2015 the CMGL group has been working on a sediment provenance study in Monterey Bay that included collecting >30 sediment cores offshore over the course of 3 days in July 2017 (with 3 undergraduate and 1 graduate students), and collecting >90 surface samples from the beaches, rivers, cliffs, and watersheds surrounding the bay in July 2018 (with 3 undergraduate students). This project, funded by the American Chemical Society's Petroleum Research Fund, is looking to identify changes in sediment sources to the bay over the past several decades.

In addition to being on a boat and the beaches of Monterey Bay, Dr. Carlin has also teamed up with Dr. Kirby and colleagues at UCLA to collect cores from remote alpine lakes in the coastal ranges of Northern California. This work, funded by the National Science Foundation, has consisted of 2 field campaigns thus far in the summers of 2017 and 2018 with a final field season planned for this summer. During the past 2 summers we have pulled >20 m of mud from lakes with the help of 1 undergraduate and 2 graduate students, and driven more than 4,000 miles across Northern California and southern Oregon.

Finally, the CMGL group has also continued to work in local coastal wetlands in Upper Newport Bay, Seal Beach, and Los Penasquitos Lagoon in San Diego County. Additionally, we have just started a new project in a coastal wetland in San Francisco Bay. This muddy work has involved a number of undergraduate and graduate students over the past couple of years with projects looking at everything from paleo-earthquakes, to Holocene wetland evolution, to wetland response to sea level rise and carbon sequestration and cycling.

## Matt Kirby...

Cryptozoology? Fact or fiction. Well, here in the Kirby lab, we explore all kinds of facts and fictions. For the past 2 years, my students and I have spent weeks in the North Coast Range of California collecting mud from alpine lakes. Our research examines lake sediments for evidence of past climate change, specifically drought and floods. Of course, all this fact must be tempered with phantasmagorical fiction!

To this end, we have quietly searched the woods for the elusive, but assumed friendly, Sasquatch aka Bigfoot aka Forest Devil. Yes, my students and I extract meters and meters of lake mud, but always – always with a furtive eye for movement in the woods. For example, last summer at North Yolla Bolly Lake, Dr. Joe Carlin and I heard some strange noises and saw some scattered movement on shore. Note: we were safely aboard a coring platform in the middle of the lake.

I quickly dropped the corer in the lake – what's \$2500 worth of equipment versus a once in a lifetime photo of Giganto?? Although Joe begged me to think of the fact and avoid the fiction, I was helpless against the pull of the unknown. I snapped dozens of pictures. Later that night, we all sat around and gazed at the wonderous photos I had successfully recorded. It turns out that – in my lust for fiction – I failed to recognize that the noises and movements were nothing more than my students talking and walking along the edge of the lake.

We all had a good laugh. Do I regret my passion for fictional fact!! Never! In summary, I plan to refocus my field work this summer, keeping an eye to the sky for the terrifying Mothman.



## Jeff Knott...

Reading the synopsis from 2015, things have not changed much. I am still working out in Death Valley area and dabbling in tephrochronology. Undergraduate students (Ken Heitkamp '17, Grant Kennis '17, Eddie Jimenez '18, Amber Walker '18, Shayna Avila '18, Lindsey Langer '19 and Matt Pilker '20) have worked/working on paleolandscape reconstruction in the Death Valley area by examining basalt composition. Eddie Reyes ('19) studied spring flow in the Mojave Desert, including McDonald Well, which was a stopover for a Fremont expedition in the 1850's. Priscilla Martinez ('20) is working on tephrochronology of the Modelo Formation. Aaron Katona ('17) finished his M.S. thesis on the tectonic geomorphology of the White/Inyo Range.

I am completing a 1-year stint as Department chair in August. After that, I will retire and enter the early retirement program during which I will teach engineering geology and whatever else is needed in spring semesters. I have a project I have been working on for several years whose overarching goal is: How did the pupfish in Death Valley get where they are and when? Many of the undergraduate and graduate projects done over the years are part of this project. With any good luck I will complete this work in the next 5 years and then concentrate on my woefully neglected golf game.

The budget is so tight that Shayna (left) and Amber must share a hammer.



Grant Kennis (left) and Ken Heitkamp collecting a sample in Death Valley.

## Rich Laton...

It's hard to believe that I have reached 20 years of service at Fullerton. Thanks to everyone who has been keeping me busy over the years because the time has flown by! I'm having so much fun meeting new students, working with great colleagues, and trying new teaching methods... I anticipate at least another decade will pass before I begin to seriously contemplate retirement. As always, I have students working on projects ranging from Malibu to Mojave, from well hydraulics to aquifer testing, from modeling to sampling. Never a dull moment in the old lab!

Catherine and I sent our first daughter, Maggie, away to college this year to Cal Maritime (Tell the truth, who knew there was a maritime school in the CSU lineup?! ((She loves it!)). Our son William is a junior at Servite, and our youngest daughter, Helen is finishing middle school this year. We enjoy the challenges that all of these ages bring and are excited to see the kids test their wings. As a family, we enjoy traveling to see friends and family all over and heading out to the desert to find "cool rocks". I am still active with the National Groundwater Association and my alma mater, Western Michigan University. The volunteer work I do with these two organizations is fulfilling.

I've also been enjoying working with the department to organize our annual CSUF Geology Department Alumni get together which happens in October. It is great to see how well so many of our former students are doing. PLEASE, if you haven't attended yet – this is your year! Save the date: October 4<sup>th</sup>.



### Save the Date!

*CSUF Geological Sciences 7<sup>th</sup> Annual Alumni  
Dinner!*

*Friday, October 4, 2019 – 6:00 – 10:00 p.m.  
Location TBD*

## Sean Loyd...

The Loyd Lab has been involved in some very interesting research over the past year. Recent highlights include publication of former Masters student Kylie Caesar's work on salt dome cap rocks which demonstrates that unique microbial communities facilitate methane consumption in the US Gulf Coast subsurface.

Current Masters student John Hill has identified multiple sulfur isotope signatures that indicate microbial sulfur cycling as an important driver of economically extensive elemental sulfur formation in similar Gulf Coast mineral deposits.

Current undergraduate student Yasmeen De La Cruz and Masters student Mauricio Avila are exploring carbonate mineralization pathways and subsequent impacts on preserved organic matter in marine sediments. This work has, in part, led to the discovery that these carbonates form as a result of multiple microbial processes, similar to other minerals that are relatively extensive in the geologic record.

Masters student Bayne Westrick-Snapp and undergraduate Andres Bustos are investigating carbon phase and isotope geochemistry of middle to late Cambrian carbonates of the Western Great Basin. This time interval is particularly important as it directly post dates the Cambrian explosion of metazoan life, a profound and unprecedented evolutionary event in Earth history.



# Vali Memeti...

After all the buzz in the field and geochem lab the last couple of years, it has gone a little quiet in the Memeti lab this spring as everyone is currently writing. While the undergraduate students (Aly Angulo, Ryan Bremer, Celeste Flores, Rebekah King, and Jamie Hayward) are busy completing senior theses and thesis proposals, graduate students Melissa Chambers, Louis Oppenheim and Cullen Scheland and Vali are preparing publications on their field, geochemistry and geochronology results from their projects in and around Yosemite National Park.

A lot of this NSF-funded research has been focusing on mineral scale geochemistry to determine the size and longevity of magma bodies and the magma processes that occur along internal pluton contacts, and now we have some really cool results to write about!

For example, Melissa has determined using zircon ages and geochemistry she collected at Princeton University that K-feldspar megacrysts are magmatic crystals that grow over ca. one million year and grow large by getting recycled across plutonic units. She is preparing a manuscript for the journal *Geology*. The other project is looking into regional magma focusing during high flux arc magmatism in the central Sierra Nevada that yielded a publication in *EPSL* last year.

A USGS EDMAP grant funded Cullen's and two undergraduates' (Aly and Jamie) 8-week mapping endeavor in the Jack Main intrusion last summer.

Postdoc Ana Martinez is conducting mineral geochemistry research on gabbros from North and South America and just got her first paper published and another one submitted for review. And, although all students have been working really hard and doing an excellent job, Cullen was awarded the *University's 2019 Outstanding Graduate Student Scholarly and Creative Activities Award for the college of NSM*.

On other fronts, Vali has been working with former colleague and geoscience educator Natalie Bursztyn and her students on a geology app for Yosemite National Park, which will be published through TravelStorys. It is in the beta testing phase at the moment, but will likely go live this summer. Check it out at <https://www.travelstorys.com/explore-tours/> and let us know of any errors. Alumna Sierra Patterson, who is currently working for the USGS at Menlo Park, has also been busy working with Vali and alumnus Ryan McKay on publishing their cogstone thesis research they did as undergraduates two years ago. It is soon coming out in *California Archeology*.

On a personal note, Vali became a Mom in summer 2018 and took the fall off teaching. She has been having a lot of fun watching baby Sophie grow and learn, while she is trying to figure out a healthy work-life balance. Sophie is already rocking the handlens. Watch out Geol 303A students! She has set the bar really high for next semester!



Backpacking trip to the Jack Main Canyon intrusion in western Yosemite National Park with Cullen Scheland (left), Vali Memeti (center), and Melissa Chambers (right)



Geol 510T Physical and chemical evolution of magmatic arcs class trip to Joshua Tree National Park in March 2019. From left to right Vali Memeti, Jamie Hayward, Melissa Chambers, Joey Hawkins, Cullen Scheland, and Aly Angulo.



8-month Sophie Memeti-Paterson determining the mineral assemblage in the rock.

# James Parham...

In October 2018, James F. Parham (Assoc. Professor), CSUF students, and a former postdoc in the department described a new species of extinct walrus from Orange County and named it after the CSUF Titans. The new species is called *Titanotaria orangensis* and represents one of the most complete known fossil walrus skeletons in the world. Unlike modern walruses, *Titanotaria* lacked tusks and did not live on ice floes, although it was similarly huge (~3 meters long). *Titanotaria* was found in 1993 from the Oso Member of the Capistrano Formation Lake Forest.

In a 2017 study, Parham and his CSUF student collaborators dated these sediments at ~6-7 million years old using fossil horse teeth. Isaac Magallanes, the paper's lead author, earned his bachelor's degree in our department in 2017. Isaac is currently finishing his Master's degree at the University of Florida. Parham, alumnus Gabriel-Philip Santos '18 (M.S. geology) who is the paleontology collections manager at the Alf Museum in Claremont, and Jorge Velez-Juarbe, a former postdoctoral scholar in the Parham Lab and now marine mammal curator at the Natural History Museum of Los Angeles County, are the paper's co-authors. Their paper, "A New Tuskless Walrus from the Miocene of Orange County, California, With Comments on the Diversity and Taxonomy of Odobenids," was published today in PeerJ-The Journal of Life and Environmental Science, a peer-reviewed open-access scientific journal and can be found here: <https://peerj.com/articles/5708/>

You can read the CSUF news article about *Titanotaria* here: <http://news.fullerton.edu/2018fa/walrus-fossil-research.aspx>



Isaac Magallanes (BS '17) and James Parham studying *Titanotaria orangensis*.  
Photo by Matt Gush.



*Titanotaria orangensis* in action. A painting by Justin & Smile Studios.

# Adam Woods...

Hello Alumni and Friends! I started out the 2018-19 academic year by learning that I had been elected department chair starting in fall 2019. Looks like the upcoming 3 years are going to be eventful!

My students and I continue to work on reconstructing environmental conditions around mass extinctions. I have one graduate student (Austin Poncelet) who is finishing up his thesis examining the sequence stratigraphy of the Upper Ordovician – Lower Silurian Ely Springs Dolomite in order to better understand the nature and timing of the Late Ordovician glaciation and its role in causing the End-Ordovician mass extinction. My group also continues to work on Lower Triassic carbonates from California, Nevada and beyond to determine the role of detrimental environmental conditions in the recovery of life from the Permian – Triassic mass extinction. I currently have 2 graduate students (Anthony Macias and Ross Kovtun) completing theses on Lower Triassic rocks from the Western Canada Sedimentary Basin and Union Wash Formation of east-central California, respectively, as well as 2 new undergraduate students, Brandon Moerer and Sunil Shah, examining the trace element chemistry of a portion of the Union Wash Formation. If you want to learn more about the recovery from the Permian – Triassic mass extinction and see some really weird rocks up close, I am leading PS-SEPM's fall field trip to the Union Wash Formation this fall.

My family took our annual excursion to the Mississippi Gulf Coast and New Orleans last summer, and got to sample all of the local marine invertebrates in fried form and covered in hot sauce. The kids are doing well: Wyatt is finishing up 4<sup>th</sup> grade and has one more year to go before he starts Middle School. When not playing Fortnite, he is out playing baseball, or serving as chicken whisperer in the backyard to our 2 hens, Lucy and Peppermint Patty. Vivian is finishing up 2<sup>nd</sup> grade and is active in Girl Scouts, soccer, gymnastics, hip hop dance, swim team, and generally riding the back of the car from activity to activity. Bronwyn is doing well and is at Carollo Engineers working in their Stormwater Group.

If you're on campus, please stop by and say hello! It's always great to catch up with our alumni!





# Kathleen Davis...

From the desk of K2; Who is this??  
Kathleen Le Gare Davis

I have been with the Geology Department 12 years; 13 with the University. Since then.. given nick names... Dr. Davis, Kat, Katalina, and K2 along with traditional name – Kathy; My sons DJ and Dustin also gave me a nick name – Moogy means Mother; The Ferengi call their mom on Star Trek: “Deep Space Nine” .

On another note, I so much enjoy working faculty student and staff; Brian Killeen says I cannot retire til 2040. Wow!!

Actually took a few days off for a “real vacation”; Aruba! First time out of the country! It took me a few days to get the hang of relaxing... and not bad!!

Take care and have a great Summer!  
Kathleen (K2).....

# Leslie Hargrove...

It has been a little over 3 years since I was lucky enough to join the Geology family here at CSUF. Working with the students, faculty and especially the staff has been great! I could not ask for a better team. I have had the pleasure to work with 3 Chairs during my time, Phil Armstrong, Diane Clemens-Knott and Jeff Knott. All of them are retiring (along with Tish) and it will be bitter sweet. Jeff & Diane will still be around so I will still get to work with them. Phil and Tish are moving to Oregon and I wish them the very best and look forward to going up to Oregon and have Phil take me to some good fishing spots! I am looking forward to breaking in our new Chair, Adam Woods this fall.

I have 2 granddaughters that are my pride and joy! Spending time with them and all of my family is a big part of my life and I look forward to each and every time I get to see them.



My Granddaughters, Evelyn (7) and Eleanor (4)



# Brian Killeen...

My awesome adventure continues, working in the Department of Geological Sciences. Summer 2018 marked a new format for our GEOL 481, Field Camp capstone, welcoming full-time camping and mapping in central CA. I was lucky enough to join the group for several days at the midpoint, and our students were doing an incredible job as field geologists. And just 4 ½ years after joining this phenomenal family, serving the Students, Faculty, Staff, College and University, I am eagerly looking forward to a bright future for CSUF and our Geology Department.

Tentatively, the University is planning a complete overhaul of our 2<sup>nd</sup> floor home in McCarthy Hall beginning summer of 2020. It is sure to be cutting edge and help to continue the exceptional work of our Faculty, Staff and Students.

There have been some exciting milestones in my personal life. Tina and I are celebrating more than 22 years of marriage, my son Brendon is continuing his passion playing High School Baseball, and my daughter Brooke is completing her Freshman year in college, studying Biological Sciences at Cal Poly San Luis Obispo.



Field Camp 2018



# Matt Wilken...

Celebrated my 50<sup>th</sup> birthday on the rim of an active volcano. The edge of Kilauea was a fantastic spot to enjoy lunch at the Volcano house. Aloha!

