New Mexico State University
Department of Geological Sciences

Newsletter 2021

NM STATE

INSIDE THIS ISSUE

Editor: Reed Burgette
burgette@nmsu.edu

Front Cover:
Poppy explosion on the flank of the Organ Mountains
Photo: Emily Johnson

Back Cover:
View from the Sierra de las Uvas on the Monumental Loop bicycle tour.
Photo: Ronny Sholdt

Emeritus professor Bill Seager was honored with a lifetime achievement award at the 2021 Homecoming celebration. See page 3 for more. (Photo: Jeff Amato).

nmsu #givingtuesday

Giving Tuesday is November 30, 2021!
Support from alumni and friends helps student learning and research in many ways. See more information on page 6.

Message from the Department Head

What a couple of years it has been! The department, along with all of NMSU, went remote at Spring Break of 2020, making faculty scramble to put their classes online and students scrambling to learn how to learn topics like microscopy without a microscope! We persevered and made it through. Much of the department, including faculty and graduate students, moved back into Gardiner Hall in June 2020 using NMSU Return to Research protocols. And we moved full-time back on campus for the Fall 2021 semester. Although COVID has crept into our classes and labs, it has not been transmitted in the department, and department personnel have a very high vaccination rate.

We have had several changes to our staffing. Dr. Reed Burgette was tenured and promoted to Associate Professor (congratulations, Reed!). Dr. Emily Johnson has taken a leave of absence to try out a job with the USGS. And Dr. Jennifer Thines, who earned her BS Geology from our department in 2016, has returned for the 2021-2022 academic year to replace Dr. Johnson and Dr. Frank Ramos, who is on sabbatical.

Karen Hancock is our new amazing (and camera-shy!) administrative assistant. We share her with the Department of Geography, and she manages both departments well.

The most inspiring thing about this department is the way that everyone responded to the pandemic with creativity, energy, and minimum of complaining. Moving the Introductory Geology lab online was no small task; neither was starting to teach it face-to-face again. All our classes moved forward; students are graduating and finding jobs; faculty are publishing their research and submitting grants. It is a testament to the tradition of just-getting-things-done in this department!

Please feel free to contact me at nmcmilla@nmsu.edu or 575-646-5000!

Peace,

Nancy J. McMillan
Regents Professor
Department Head, Geological Sciences

Homecoming 2021

The highlight of Homecoming 2021 was presenting Dr. Bill Seager with the Department of Geological Sciences Lifetime Achievement Award. Dr. Seager started the geologic careers of so many of our students, both undergraduate and graduate, and is still making huge contributions to the understanding of the geology of the region….no one compares to him! We held a lovely banquet outside in a tent on campus, and honored him with a plaque, a framed certificate, many fine memories, and, yes, a cake designed to look like the Organ Mountains at sunset!

Saturday morning dawned cloudy, but intrepid field trip leader Dr. Brian Hampton, with help from Dr. Frank Ramos and Dr. Jeff Amato, led an interesting trip around the base of Picacho Peak to examine the Palm Park formation and the Robledo Fault, and to discuss the transition from Laramide compression to Rio Grande rift extension in southern New Mexico. Despite a bit of rain, a great time was had by all!

Congratulations to Dr. Seager, and thanks for all your contributions!

Homecoming field trip

The department is back in the field! Students, alumni, faculty, and friends explored the geology on the south side of Picacho Peak for the 2021 Homecoming field trip in honor of emeritus professor Bill Seager.

Southern Rift Institute

The Southern Rift Institute (SRI) was formed in 2017 to support interdisciplinary field-based student research in the southern Rio Grande rift. Our location in one of the premier examples of a narrow continental rift enables work on important questions about rifting processes and the evolution of the Rio Grande rift. Thanks to funding from department alumni and friends, the SRI continues to support student research projects.

SRI Faculty are actively pursuing geology projects in the Rio Grande rift:

Jeff Amato's student Michelle Gavel finished in 2019, but her work has recently been featured in two publications: A cover article in GSA Today (Ricketts et al., 2021), entitled "The origin and tectonic significance of the Basin and Range–Rio Grande rift boundary in Southern New Mexico," and the manuscript "Thermochronological transect across the Basin and Range/Rio Grande rift transition: Contrasting cooling histories in contiguous extensional provinces," published in Geosphere (Gavel et al., 2021).

M.S. student Ronny Sholdt investigating a carbonate soil capping a faulted alluvial fan.

Reed Burgette's MS student Ronny Sholdt is continuing progress toward assessing the late Quaternary deformation rate across the southern Rio Grande rift. He collected high-resolution topographic data with a drone and GNSS surveying to measure fault scarps from a transect across the rift. Ronny is wrapping up data analysis and writing his thesis with a goal of defending in the coming semester.

Earlier this fall, Brian Hampton welcomed new graduate student, Ethan Schneider (from Illinois State Univ.) to the research lab. Ethan will be working on determining provenance and sediment dispersal during the early, closed-basin stage of the Rio Grande rift. His strata of interest include the latest Oligocene–Miocene Hayner Ranch and Rincon Valley formations. Ethan's project builds on provenance results from a recently completed MS project in our group by Shay Ridl (now at Univ. of Iowa for his PhD). Second-year MS student Justin Friend (from Texas A&M) continues working to decipher secondary albitization trends from the Permian Abo Formation throughout New Mexico. Although Justin is not working directly on rift stratigraphy, he is considering what role rift heat might have played on diagenetic alterations observed in the Abo Formation.

We thank everyone who donated to SRI over the past year. We particularly want to acknowledge Mark and Kim Kroenke, Paul Matheny, and Joan Gardner, who have donated multiple times, and Steve Henry and Krys Swirydczuk, who are first time donors who gave a substantial donation this year! Much appreciated!

Your donations will help further student education and research on these important topics. See next page to learn how you can support the SRI.

Emily Johnson and M.S. student Mike Wyatt returning from sampling rhyolites. Wyatt is working on caldera volcanism with SRI faculty Amato and Johnson.

Consider Supporting the Department

You, our alumni, are amazing in the way you support the department's scholarships and other projects. Your enthusiasm for our students is well-known at NMSU as one of the best! And we, the faculty and current students, really appreciate your generosity!

Please consider a donation to one of these featured funds. If a fund you would like to support is not listed below, simply click here, click on the drop-down menu marked FUND, select SEARCH FOR A FUND NOT LISTED, and type in the fund. You will be directed to the correct page. Or you can send a check with the name of the fund on the memo line to the department at this address.

Department of Geological Sciences
Box 30001, MSC 3AB
New Mexico State University
Las Cruces, NM 88003

This year, we feature three funds that have a large impact on our students. A click on the highlighted link will take you to the appropriate donation page.

First, we are starting a new undergraduate scholarship to Honor Dr. Seager's Lifetime Achievement Award. We can start awarding the scholarship when the amount reaches $25,000. The fund is in the process of being set up. We will notify people on our email list once it is ready, and we will update information on a webpage about the Seager Scholarship. Stay tuned to hear about our progress!

Second, the Southern Rift Institute supports student research in the rift (see previous page). This fund makes it possible for students to acquire thin sections, geochemical and isotopic analyses, geochronologic and thermochronologic dates, and other important data for their graduate and undergraduate theses.

Finally, the Department of Geological Sciences Fund allows us to respond to greatest needs, whether they be laptops and card tables to help students transition to remote learning at the beginning of the pandemic, student travel, or simply response to daily crises.

Thank you so very much for considering a donation!

Field trips

Examining Pennsylvanian sedimentary rock of the Sacramento Mountains on a pre-COVID 2020 Tectonic Evolution of North America field trip

Students in the field observing Cretaceous strata, northwestern New Mexico

Students in the field observing Jurassic strata south of the Nacimiento fault, northwestern New Mexico

Field trips continued

Students in the field observing Pennsylvanian strata, Sacramento Mountains photo: Brian Hampton

The graduate Neotectonics class in the field for a mapping project on the Caballo fault, November 2021

Below: undergraduate students in the field, Robledo Mountains photo: Brian Hampton

M.S. student, laser enthusiast, and amateur wildlife photographer Jacob Piper captured images of a skunk family in the (near) field outside Gardiner Hall

Faculty Profile: Jeff Amato

Although there were no defenses from the Amato Research Group over the past year, Mike Wyatt is nearly finished with his research on the volcanic history of the Schoolhouse Mountain caldera, and he is currently working for a mining company in Alaska. Amato Research Group Alumni News: Michelle Gavel (MS '19) is working full time at the Alaska DGGS (their State Geological Survey). Sean Gaynor (MS '13) is still a post-doc in Geneva, Switzerland, and we are working towards publishing his thesis work on the 1.4 Ga magmatic event in New Mexico. Both Vanessa Swenton (MS '17) and Nick Richard (MS '19) are continuing their work in Ph.D. programs. Sarah Machin ('13) is now working at Los Alamos National Laboratory, as is Chelsea Ottenfeld ('15) and a host of other NMSU alumni. Colby Howland (MS '18) was last sighted at Golder and Associates, an environmental firm in New Hampshire. As always, I look forward to hearing from both undergrad and grad alumni, so please drop a line at amato@nmsu.edu and let me know what you are up to. Or you can drop me a line on Twitter (@ZirconsForever), like Antonio Serna (MS '06) did. He's still at Occidental Petroleum in Houston, where he runs the Production Geology Group for Texas Delaware. He has three kids and notes that zircon dating and provenance is getting more attention in the oil and gas industry.

Jeff Amato doing field work in May 2021 on the Armendaris Ranch near Truth or Consequences, with New Mexico Natural History Museum Director Spencer Lucas and NMSU Emeritus Professor Tim Lawton.

I'm working with two undergraduate students on research projects. Nicole Salladin is going to investigate the zircon ages of detrital zircons in Proterozoic metasedimentary rocks, and Paulina Burnside is working on dating rhyolite eruptions from the Mogollon-Datil event.

My ongoing projects are still numerous, and I have ambitious plans to make progress on publishing data collected over the past several years on the Precambrian rocks of New Mexico, Mesozoic rocks in Alaska, and the evolution of the southern Rio Grande rift. I continue to work mainly on using U-Pb dating of igneous and detrital zircons to understand tectonics. Together with Emeritus Professor Tim Lawton, I published the results of Sarah Machin's (MS '13) research on the age and provenance of the Beartooth Quartzite. This came out in GSA Bulletin in November 2020. My NSF-funded project studying the timing of extension in the Rio Grande Rift and Basin and Range resulted in three papers in the last year, one in Lithosphere (Reade et al., 2020), one in GSA Today (Ricketts et al., 2021), and finally, the grand summary in Geosphere (2021), with Michelle Gavel as first author: "Thermochronological transect across the Basin and Range/Rio Grande rift transition: Contrasting cooling histories in contiguous extensional provinces".

I'm still the Director of the Southern Rift Institute. We have had a banner year in fund raising, and if you are interested in helping to support student research on the Rio Grande rift, please see pages 5 and 6. Thanks to everyone who contributed this year.

In family news, Stephanie is now working for the non-profit group Environmental Education of New Mexico. Sofia is 13 years old and in 8th grade at Sierra Middle School where she is playing tennis and basketball in addition to excelling at all of her classes. Wesley is 11 and in 5th grade at Tombaugh Elementary.

Faculty Profile: Reed Burgette

The years since my last update have been eventful. I received promotion to associate professor and tenure, and we moved to Portland, Oregon, where Emily has taken a job with US Geological Survey. I spent last academic year on sabbatical, working on projects from home and pandemic parenting. I am back teaching this year, remotely in the fall, and in-person in the spring. The remote interaction technologies that emerged from the pandemic are great for collaborating with students and colleagues across the world.

We backpacked in the Indian Heaven wilderness of southern Washington in September. Mt. Adams is the volcano in the background.

In addition to making progress on projects on the Santa Susana and Sierra Madre faults in southern California, I am working on a project in the Kyrgyz Tien Shan started long ago during my Ph.D. This was motivated in part by a global seminar series on Tien Shan tectonics, another benefit of the new technology. I also participated in remote seismic hazard workshops, which led to my helping update geologic information for New Mexico for the coming update to the National Seismic Hazard Model. I have been working on late Quaternary rift deformation with current student Ronny Sholdt, who is completing his thesis while working for the state of New Mexico on groundwater issues. Ronny and I put together a presentation that I delivered at the GSA annual meeting in Portland this fall.

I was able to complete some fieldwork this summer with my current student, Brian Schrotenboer, who joined my group in Fall, 2020 after years working in the petroleum industry. Brian and I met and worked over Zoom for over a year before we finally met in person at the airport for fieldwork last summer! Brian's work is in collaboration with Kate Scharer at the USGS and funded by the Southern California Earthquake Center (SCEC). He is focusing on the Simi-Santa Rosa fault, an active fault in the area where my students Michael Reed and Jonathan Ingram worked previously. Michael is working on his thesis after a stint working for a major GIS company, and he was able to join us for several days of fieldwork. Brian and I presented progress at the SCEC meeting about reconstructing an air photo-based high-resolution historic elevation model of the Simi Valley area that predates development that now obscures faulting evidence.

Exploring geology and sea life on the Oregon coast.

Overall, we are doing well, and we feel fortunate to be healthy and contributing during the pandemic. It has been encouraging to see the students in our department succeeding and adapting to new learning and health practices over the past years. Our children are doing well, and enjoying third grade and preschool. In our free time we have been exploring Oregon and hiking, running, and skiing, although we miss the desert and our many friends in Las Cruces.

Faculty Profile: Brian Hampton

Despite Covid challenges, late 2020–2021 has been a productive period in the Basin Research Lab at NMSU!! This year, the group has been working on a range of projects in the Desert Southwest, U.S. Midcontinent, and Bolivian Andes. In addition to research and teaching, Hampton is serving as Vice-Chair of the *GSA Sedimentary Geology Division* and serves as Executive Committee Treasurer for the *NM Geological Society Executive Committee*. He is also working with colleagues to plan the *6th International Conference on Alluvial Fans* which is scheduled to take place in Las Cruces May 14–19, 2023.

Justin Friend gets a bird's eye view of the geology with a drone.

On the research front, M.S. student Shay Ridl successfully defended his thesis in late 2020 and accepted a Ph.D. position at the *Univ. of Iowa*. Shay and I are currently summarizing provenance results from his project for publication. Shay has plans in 2022 to conduct fieldwork in Italy for part of his Ph.D. project and we are excited to see his future research contributions! Rita Adamec completed an undergraduate project in our group and graduated with her degree in May, 2021. Rita accepted a M.S. position at the *Univ. of Alabama* this past fall (Congrats, Rita!). Both Shay and Rita presented findings from their projects at the 2021 *NMGS Spring Meeting* in Socorro. Current graduate student Justin Friend is making solid research contributions on his M.S. project. Justin started the second year of his project which is focused on determining the degree and extent of secondary feldspar alteration in Permian strata of the Ancestral Rock Mountains in New Mexico. Justin will present his preliminary findings at the upcoming *GSA Cordilleran Meeting* and *NMGS Spring Meeting* in early 2022. The Basin Research Lab welcomed a new graduate student (Ethan Schneider) this past fall. Ethan came to NMSU from Illinois State University and will be working on a project that will address provenance and depositional processes associated with latest Oligocene–Miocene closed-basin strata of the early Rio Grande rift.

Finally, **CONGRATULATIONS** to past and present members of the research group for awards received, manuscripts published, and life/family milestones accomplished this past year. Alicia Bonar (M.S.-2018) published a first-authored paper (with co-authors Hampton and Greg Mack) on provenance trends from the Permian Abo Formation in New Mexico. At the time of this writing, Alicia received news that she and grad-student colleagues at the *Univ. of Oklahoma* were awarded funds from *XPRIZE* and the *Musk Foundation* for their project on carbon removal. Congrats to Alicia and her group and we are excited to see the research products that result from this award! Shay Ridl received the award for *Best Student Presentation* at the 2021 *NMGS Spring Meeting*. Congrats to Justin Friend for research awards received in 2021 from *AAPG*, *GSA*, and *SEPM*. Hampton and colleagues published manuscripts in late 2020–2021 that addressed sediment dispersal trends in the U.S. Midcontinent (*Geosphere*) and Paleocene–Eocene evolution of the Bolivian foreland basin (*Journal of the Geological Society*). Finally, congratulation to Alicia and Cole Mount (M.S., 2018) on their recent engagement!

Great views of rift sediment on a Hampton-led field trip.

Faculty Profile: Nancy McMillan

Figure 1. A watermelon tourmaline from Marie Gibson's thesis.

Dr. McMillan's challenges in 2021 include helping Geological Sciences make the transition to face-to-face learning and research, mentoring five graduate students and one undergraduate researcher, and (gulp!) serving as interim department head of the Department of Psychology. Yep, she is juggling two departments through June, 2022, but is only teaching one class this year. It is very interesting to manage a different discipline with different expectations and traditions. And Geological Sciences absolutely does not pale by comparison….in fact, we lead in many areas such as interactions with our undergraduates and with you, our alumni!

McMillan's research continues to focus on provenance issues of various sorts, using Laser-Induced breakdown Spectroscopy (LIBS) as a tool. She and alumna Catherine McManus published a paper on diamond provenance, which you can read for free here. And what are all those students up to?

MS student Jacob Piper has developed an artificial intelligence decision tree that identifies common heavy detrital minerals using multivariate analysis of LIBS spectra. LIBS analysis of detrital minerals promises to be a more rapid method than physical separation of individual minerals. MS student Carrie Mullins is applying Piper's decision tree to a small drainage basin on the west side of the Organ Mountains, near Baylor Pass. She is comparing the minerals in modern sediments to those in exposed bedrock, and has demonstrated that it is possible to accurately identify the lithologic source of a mineral. For instance, the zircons from one formation are chemically distinct from those from a different formation. This project suggests that application of LIBS could be a useful tool in sediment provenance studies.

MS students Anna VanDusen and Marie Gibson are both studying zoning of tourmalines by comparing LIBS data to electron microprobe analyses. Electron microprobe can only determine the concentrations of major and minor elements, so the idea is to compare those concentrations with the intensities of those elements' peaks in the LIBS spectra. And because the concentrations are proportional to the LIBS intensities, we can trust the relative changes in LIBS intensities for all the trace elements, providing a rapid way to understand which trace elements are changing in significant manners.

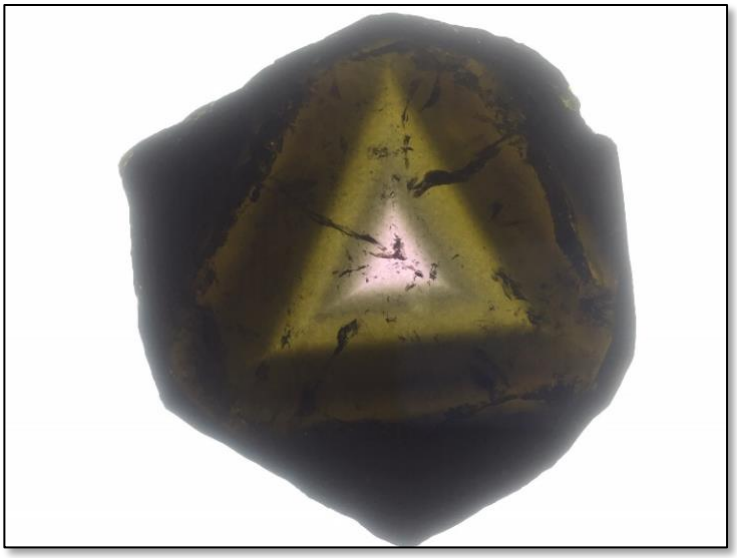


Figure 2. A liddicoatite tourmaline from Madagascar used in Anna vanDusen's thesis.

MS student Jose Marmolejo is doing something completely different. He is developing artificial intelligence models to identify abandoned mines using both satellite spectra and LiDAR data. NMSU geology students know there are a lot of abandoned mines in the state! The goal of finding them all is for remediation of environmental hazards.

Undergraduate Amber Rivera is working on a NASA-funded project through the College of Engineering that has the goal of investigating building materials on the moon that could be used to support human habitation. Rivera and McMillan are the geologists on the team, comparing Earth rocks used in the engineering studies to data from lunar rocks. It is always interesting working on interdisciplinary teams!

Faculty Profile: Frank C. Ramos

It was another exciting year for the Ramos research group as we ride out COVID. We had two new MS students join the group. Allison Mrotek came aboard in March of 2021 and is working on U/Th/Ra isotopes of ~3000-1200 year old volcanic rocks from Mt Taranaki in New Zealand. Michael Murphy, a recent graduate from Macalester College, joined us in August and will be working on dating sanidine from young volcanic rocks from Tenerife in the Canary Islands, Spain. Both projects are using cutting edge techniques and will be challenging, but Allison and Mike are already making lots of progress. Overall, the Ramos research group has never been bigger as these newbies will join Jenelle Hanson, David Morin, and Bryce Brown who are all writing the Discussion sections of their theses. In addition, Niko Martinez, Makayla Earnest, and Marc Westerfield are attending Ramos group meetings and thinking about potential undergraduate projects.

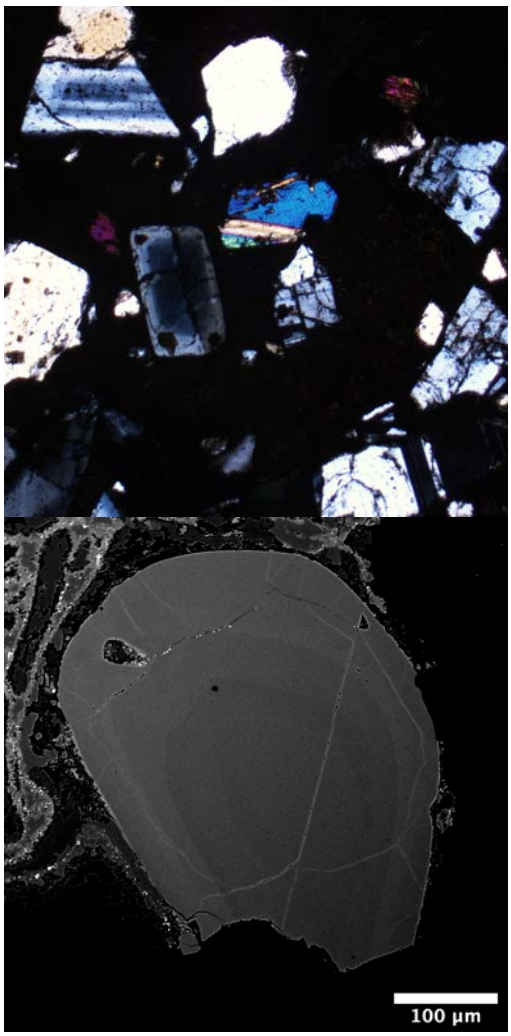
As far as graduate research, Jenelle Hansen has now dated 17 single anorthoclase crystals from a volcanic bomb ejected from the Mt. Erebus lava lake in 2016. One of her figures tracks Pb isotope variations of feldspar crystals from 500 to 2500 years in the past. Ramos has not seen a similar diagram for feldspar in all his years as a geologist. It is very exciting and she is using the Ra/Th dating of single crystals to evaluate magmatic processes at Mt. Erebus in new and exciting ways.

Bryce Brown is also focused on dating single anorthoclase crystals from young volcanic rocks from the Canary Islands, Spain. He is doing a reconnaissance study of four recent phonolitic eruptions. In fact, Bryce and Ramos actually made it to Tenerife in August for ten days where we met collaborators Dr. Joann Martí and Olaya Dorado-Garcia and sampled a range of young volcanic rocks for future MS projects. Bryce was excited to finally see "his" rocks in their volcanic contexts. He also spent many days discussing the volcanic relationships of eruptions on the island with Professor Martí who has over 25 years of experience working at Tenerife. Overall, five days were spent sampling in Las Cañadas caldera and four days were spent sampling historic basanite and tephrite eruptions on the northern and southern coasts of Tenerife. Bryce even made it into the Atlantic ocean… chilly to start but completely doable he says. Unfortunately the eruption on La Palma (a different Canary island) started after we had returned home.

David Morin is also writing up U/Th/Ra results for the youngest eruptions (<1100 years old) at Mt. Taranaki in New Zealand. We were ready to head to New Zealand to join the Taranaki research group there but COVID shut down our plans four days before our scheduled departure. David's work continued though and he is seeing some strange results in which whole rocks are in U/Th secular equilibrium while rock groundmass and host crystals reflect both U- and Th-enrichments. The results are challenging, unexpected, and will require some in depth thought to explain. Ra enrichments in the same rocks however attest to the youthful nature of these eruptions. Instead of meeting in person, the Taranaki research group (>30 individual scientists) meet via Zoom where David has presented his initial results. On the research front, it has been an exciting year with some pretty awesome results from our current projects.

In contrast to current students, we also have updates from recent and not-so-recent graduates. Nick Butterfield and Jake Buettner are still at Los Alamos National Laboratory. Nic Slater recently took employment with Unity Lab Services, the technical arm of FisherScientific. If we have big problems with the Neptune MC-ICP-MS, Nic may have to visit Las Cruces to service the mass spectrometer. Nic joins Darren Tollstrup, Ramos' 1st MS student from when he was at Washington State University, who is now the lead sales manager for FisherScientific in North and South America. Sean Scott is still at the Wisconsin Department of Hygiene in Madison operating a Neptune, but Sean is now Daddy Sean to a new daughter. Our congrats to him and Veronica (the boss). There is a rumor floating around that Corey Dimond now works with Jamie Shafer at the New Mexico Environmental Department. It still seems like a Ramos ex-group consolidation has occurred with many gathering in the Santa Fe area. In addition to graduate students, undergraduates Mariah Douds and James McClain recently graduated.

Faculty Profile: Jennifer Thines



I am excited to be returning to NMSU as a Visiting Assistant Professor for the 2021-2022 academic year while Dr. Ramos is on sabbatical. I received my B.S. in geology at NMSU before completing my Ph.D. at the University of Iowa. My research focuses on the geochemical evolution of large-volume silicic magmas from the Afro-Arabian large igneous province in Northern Yemen and East Africa. Large igneous provinces (LIPs), such as the Yellowstone Plateau-Snake River Plain and Siberian Traps, are the sites of short-lived, high-rate, large-volume eruptive episodes. The Afro-Arabian LIP saw a series of voluminous silicic eruptions ~30 million years. I use a variety of *in-situ* and bulk characterization methods to piece together the histories of these magmas and understand how they were formed, stored, and erupted. While I unfortunately did not have the opportunity to do any field work in my study area during graduate school, I was able to travel to labs around the country and learn about various analytical techniques.

As an undergraduate at NMSU, I had a wonderful time learning about the dynamic Earth processes and the local New Mexico geology. I am excited to share my love of geology with students and help them form their own fond memories of NMSU. This spring I will be teaching Igneous & Metamorphic Petrology for undergraduates and Analytical Geochemistry for graduate students. I am looking forward to exploring the cool rocks around Las Cruces with students and giving them some hands-on experience with different analytical instruments.

Top: Photomicrograph of feldspar and clinopyroxene from an Afro-Arabian rhyolite.

Above: Scanning electron microscope image of a zoned K-feldspar.

Right: Jennifer at the 1961 Vikrahraun flow at Askja, Iceland

Fieldwork near and far

Brown in Canaries: Bryce Brown standing in front of El Teide volcano, Tenerife Island, Spain.

Early COVID-era field work. Emily Johnson and Jeff Amato in the Rough and Ready Hills

Right: Brian Schrotenboer describing sediment below a late Quaternary terrace surface on the hanging wall of the Simi fault, southern California.

Below: Michael Reed climbing through Quaternary strata in the hanging wall of the Sierra Madre fault, California

Justin Friend and José Marmolejo staying distanced with Jacob Piper while exploring Lucero Arroyo, Fall 2020.

Staying connected during a couple challenging years

Jeff Amato and Brian Hampton paddling on the Rio Grande.

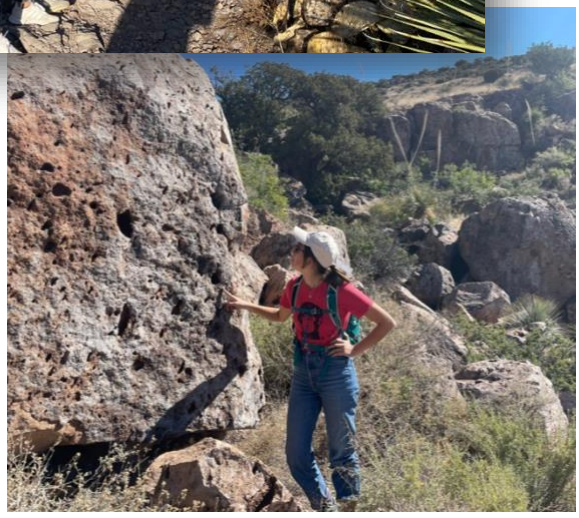
SRI Faculty and Visiting Assistant Professor Evey Gannaway Dalton (now at Utah State in Price, UT) enjoy beverages at Bosque, pre-COVID.

Above: M.S. alumni Alicia Bonar and Vanessa Swenton met up at the national GSA meeting in Portland in October. They are pursuing Ph.D.s at University of Oklahoma and Portland State University, respectively.

Below: Ronny Sholdt rode the full 256 mile Monumental Loop bikepacking route around Las Cruces in October

Closing out a year of teaching, research, & outreach

Graduate student Michael Murphy shares the myriad wonders and benefits of Geological Sciences, photo: Marie Gibson



Above: Honors geology course students observing Organ Mountains rhyolite.

Right: Undergraduate Paulina Burnside sampling rhyolite at Table Mountain, southwestern New Mexico
Photos: Jeff Amato

Closing thoughts

Thanks to all of the alumni and friends of the department! Please stay in touch, and let us know how/what you are doing! contact info at: https://geology.nmsu.edu

Special thanks to all of those who choose to include NMSU Geological Sciences in their charitable giving! The donations have an amazing impact on the next generation of geologists.
See page 6 for giving opportunities

Department of Geological Sciences
New Mexico State University
PO Box 30001, MSC 3AB
Las Cruces, NM 88003

https://geology.nmsu.edu

BE BOLD. Shape the Future.
College of Arts and Sciences