

THE COLORADO COLLEGE GEOLOGY DEPARTMENT



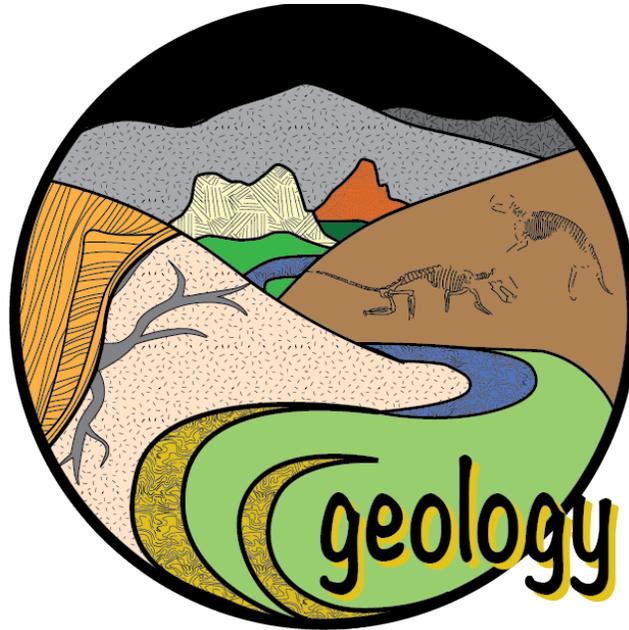
2021-2022
Volume XXIII

Thank you to Steve Weaver for 27.5 years with CC!

www.ColoradoCollege.edu/academics/dept/geology

**Cover Photo:
Great Sand Dunes National Park**

by Stephen G. Weaver



Colorado College Geology Logo,
by Professor Sarah Schanz

The Precambrian Basement

2021-2022

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Dear Geology Alums and Friends of CC Geology,

With newfound vigor following the years and months of pandemic distancing, the Geology Department is back in action! There are many developments to share. **Michelle Gevedon** joined the department, bringing her expertise in igneous petrology and isotope geochemistry, and an irrepresible love of skarns. **Sarah Schanz** is in her third year at CC, savoring an entire year of in-person interactions and habitual use of CC Geology's 'outdoor classroom.' Sarah received an NSF grant this year, which will provide her with a teaching release in Block 8, and the chance to jump-start the research on bedrock river channels (see below for news of the Block 8 faculty visitor). **Zhiyang Li** is well-situated as a full-year visitor in our Department, because the rock types he loves are so near at hand. He is an expert on mudstones, and considers the Western Interior Seaway sediments to be the formations with THE most appeal, in our local strat section, meaning there was no break in continuity, in respect to a Pueblo Reservoir project in GY305 Sed Strat. **Henry Fricke**, with great zeal, led our Department's work on curriculum revisions that maximize both on "who we are now" and "what motivates students to pursue studies in geology." I hasten to say that all of us faculty enthusiastically embraced this challenge, and... we did it! As of January, we revised the curriculum, got new courses on the books, and adopted new major requirements for 2022 and beyond. Henry is involved in a big joint NSF proposal with Denver Museum of Nature and Science—with lots of work to do at Corral Bluffs, the premier location that records the Day the Dinosaurs Died and The Rise of the Mammals (the titles of PBS NOVA specials that chronicle these events—check them out, if you somehow missed them!). Next up, is **Paul Myrow**, who is making the most of a sabbatical, this year. From what I know, Paul at this moment is in Argentina. But we all accept that Paul's state of rest is a state of motion. Over the past two years, it seems, Paul has also visited Myanmar, Thailand, southwest China, inner Mongolia, Vietnam, Svalbard, Spain, Wyoming/Montana, and, well, equatorial Gondwana (we can include that last, because the Early Paleozoic world, and its distinct sedimentation processes, is what links all those locales). Please read more about what these Geo faculty are up to—including the Esteemed Department Chair, who is me—in the following pages.



The 2022 Geochemistry class enjoying a well-earned lunch.

Now let's get down to what powers the program. **Mandy Sulfrian** is our mainstay in the main office, and she has such capacity that CC selected her to be Lead Administrative Assistant, with responsibility for training and assuring new employees across all programs. Pretty often, we get to see Mandy's sidekick, Charlie, around—and he is a generous source of teaching specimens. Thanks mucho, Mandy and Charlie! **Steve Weaver** is our long-serving technical director, and—there is a **feature on Steve** inside this newsletter, and loads of good wishes. Congratulations on your Geo accomplishments and all the best wishes for your impending retirement, Steve; we suspect that your photographic lexicon will now increase. Steve, in characteristic big-hearted fashion, negotiated the acquisition of a scanning electron micro-

scope in the Geology Department, from a medical equipment company that was upgrading to a new machine. What a parting gift, Steve. We are going to name the instrument "DreamWeaveMachine" in your honor!

The Geology Department also honors **Bob Winkelblech**, CC Transportation Director, in this newsletter. Bob's been coerced by PCB co-editors, India and Izzo, to share some vivid first-hand accounts of past adventures on Geology field trips. You're one of us, Bob, and **we thank you** for putting in all those road miles and roadside repairs, and for miraculously finding CC Transportation employees who were willing to do the same! Paraprofs **India Phillips '21** and **Izzo Steenrod '21** have embraced every logistical challenge and education task



Earth as a Physical System starting their 6-day field trip in the Medicine Bow Mountains, WY during Block 1.

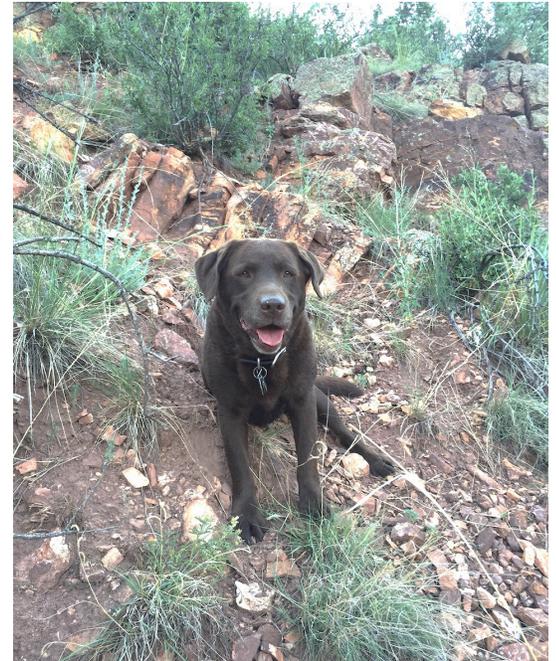
we've put in front of them, all the while in good spirits and building stamina for whatever will come next. They started off the year in Block 1 by wasting no time in racking up an enormous field food purchase, more than \$750. Thank you sincerely for all your good work this year, Izzo and India! Things around CC were so back-to-normal that we also got to employ a visiting paraprof for a block, **Claire Brandhorst '21** who aided Sarah Schanz in her fall course, GY320.

And more power to the program comes from you Alumni and Friends of CC Geology! Alumni gifts to Geology funded some key equipment that is central to our active geological existence. With donated funds, we were able to purchase a new field vehicle (to replace our old Forerunner with 203,456 miles on it), a carbon coater for preparation of samples to be analyzed using our new (second-hand) SEM, and the replacement of the Xray detector on our Xray diffraction instrument (which is getting heavy use from Henry and the Geochemistry class, at this time). The Noblett-Witter Family Internship Fund, entering its sixth year, complements Geology's equipment and research resources with opportunities for practical, applied employment experiences that acquaint CC students with career paths. For all your contributions and support, Geo Alumni, we are grateful. You help us strive in the geological endeavor, and to equip current geology majors with experiences that prepare them to grapple with the geological problems, societal trends, and rapid global change of the sort that only an earth scientist—accustomed to complexities and 'filtering' information to see the central narrative—can grasp.

Visiting Professor Emily Pope '04 and Riley Scholar Solomon Seyum, who—together with their kids Iris and Desta—form a family unit, have secured new positions and are making a move to California, this spring. Best of success as you move back to the Pacific Rim, Emily and Solo-

mon, and thank you for your presence and supreme contributions to CC Geology. Incoming to the Department in Block 8 is a returning visitor, Dr. Steve Quane, who will teach Intro to Earth Systems. Steve taught at CC for three years in the mid 2000s, and we are enthused to have this volcanologist and terrific educator back in the Department, following a period of employment at CC's Canadian sister school, Quest University.

My opener to the newsletter will close with these aspirations, that pervade all that we do: Within the CC Geology Department, we strive to be engaged and actively aware of racism both in academia and everyday life, counter racist expressions and behavior, and take collective action to ensure that all department policies, and practices are inclusive and equitable. We are members of URGE, a federally funded antiracism education workshop in geoscience, that guides Geology's ongoing work that contributes to Colorado College's mission to become an antiracist institution.



Pearl, you are such a Geology dog! We miss you and think of you on every outcrop we crossed together. -Christine

The CC Geology Department acknowledges that our educational programs are carried out on the homelands of the Ute Peoples and members of the Apache, Arapaho, Comanche, and Cheyenne Nations. These people occupied these lands when our forebears arrived, and these indigenous communities remain here today.

Please enjoy the newsletter, and . . . send your news to be included in the next PCB!

Sincerely,
Christine Siddoway
Chair, Geology Department.



Tava Peak (Pikes Peak) with Garden of the Gods



Land Acknowledgement

The Colorado College Geology Department acknowledges that our educational programs are carried out on the unceded territory of the Ute and other Native peoples and rely on networks of travel paths developed by their ancestors. We also acknowledge that, at their origins, Colorado College and our department are associated with resource extraction and land appropriation that have dishonored and diminished the traditional lifeways in this region. These practices displaced indigenous populations, degraded landscapes, and led to unequal distribution of wealth, health, and opportunity in the Rocky Mountain West. In recognition that the Ute and Native populations are living people with a present and a future as well as a past, we strive to honor their history and learn from indigenous knowledge of earth systems to create a more inclusive approach to inquiry. We will seek opportunities to redress the exclusions and erasures the Native peoples have endured.



Tava Peak (Pikes Peak)

2021 Antiracism Commitment

We commit to learning, listening and working to become an antiracist department and program, in order to offer a welcoming place of study and home-department for students of all backgrounds and identities. We acknowledge that a culture of racism often works unconsciously in our thoughts, actions, and words (Hill, 2008), and that without an active awareness of racism we as educators and learners may inflict harm. We recognize that the compositional diversity of the U.S. population as a whole is not represented among students and professionals in STEM fields, a disparity that is pronounced in the geological sciences. Addressing this limitation will strengthen earth science. Within the CC Geology Department, we are working to: 1) be engaged and actively aware of racism both in academia and everyday life, 2) counter racist expressions and behavior, and 3) take collective action to change, transform, or augment department policies and practices to be inclusive and equitable. We are participating in URGE, a federally funded semester-long antiracism education workshop in geoscience, that guides our creation of Departmental policies and actions that create an antiracist framework and contribute to Colorado College's mission to become antiracist.

Cited work: Hill, Jane H. 2008. *The Everyday Language of White Racism*. Malden, MA: Wiley-Blackwell.

Sarah Schanz

(Geomorphology)

Hello everyone! Geez, what a year! (How many years can I get away with saying that?) Here's some highlights of what I've been up to:



Research chugs along, powered by all-star student researchers. Sam Bower '21 wrapped up his thesis this year, in which he used a LandLab numerical model and chi-squared statistics to estimate the age of a large valley-blocking landslide in the West Elk Mountains, CO. Inspired by the landscape, I backpacked in this summer to collect samples for thin section and cosmogenics. We're hoping to verify Sam's age estimates with exposure dating. Highlights of that trip include discovering I have terrible July pollen allergies and that Oliver the dog does not enjoy rock hammering (though he does not mind lounging on sunny rocks while we gently chisel away).

In later July, I returned to the West Elks with student Kira Ratcliffe '22. Kira is working on sediment dynamics in West Elk Creek, about 10 miles upstream of Sam's landslide. We measured ~1000 rocks for grain size, angularity, and lithology. We found grain size and angularity increase downstream, contrary to geomorphic theory, so now we are re-analyzing the landscape to figure out why this alpine system is behaving so strangely. Colorado weather outdid itself for us for field work: the trip started in sun, turned to a thunderstorm that sat above us for a few hours while we huddled in a copse of trees, and then rained for another 18 hours. A great way to break in a new tent.

Over last spring, Peyton Colee '21 finished her senior thesis on earthflows in Washington State with some nifty GIS work analyzing directional surface roughness; we re-formatted

her thesis in early summer and submitted it for publication in *Earth Surface Dynamics*. We're currently waiting in round two of peer review, and presented our results at AGU remotely in December.

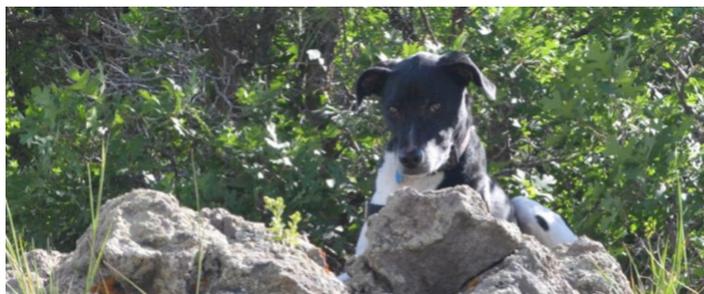
My first NSF proposal was submitted and funded last year!! Building off work from my postdoc, CC students and I will be studying meandering bedrock rivers with collaborators at Indiana University. Field work and computer modeling gets started this summer, but preliminary results are already pouring in! Iván Beck, OBE '23, spent J-block preparing a dataset of bedrock and alluvial rivers that Parker Rehmus '22 analyzed in Block 5 through GIS work and numerical modeling.

On the teaching end, I started the first of hopefully many years visiting the Sangre de Cristo Mountains with GY320. We spent two days investigating glaciation, faulting, and river processes in North Crestone Creek. We surveyed boulders under rustling yellow aspen leaves and mapped glacial moraines; life doesn't get much better. I hope to continue visiting this area, highlighting a different valley each time and creating a really nice dataset on glacial legacy in rivers! Already we're getting some neat data: students in GY320 accurately estimated the age of fault activity near Villa Grove, CO, using survey data and numerical modeling.



GY320 students surveying North Crestone Creek, using proper protective footwear, of course.

This was also the second year that I taught in the First Year Programming (formerly FYE). I re-taught a seminar exploring the “Beginnings of the Anthropocene”; this was a fun opportunity to look at local field sites with a new perspective, and consider how million-year-old rocks can be used to argue for/against a new epoch! Fun times included trying to re-create Eleven Mile Canyon in the department stream table, with surprising accuracy.



“Please stop being so loud, I am trying to nap.”
—Oliver in the West Elks

On the home front, not much has changed. Trevor and I spend most of our free time hanging out with dog Oliver and hiking. Our families road-tripped out here over the summer and we spent a few days showing them the local rocks and brews. After getting vaccinated and boosted, we felt comfortable flying to see family for holidays, and spent Thanksgiving in sunny Santa Barbara and Christmas in snowy Seattle.



Henry Fricke
(Geochemistry)

Hello From the Garden Level of Palmer Hall! It feels like 2021 went by very fast; I never even got used to writing it on my checks (yes, I still write checks and no, I'm

not 100). Much of the action in my life was outside of the office, and not just because of Covid. On the work side, I started 2021—my 21st year at the CC! —with a half-year sabbatical from teaching and from committee and administrative work of any kind. This

allowed me to stay home and focus on 2 manuscripts that are very close to the submission stage, and 2 others that now look like papers rather than a list of bullet points. The former represents a new research direction for me, as both center on soil processes and the development of new proxies for interpreting the geochemical characteristics of paleosols. In one paper I argue that the traditional approach of using the ration of soluble to insoluble ions in soils to infer mean annual precipitation is somewhat misguided, and that these ratios relate more directly to evaporation minus precipitation (E-P) at seasonal and monthly timescales. In the other paper, I develop a brand-new carbon isotope proxy for recognizing the occurrence of methanogenesis in ancient soils and thus of studying floodplain hydrology. A by-product of this work is the realization that soil-respired CO₂ in water-logged soils may have carbon isotope ratios that are much higher than typically assumed in paleoenvironmental studies. You can't call me a paleopedologist yet, but I guess I'm leaning that way (although the less we speak of paleopedology the better; it sounds creepy). My other leanings remain the same as before, that is towards dinosaurs and the reconstruction of the late Cretaceous landscapes and ecosystems they occupied, and this is the focus of the other 2 manuscripts that are not as far along. In addition to writing, I spent part of my spring sabbatical working with the rest of the department to revise our curriculum considering the department's renewed commitment to DEI work and in light of having two new faculty members. As part of this process, I helped organize a NAGT (National Association of Geoscience Teachers) Traveling Workshop in the spring of 2021 during which the department worked with outside facilitators to review & revise the goals & learning outcomes, and I was a participant along with other faculty in CC's URGE (Unlearning Racism in the GEosciences) discussions and in the drafting of several program deliverables



A happy (if slightly sunburnt) Geochemistry class returns from a long day in the field.

related to this 16-week program. These have been really rewarding projects to work on, and I'm excited to see our 'talk' turn into some 'action' over the coming semesters. Away from CC, the first half of the year was emotionally draining, which may be a reason it went by so fast. After struggling with dementia for several years my father passed away, and I was making many trips back and forth to PA during the height of the Covid lockdowns to help my mom. At the same time Eli was still going through the ups and downs of starting his college career in endless quarantines, and was considering leaving, while Annaliese spent countless hours planning her own move out of the house (to attend college herself). Overall, these ups and downs, and in particular the slow journey of becoming an 'empty nester', were more challenging than I imagined they would be, and I really started to feel the 'age' in middle-aged.

Fortunately rebounds from many of the mid-year lows have since taken place. Eli spent the summer working outside as a fly-fishing guide before returning to a more open college campus, and he is now thriving as an English-Government double major. Annaliese's hard work in school and on the court helped get her admitted to Williams College where she is excited to join the volleyball team and jump into new classes, and an end-of-summer trip to Mexico with two other couples provided Erin and I a wonderful

and relaxing glimpse of the upside of being empty nesters. At work, the start of the new academic year at CC gave me the opportunity to incorporate the Department's new learning outcomes into my courses, in particular GY150 'Environmental Geology', which I taught twice. This new version of an older course uses the understanding 'hazardous' events and earth resources as the rationale to dive into processes of the rock cycle and larger earth system while still retaining many of the traditional components of GY140 (e.g. investigation of the local strat section, field trips to look for evidence of hazardous processes & materials formation = rocks, etc.). 'Tweaking it while teaching it' was a fun (and a bit stressful) challenge, but students seemed to like the new emphasis. It was also a lot of fun to co-teach GY211 with Michelle during her first semester on campus, and I look forward to turning all responsibility of the Department's extensive rock, mineral and thin section collections over to her ASAP. Well, I think it's time to wrap this up, and in honor of my ~ 20th anniversary at CC I want to do so with a thank you. In particular, I want to thank all of the students I have had the genuine pleasure of spending time with over these two decades. There have been bumps in the road for sure, and it may have never seemed obvious, but you are what makes this job a pleasure day in and day out, and for giving me this I am deeply grateful. Take care, Henry.



The new GY150 class learning about mine tailing remediation in California Gulch near Leadville, CO.

Paul Myrow(Sedimentology/
Stratigraphy)

Best wishes to everyone from my bedroom, where I have been in quarantine for the last eight days with Covid. Somehow, I thought I would be the one to avoid ever getting it! Hubris on my part. Oh well, the mighty have fallen, although the cabin fever has been worse than the symptoms (relatively mild).



What a year it was...including a real surprise, namely marriage last April to a wonderful woman from Argentina who I had first met back in 2010. A small wedding during Covid in my hometown in upstate New York. We mostly stayed put in Colorado through the summer and then moved to Pasadena and Caltech for the academic year for my sabbatical. We live just off campus of Caltech, and we are enjoying the California life and all that L.A. has to offer (insert jokes here!).

This year I had three field expeditions to northern Wyoming and southern Montana to work on Devonian strata with recent alumnus Mingxi Hu '21, who is now a graduate student at Washington University. We recently published our second paper from this work with an Argentinian and a Polish colleague, and have another manuscript nearly finished. The latter is covering multiple Devonian and Mississippian formations. I also helped lead an Agouron Institute field excursion to the northern Bighorns with Caltech professors John Grotzinger (father of last year's paraprofessional Heather), Mike Lamb, and CC alumnus Woody Fischer '00. On a separate front, I am also working on Ordovician through Devonian strata in areas close to Salida, with my

student Max Sandweiss '22. Part of his thesis includes work on the Williams Canyon Formation outside of Woodland Park and at its type section in Manitou Springs. He has carbon isotope data from various units as well as U-Pb detrital zircon data.

I am also working on an NSF funded project to work in Myanmar, Thailand, and southwest China, which is linked to our IGCP Project 668, entitled "Equatorial Gondwanan History and Early Palaeozoic Evolutionary Dynamic". Our field work is on hold given the political problems in Myanmar and the Covid epidemic, but it has given us more time to write up results from data that we had already collected. I spent the fall working with my long-time collaborator from UC Riverside, Nigel Hughes, on a book chapter that summarizes the Ordovician of the Indian Subcontinent, and we plan to work further on a book (under contract) on the Cambrian of the Himalaya. Additionally, I helped a past advisee Tim Gibson '10, presently a postdoctoral fellow at Yale, on a manuscript, and I have a paper in press with past postdoctoral fellow and longtime colleague Jitao Chen and CC alumnus Anne Hakim '15 on deep-sea deposits in Inner Mongolia.

I finally finished restoration of my 1967 Ford Galaxie 500 convertible, and I am thinking of my next car project since that one was so fulfilling (read: really hard!). I am also trying to



finish up the artwork for the next CD of my music, which has been sitting ready to go for quite some time. Finally, I am learning Spanish on Duolingo, and it is going steady but slow. Adios amigos and keep in touch!



Zhiyang Li
(Visiting Professor
Stratigraphy)

Hello everyone! When I am writing this, it occurs to me that it is about this time last year when I applied for this Visiting Assistant

Professor position in sedimentology in the department. As I first saw the job advertisement, I felt the post was written for me. And I was super excited that I was offered the opportunity to join this wonderful department.

Since last August, I have enjoyed working and teaching at CC, both in the classroom and field. I am amazed by the enthusiasm, creativity, and curiosity of all the students I have met in different courses so far. Co-teaching GY212 in Block 1 with Christine was “eye-opening”. The field trip to Wyoming was a lot of fun. The students were willing to take on any challenges.



Lucas Bush '24, Grace King '24, and Ben Roche '24 “zealously” digging for fossils in the Mowry Shale during a field trip to Wyoming in GY212. I never expected to see students enjoy digging into shales as much as I do so soon in my career.

And I am particularly proud that all the students have successfully and “fearlessly” applied the backstripping method to the data they collected from the field. I couldn't have enjoyed teaching GY305 more. The field trip to the Pueblo Reservoir State Park was very reminiscent because I have spent some time looking at the Greenhorn Formation there

during my Ph.D. And it was great to visit and contemplate these classic outcrops with students together (many questions remain unanswered!). The four-day trip to western Colorado and south-central Utah was very successful and rewarding. Thank you, Paul, for providing all the detailed information about the outcrops. We have seen many exciting features at all stops, and it was particularly fulfilling to see students start to connect everything through the trip. On the last day of the trip, we visited many nice outcrops along Hwy-24 west of Hanksville, where I have spent so many field seasons.



GY305 (Sedimentology and Stratigraphy) with quite the lunch spread at Factory Butte in Block 3.

Co-teaching GY140 with Sarah, again, surprised me how creative and vibrant the students at CC are. We visited many places around Colorado Springs, and I still couldn't resist smiling when thinking about the excitement among students at different field localities. During all the courses I have taught and co-taught over the last semester, I had one thought that every now and then popped into my mind. That is—I wish I had studied geology at CC during my undergraduate.

In my spare time (thanks to the block break and free block), I am happy that many results I presented in my job talk are now published. The study on the effects of mantle-induced dynamic subsidence in the Cordilleran foreland basin (CFB) is out in GSA

Bulletin. The careful synthesis of the high-resolution shoreline history in the Late Cretaceous CFB has just come out on Earth-Science Reviews. Currently, I am enjoying working with two students in the GY370 course (Sedimentary Basin Analysis). Each of them is working on interpreting geophysical well logs from one Laramide Basin. And I look forward to seeing more high-resolution reconstructions of the tectonic subsidence and sedimentation history of the Piceance and Denver basins during the Late Cretaceous. I am also picking up the project on the Greenhorn Formation. Many interesting things emerge when looking at these rocks in great detail, and I will attempt to develop a story that connects everything.

I look forward to teaching GY140 again in Block 7 and GY101 catastrophic geology in block 8. Learning together with the students at CC is always inspiring and fulfilling. And I cannot wait to see students start to develop the passion for geology and more concerns about our Earth. At last, I just want to say that I have enjoyed every minute working in the department, learning with students at CC, and living in Colorado Springs. And I wholeheartedly appreciate all the help and support from everyone in the department over the past year!

Michelle Gevedon
(Igneous Petrology)

I'm excited to be writing my first ever entry for the PCB, and even more excited to be here in the CC geology department as the new crystalline rock petrologist! As a scientist, I am interested in the igneous, metamorphic, and hydrothermal processes that link the creation and deformation of earth's crust, and that aid in the transport of vola-



Block 5 Igneous Petrology class in the field near Coto-paxi, CO.

tiles and metals. My petrologist's toolbox is filled with geochemical and mass-spectrometry techniques including high-temperature stable and radiogenic isotope ratios, including a range of geochronology methods, trace element geochemistry, and—as this year's crop of GY310 students will contest—lots of petrographic analysis! I have on-going research projects in the southern Sierra Nevada mountains and the Mojave Desert, both of eastern California. I'm currently wrapping up a project on the Cycladic Blueschist Unit exposed in Syros, Greece, and looking forward to launching a new project (fingers-crossed for the fate of a collaborative NSF proposal!) on the South Island of New Zealand this coming year.

I've come to CC after post-docs and my PhD work in Texas (at Southern Methodist University (post-doc) and the University of Texas at Austin (post-doc and PhD)), but I grew up in southern California and graduated from Cal State Fullerton (B.Sc. and M.Sc.), so I am thrilled to be back in the land of mountainous topography—and local crystalline rocks. It's been a blast getting to better learn the

local Colorado geologic history, and am cooking-up local research projects to launch in the coming year.

In the non-science corners of my life I enjoy spending time with my husband Steve, and our two dogs, Stella and Jasper, doing your typical outdoors activities (hiking, camping, and fishing). I have traditionally been more of a sand- and sun-lover than a snow-lover, and I'm still learning to appreciate the Colorado winter. We are avid baseball (Go Dodgers!) and hockey fans and have enjoyed attending the CC hockey games this year. I also love to garden and have quite the house plant collection (I brought along ~60 potted plants during our move from Dallas to Colorado Springs), and I enjoy baking (it's chemistry you can eat!) when I have the time.

This first year at CC has been fast-paced and lively as I get accustomed to teaching and learning on The Block Plan, and as we all transition back to in-person courses. I co-taught a block of Introduction to Earth Systems with Christine that involved a week of learning the connections between rifting and volcanism in the Rio Grande Rift and Valles Caldera in New Mexico, and co-taught a block of Earth as a Chemical System with Henry that took us into a cave and hunting for garnets and sillimanite on Wilkerson Pass, and had a spirited group of 17 students hone their petrography and petrology skills in Igneous Petrology during Block 5. I'm especially looking forward to Block 8 this year, when I'll teach the first round of what will be a new and reoccurring analytical methods course in geochronology; among other topics, this year's geochronology students will learn the ins and outs of zircon U-Pb geochronology and include an analytical session and visit to Stanford to use the SHRIMP-RG. I'm especially looking forward to developing new geology courses at CC, including a course dedicated to the mineral resources required for society's shift to renewable energy and away from fossil fuel resources.



Christine Siddoway
(Structure)

Instead of a written 'blurb' in text form... Christine provided her individual annual report in photo and video format!

Here are links to her 4-part entry:

- 1.) Video teaching along the Dakota hogback: <https://vimeo.com/690712127>
- 2.) Video slideshow of the alumni Antarctica trip: <https://vimeo.com/690712026>
- 3.) [Green Rock news report](#) (see also PCB page 19 in this issue) and Tankersley et al. (Matt Tankersley '19) publication preprint: <https://www.essoar.org/doi/10.1002/essoar.10509277.2>
- 4.) Photo from Antarctica



In December, I got to be back in the field with Michelle Segal Smith '98! We're pictured here with Michelle's close pal Heidi Vanderhoof (who I consider to be a long lost Dutch relative). We braved the heavy seas together also with their devoted partners Doug Smith and Kevin Maguire.



Steve Weaver
(Technical Director)

Another year as Geo Tech Director supporting the Geology Department has passed. Unfortunately as we all know, the COVID 19 pandemic

issues continued but the college did manage to return to more normal in person teaching which occurred with some restrictions including still limited fieldwork but generally we were able to return to most of our normal in person student interactions. Personally, much of my work centered on equipment and centered around getting a donated JEOL Scanning Electron Microscope with an Oxford EDS system installed and running in the department. A local company was upgrading their SEM lab and very generously donated their old system to us. It took a while to get it installed in the room next to my office in Palmer but by the end summer of 2021 it was done and is now available for classroom work and faculty and student research. More equipment news includes a coming replacement for our old Epsilon 5 EDS-XRF system with a new benchtop EDS-XRF system from the company that made our old system. It has been recently ordered and hopefully will be installed in late May or June. I am looking forward to that, as well as helping our new petrologist Michelle getting her lab and equipment needs for her research and teaching work set up and functioning.

I did manage to indulge some of my creative passion of landscape and nature photography with a mid-summer trip to Wyoming and Colorado and a winter break trip down to New Mexico to photograph the Sandhill Cranes and Snow Geese at Bosque del Apache NWR. As always, you can check out my work at my main website: www.stephenweaver.com and my photoshelter: <https://stephenweaver.photoshelter.com/>

Finally, I can also announce now that I am officially planning to retire from the department at the end of June this year after 27 and half years of service to this amazing department! It has been a pleasure and honor working and getting to know all you grads over the years and helping you on your way to all your successes and achievements. I am proud of all of you!

See pages 13-16 for a celebratory feature on Steve and read about the many positive impacts he has had on past students.

Mandy Sulfrin
(Academic Administrative Assistant)



It's been a busy year in the Precambrian Basement of Palmer Hall – time flies and it's now mid-January! Hard to believe! Colorado Springs hasn't gotten much snow this year so we're all hopeful that the snow in the mountains helps the water reservoirs for the next year. Charlie and I traveled to Maine in October – love it there! We bought some property near Acadia National Park and are hoping to retire there in four years. Not set in stone; who knows what will happen in four years?

Otherwise, it's been a quiet year for us – avoiding getting sick and working. Charlie has been traveling a lot the past year, working on a project in Nevada, looking for gold. So I've been taking care of the dogs and house and still enjoying working with faculty, our parapros, and students in the office. It's so nice to be back in person!

Hope all is well with you. Give a holler when you're in Colorado Springs or on campus. I'd love to see you and catch up!

Steve “Dream” Weaver: Retiring after 27 ½ Years with Colorado College Geology

“A real gem, industrious, dedicated, one-of-a-kind, patient, intelligent, generous, patient, amazing, kind, significant, beloved”



Steve “Dream Weaver” has been Geology’s Technical Director for 27 ½ Years, and is retiring this year! Alumni sent in memories and photographs to celebrate and share Steve’s invaluable contributions to the department and influence on each graduate. Thank you, Steve, for your patience, enthusiasm, and dedication, and we hope you enjoy these recollections.

“I have the unique experience, along with Dr. Dicky Heermance, of researching with Steve in the Summer of 1994 on our Keck Project in southern Oregon. Steve was the assistant professor on the project (he was teaching at Beloit College) with Stan Mertzman from Franklin and Marshall College, and was an amazing professor to work with. His breadth of knowledge of hard-rock geology was (and I’m sure still is) invaluable to us in our field work, and his guidance helped us ensure we were looking for every detail possible to develop a comprehensive map and understanding of the research area. Much like our Geology profs at CC, Steve has a personality that meshes well with the students, and he was very well liked. During our senior year (1994/1995), Steve was recruited from Beloit to become CC Geology’s Technical Director. I was one of the Paraprofs for the summer session in 1995, and I recall Steve being in the PCB getting to know the lay of the land. It’s

hard to imagine what CC Geology would be like without Steve. His role as Technical Director was significant in bringing the department into the 21st Century.”

—**Jonathan Zook ‘95**



Steve Weaver on a Regional Studies trip in the Canadian Rockies, 2000. Photo courtesy of Eric Leonard.

"I graduated in 2000. The computer lab was pretty different back then, as we didn't have laptops so we'd all go hang out in the lab trying to finish off our theses. No one knew quite how to use computers or find information very well except ol' Steve. When the coffee got the best of us and the sillies kicked in, we'd sing our anthem to Steve: 'Dream Weaver' but changed the lyrics just a bit: "ooh, Steve Weaver... I believe you can get me through the night" when he'd come and solve our computer glitches."

—**Meadow Koslen '00**



Geoday, 2000: Poster reads, "Steve: April Fools!!! Thanks for all your help! We couldn't have done it without you. The class of 2000". Photo from the paraprof office "wall archives".

"I have a memory, which is a testament to Steve's patience and dedication as an instructor. As part of my senior year project, I needed to measure the total organic content (TOC) of sediment samples from a glacial lake core. TOC was to be determined by pyrolysis using the in-house UIC CM 5012 CO₂ callometer (I only know these details because I still have my printed report). Steve was the one to show me how to use this contraption and let me practice loading it. He



Steve lake coring at Crowfoot Lake in the Canadian Rockies with Ben Gross '02 in winter, 2000. Photo courtesy of Eric Leonard.

must have told me ten times, DO NOT flip the sample in the instrument because it was a pain in the ass to clean. But Steve trusted me to operate the machine on my own. He left the room. I don't think he had even crossed the hallway before I flipped my first sample. I don't recall how long I waited before getting Steve because I was nervous about his reaction but I do recall that when I did tell him, he only sighed. I eventually did run all my samples but on another day. I can imagine I wasn't the only one to have made this blunder. Steve, I thank you for your quality instruction and patience. Your generous reaction to my mistake has stuck with me as an example of good mentorship."

—**Paul Bovet '03**

"Steve, Julia and I toured from CC to the California (via Zion NP), where we looked at the Bishop Tuff and obsidian domes and flows of the Long Valley Caldera, the Tuolumne Intrusive suite of Yosemite NP, the Sierra Nevada Batholith north of Lake Tahoe, Lassen Volcanic NP, and the Medicine Lake Highlands near Mt. Shasta. We completed the trip with a stop at GSA in Salt Lake City where we listened to a full session on the Tuolumne intrusive suite! Throughout the trip, Steve imparted his knowledge of petrologic processes, while making sure that every outcrop stop was planned to ensure the best lighting for optimal visibility. And of course, no trip with

Steve could ever be complete without a pre-dawn photo shoot with large format film (for Steve) and disposable cameras (Jenny and Julia) at Mono Lake! His gift of a Geology of the Sierra Nevada book containing Steve's own photos is a wonderful reminder of this class, and of Steve's enthusiasm to show us so many amazing places, and is something I still treasure. I tried to locate our 'Living the Dream-Weaver' powerpoint from the pizza lunch we did after this course but haven't been able to."

—**Jenny Haywood '06**



Steve Weaver, Jenny Haywood '06 and Julia Labadie '07 on the 2005 Igneous Petrology trip. The "Living Dream-Weaver" powerpoint from the trip has yet to be located, and any tips would be *much* appreciated. Photo courtesy of Jenny Haywood.

"Jenny and I had so much fun during our Igneous Petrology course with Steve. It was a dream course—we did some initial lab work (looking at thin sections, which we loved) then hit the road for the rest of the block—traveling and camping through Colorado, Utah and Northern California (and back!). We learned so much in the field—including how to get a great photo and think about the big picture. Steve was a huge inspiration to me during my time at CC—his genuine love for geology, enthusiasm for being in the field and teaching students, and his

admiration for nature in all forms were awe-inspiring. We saw some really beautiful places with Steve and connected what we were looking at with the processes that formed the landscape. We read papers around the fire, had lively discussions, and learned a lot about each other. What more could a geology student ask for?! I think it's why both Jenny and I went on to grad school :) Send my best wishes to Steve and congrats on this milestone! "

—**Julia Labadie '07**

"Steve Weaver, Ph.D. always strikes me as one of the most industrious people I've ever met. When not calibrating XRF, XRD and other department instrumentation, he's actively engaged in the analytical portions of CC student-led research and student learning. One of my most vivid memories of Dr. Weaver was on a field trip near Salida during Mineralogy in December 2004. It was close to zero degrees, and it took a righteous amount of courage to step out of our warm tents that morning, but we heard Steve's wake-up call, "It's a BEAU-tiful day!" that shattered the still mountain air and proceeded to ricochet off the canyon walls. It's hard to avoid field work when your professor has that sort of unrelenting enthusiasm—even in freezing conditions! I announce, "It's a BEAU-tiful day" on my field



Steve in Scotland during the Regional Geology trip September 2004. Photo courtesy of Eric Leonard.



Steve Weaver with Regional Studies in Iceland. In addition to being a talented Technical Director, Steve is known for his award-winning photographs, some of which can be found coloring the covers and pages of PCB issues, as well as on his main [website](#) and [photoshelter](#). Photo courtesy of Jeff Noblett.

trips to California, New Zealand, France, the Rockies (not as loud as Steve, but in the same tone). One of his other gifts is photographing nature. Right now, I'm admiring his 'Rocky Mountain Dawn'—an original archival ultrachrome pigment photographic print (2003). It's one of my favorite items from CC, a gift from the Economics Department that now hangs in my office. Thank you Dr. Weaver, for inspiring so many of us to search for the geological meaning in difficult to parse geochemical data, and for showing us how to appreciate the rugged beauty of the Rockies and Four Corners area of the USA."

—**Jon Rotizen '07**

"The immense patience he exercised when after working tirelessly to file down thin sections of petrified wood and epoxy them onto glass slides... I accidentally put them on the roof of my car before driving to bring them to the Denver Museum and they all smashed :/ Oops, so sorry about that..

Also waking up to him screaming "It's a Beeeauuutiful Day" every morning during our field trip to Death Valley will forever be seared into my memory—in the best way. Love you, Steve!"

—**Maisie Richards '11**

"Steve is a kind, patient, intelligent, and understanding human. There was a field trip where I was having a hard time and needed to depart early. Conveniently, we were literally an ocean away from CC so it was a difficult decision to make. Steve, however, was so incredibly understanding and went out of his way to drive me to the airport (mind you, it was 3-4 hours away from the field site... maybe 5 hours total due to the numerous glacial lagoon photo-op stops) and made sure I was safe and sound by taking me all the way to the security checkpoint of the airport. Steve made a safe space for me to talk, cry, sit in silence, or tell silly stories. He normalized the very real experience I was having and made me feel like my emotions and mental health were not burdensome. I will never forget this trek with Steve; I am so thankful for it. Steve is truly a one-of-a-kind GEM of a person. You are so appreciated and are a supercritical facet to the success of the department and the wonderful people who are a part of it. Here's to snapping pics and enjoying rocks for another 27 years! Neveah has an awesome grandpa!"

—**Liza Bering '19**



Steve in Iceland on the 2018 Regional Studies Trip, photographing. Photo courtesy of Eric Leonard.

CC Geologists are Goldwater Scholars

Cade Quigley '23, of Twisp, Washington, and Abby Roat '22, of Oakland, California, are two of 410 college students from across the United States to be named 2021-22 Goldwater Scholars. Both Roat and Quigley are geology majors and physics minors. The Goldwater Scholarship is given annually to sophomores and juniors who intend to pursue careers in the natural sciences, mathematics, and engineering. This is the second consecutive year two CC students have received the prestigious scholarship.



Abby Roat '22



Cade Quigley '23

See CC's News & Events page for more details about [Cade Quigley](#) and [Abby Roat](#) and their research.

CC Geology Student Mackenzie Boyd Starts Nonprofit

Mackenzie Boyd '24 started Project: Distributing Dignity in 2019 to address period poverty on the Pine Ridge Reservation and prevent students missing school because of the inability to afford menstrual products.



Read more at www.projectdistributingdignity.org or in the [news](#).

GSA Reunion: Portland, OR Oct. 2021



Fai Chanchai '20, Nancy Calhoun, Jen Pierce '95, JC Creveling, Tianran Zhang '19, Craig Lundstrom '87, and Claire Lukens '04 at the GSA reunion.

Sarah Schanz Receives NSF Grant

Colorado College Assistant Professor of Geology Sarah Schanz has been awarded a \$463,586 grant from the National Science Foundation for her project, "Collaborative Research: Climatic and Geologic Controls on the Threshold Conditions for Bedrock Single- and Multi-thread Channels." Working with Brian Yanites at Indiana University Bloomington, the three-year project will explore the phenomena of meandering bedrock rivers—those whose banks and bed are solid rock rather than gravel and sand—in order to study how they carve valleys and transport nutrients and sediment. The goal is to understand what geologic and climatic conditions are favorable for forming wide, habitat-rich valleys versus narrow, incised gorges.



Continue reading about Prof. Sarah Schanz's grant on [CC's News & Events page](#)

Christine Siddoway featured on BBC

Christine Siddoway presented at the European Geoscience Union General Assembly in April 2021 where she was interviewed by BBC about a dropstone her research team found in marine cores from off the coast of West Antarctica that holds clues to past ice sheet extent. The cores come from IODP Expedition 379 on the Joides Resolution. [See BBC article.](#)



New Scanning Electron Microscope in the Geology Department

A second-hand SEM was generously donated to CC Geology at the end of last year and is being used by both professors and students. .



Students in Michelle Gevedon's Block 5 Igneous Petrology learn to use the SEM.

New Forerunner in the Geo Fleet

The Geology Department replaced the old Toyota Forerunner with a new one this year, with help from CC Transportation. We welcome vehicle 949 into the Geo Fleet, and say farewell to the old one!



From left to right: The new Forerunner (949), the old Forerunner (right before its sale), the "new" van (916), the "old" van (850).

Antarctica Alumni Trip with Christine Siddoway



Christine and alumni on the cruise.

Colorado College alumni were able to visit Antarctica in with Professor Christine Siddoway in December 2021. They experienced some very stormy weather- which also preventing them from seeing the solar eclipse despite being in its path.

Geology Day

Saturday, April 3rd 2021 via Zoom

Nerissa Barling '21 "Post Eruption Long Range Displacement Ground Deformation Monitoring of Large Rock Fractures at Hawai'i Volcanoes National Park"

Peyton Colee '21 "Timing and volumes of earthflows in the North Fork Teanaway River valley to understand the genesis of salmonid habitats"

Mingxi Hu '21 "Sedimentology, Stratigraphy, and Carbonate Chemostratigraphy of Lower Devonian to Lower Mississippian Strata in Northern Wyoming, United States"

Blaize Adler-Ivanbrook '21 "Stratigraphy, Sedimentology, and Chemostratigraphy of Ordovician and Mississippian Strata: Canon City, CO"

Hannah Buchband '21 "Dropstone and Ice Sheet Model Constraints on Pliocene West Antarctic Ice Sheet Extent"

Jonny Norwine '21 "Kriging with Small Neural Networks: Lessons learned at the boundary of geostatistics and machine learning"

Cade Quigley '23 "Effect of Rock Mechanical Strength on Continental Rift Basin Geometries"

Abby Roat '22 "How does subglacial hydrology impact melt rates at the margin of Humboldt Glacier, north Greenland?"

Charlie Robinson '21 "Mechanical interaction between fractures and stiff chert inclusions"

Sam Bower '21 "Numerical Modeling of Landslide Dams - a Case Study in the West Elk Mountains, Gunnison CO"

India Phillips '21 "Using an isotope mixing model to investigate tyrannosaur dietary changes in inland and coastal environments"

Isobel Steenrod '21 "A stable isotope study of elemental cycling and floodplain hydrology before and after the K-Pg impact in the Denver Basin, CO"

Claire Brandhorst '21 "Faulting Along the Ute Pass Fault Zone: A structural analysis of minor faults along the eastern Front Range"

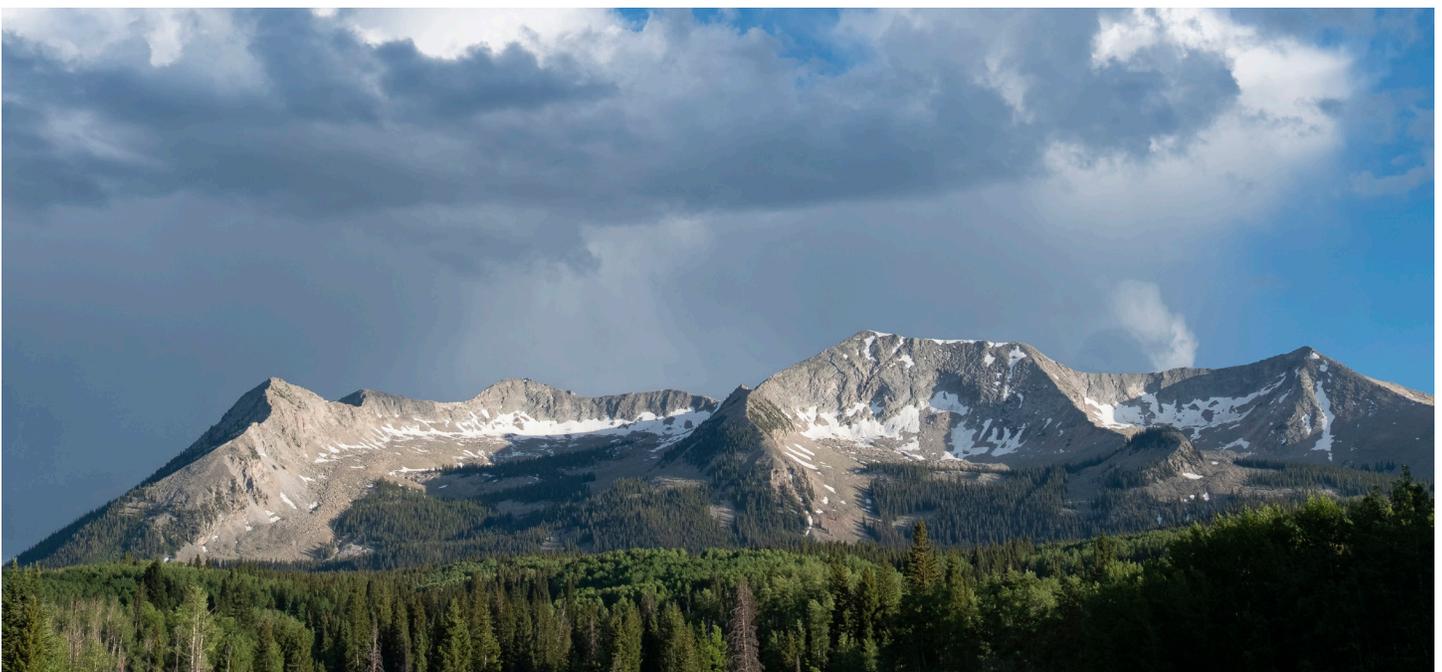


Photo by Stephen G Weaver

Department Awards

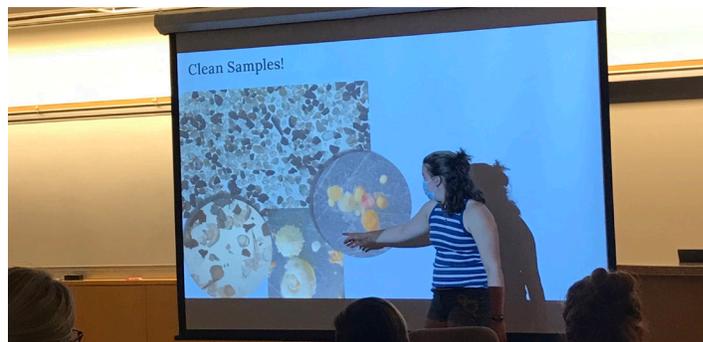
Annual Awards Presented at GeoDay 2021
Year: 2020-2021

Rocky Mountain Association of Geologists Award	Mingxi Hu '21
Association of Women Geoscientists	Nerissa Barling '21
Estwing Outstanding Senior Geologist	India Phillips '21
Rocky Mountain Association of Geologists McKenna Scholarship (for a junior the previous year)	India Phillips '21
Buster Scholarships	Max Sandweiss '22 Fiona Swope '22
Gould Scholarship :	Ren Carroll '22
Putman Scholarship Recipients	Helen Haddad '22 Ren Carroll '22 Clay Rodriguez Gould '24 Jack Henry Kent '24
Charles Rhoades Scholarship	Clay Rodriguez Gould '24 Helen Haddad '22
William A. Fischer Family Scholarship	Nora Wynn '22



Geology Gender Minorities Soup Night May 2021, socially distanced and BYOS (bring your own soup), but together in-person.

Student Seminar Series 2021-22



Fiona Swope '22 presents about her research.

Block 1: Sept. 13

Fiona Swope '22: "Marine Mud from the Atlantic Ocean to the Amundsen Sea".
(Read about Fiona's summer research on page 23)

Abby Roat '22: "Characterizing changes in 21st century subglacial hydrology at Humboldt Glacier, North Greenland".

Block 2: Oct. 18

Spencer Shaw '23: "Geomorphic Characterization of Fountain Creek: A Study of Planform Change and Channel Migration".
(Read more on page 24)

Nora Wynn '23: "Soundwaves on Seismometers: Detecting Infrasound from Repeating Explosions". (See more on Nora's research with Fransiska Dannemann Dugick '15 on page 38)

Block 3: Nov. 8

Cade Quigley '23: "Environmental Influences on Background Seismic Noise in the Alaskan Arctic". (See page 24)

Jackson Kohn '23: "Geogenic Trace Element Mobilization in Groundwater Aquifers of the Central Valley". (See page 25)

Block 6: Mar. 14

Mackenzie Boyd '23 and Emory Pollatsek '23: "Fossils in the Front Range: Dinosaurs in Denver". (See page 24)

Visitor Seminar Series 2021-22

Block 2: Sept 30, noon, Professor Juergen Scheiber, Indiana University Bloomington, "With One Arm Tied Behind Your Back Doing Geology by Proxy in a Faraway Place (Mars)".

Block 3: Oct 28, Dr. Danica Roth, Colorado School of Mines, "Postfire landscape response, seismic monitoring of surface processes and postfire sediment transport".

Block 3: Nov 12, noon, Philip Armstrong '07, North Star Renewables, "Where does the light in that lightbulb come from? Sources of energy and generation of electricity along the Colorado Front Range".

Block 5: Feb 2, noon, Dr. Evan Ramos, Post-doc Rice University, "Silicate Weathering in Warm Climates of the Past: A Tale of Two Laramide Basins".

Block 6: Mar 4, Dr. Daniel Ibarra, Brown University, "The Rise and Fall of Ancient Lakes in Western North America".

Block 7: Apr 1, Dr. Monique Holt, University of Illinois Chicago, "The Intersection of Science and Diversity, Equity, Justice, and Inclusion".

Block 8: Apr 28, Gabriella Rossetto-Harris '15, PhD Candidate Pennsylvania University, "Final gondwanan break-up, retroarc volcanism, and Eocene fossil rainforests in Patagonia: paleobotanic records of Southern Hemisphere biogeography and evolution".

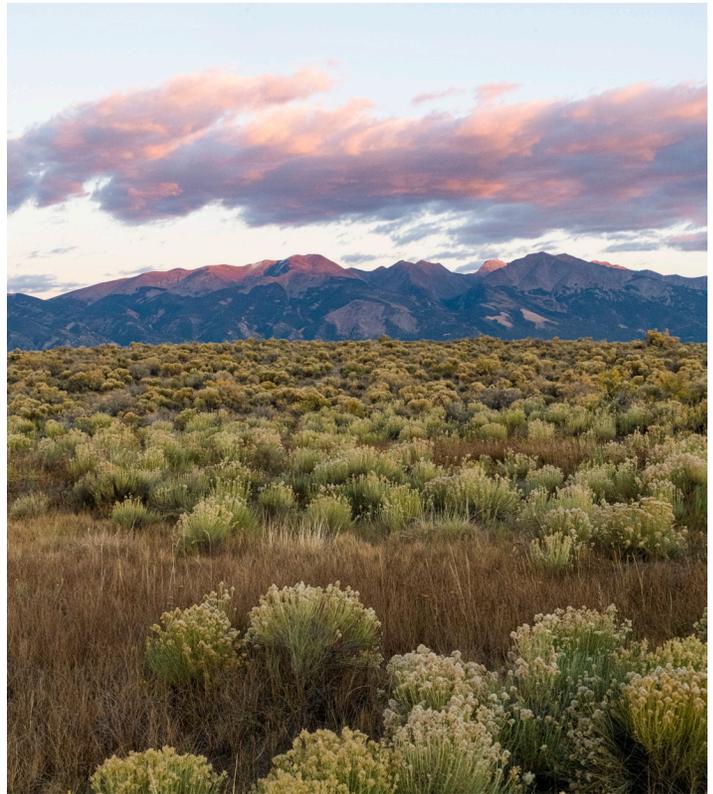


Photo by Steven G. Weaver.

Recent Faculty Publications

Myrow

[Review of Palaeobotany and Palynology](#)
[Sedimentary Geology](#)
[Geological Magazine](#)
[Sedimentology](#)
[Geological Magazine](#) (book review)
[Journal of Asian Earth Sciences](#)
[Journal of Paleontology](#)

Siddoway

[Earth and Space Science Open Archive](#)
[The Journal of Geology](#)
[Book Chapter](#)

Fricke

[Journal of Sedimentary Research](#)

Schanz

[Earth Science Dynamics Discussions](#)

Gevedon

[Geology](#)



Photo by Steven G. Weaver.

American Geophysical Union

New Orleans, Louisiana 13-17 December 2021

CC Presentations

Peyton Colee '21: Applying a new surface roughness metric to determine earthflow age, cause, and impacts on salmon habitat

Matt Tankersly '19 and **Christine Siddoway:** New Contribution to Ross Ice Shelf (Antarctica) Boundary Conditions: Basement Depths and Sediment Thickness Determined from Aeromagnetic Data

Ben Roche '23: Survey of Adirondack Metamorphic Temperatures Using Quantitative EDS Mapping

Cade Quigley '23: Environmental Influences on Seismic Noise Across the U.S. Arctic

Cade Quigley '23: Laterally Heterogeneous Crustal Mechanical Properties Control Early Rift Asymmetry

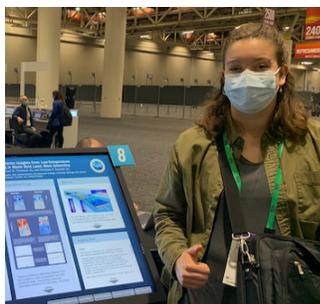
Helen Carter '20: A Methodological Study of Tourmaline Thermometry on a Suite of Metamorphic Rocks from the Picuris Range, New Mexico

Abby Roat '22: Characterizing changes in 21st century subglacial hydrology at Humboldt Glacier, north Greenland

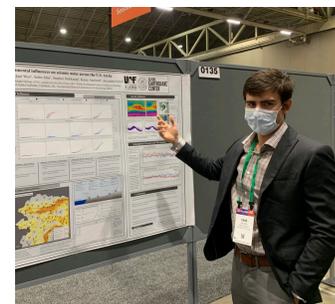
Jess Hebert '20: Geochemical Tracers of Fluid Transfer to the Mantle in Modern Subduction Zones



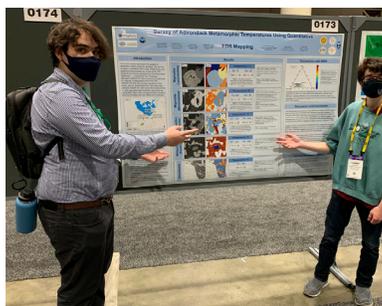
From left to right: Claire Lukens '04, Emma Marshall '16, Tom Ashley '12, Christine Siddoway, Zion Klos '09, Kathryn Baker '12, Tyler Doane '10.



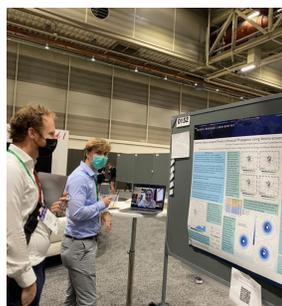
Fiona Swope '22 presenting her poster.



Cade Quigley '23 with his poster.



Ben Roche '23 (left) presenting at AGU.



Nora Wynn's '23 poster at AGU.



From left to right: Christine Siddoway, Zion Klos '09, Kathryn Baker '12.

Noblett-Witter Family Fund Internships

Summer 2021

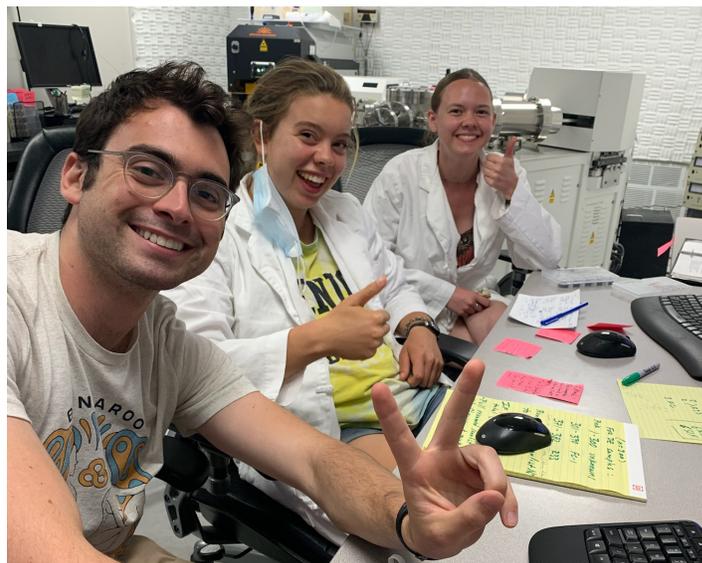
During the summer of 2021, students had internships in Colorado, Florida and Alaska. These internships were made possible by the generosity of Bill Witter '86.

Student	Organization and Position	Sponsor
Mackenzie Boyd '24	Denver Museum of Nature & Science	Tyler Lyson
Emory Pollatsek '23	Denver Museum of Nature & Science	Tyler Lyson
Fer Juarez Duran '23	Life on the Edge Lab (NASA): <i>Astrobiology Intern</i>	Amy Williams
Parker Rehmus '22	Neptune & Co: <i>Asst Hydrogeologist</i>	Aaron Bandler '11
Jackson Kohn '23	RHIZE Mountain Retreats: <i>Permaculture</i>	Misty Banta
Nora Wynn '23	Sandia National Laboratories: <i>Geophysics</i>	Fransiska Dugick '12
Spencer Shaw '23	USGS: <i>Hydrologist in training</i>	Laura Hempel
Cade Quigley '23	U of AK Fairbanks: <i>Seismic Noise & the Arctic</i>	Mike West '93

Student Research and Internships

Fiona Swope '22

As a research assistant for Christine Siddoway's NSF ICI-HOT project, I had the opportunity to accompany Christine's GY250 class to the University of Arizona's Laserchron lab. In Arizona, I helped the class collect U-Pb detrital zircon and (U-Th)/He apatite ages from cores drilled off the coast of Antarctica. On returning to Colorado, I began investigating the DeVicq Trough in West Antarctica and identified useful near-shore detrital samples from the Oregon State University Marine and Geology Repository that would yield apatite grains to perform geochronology on. Despite the closure of OSU due to COVID-19, I was able to continue research using Pecube, a 3D kinematic modeling software with the assistance of Jennifer Taylor, a PhD student at the University of Minnesota. My modeling results will be compared with future runs using the (U-Th)/He ages from the OSU-MGR samples to discover the timing of past deglaciation events of the West Antarctic Ice Sheet.



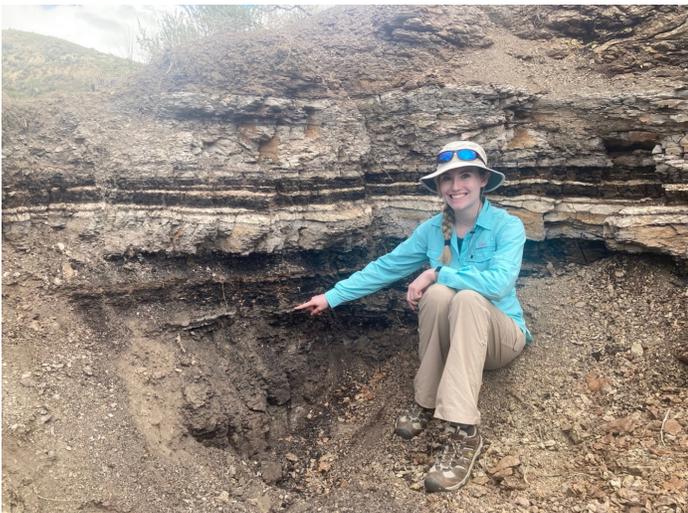
Fiona Swope '22 (middle) at the University of Arizona.

Fer Juarez Duran '23

Fer will be presenting at the AGU 2022 Astrobiology Science Conference in Atlanta, GA, in May 2022 on research he conducted while in Florida for a Noblett-Witter internship last summer: "Organics Detection from the El Tatio Geyser Field Digitate Stromatolites, with Implications for Organics Detection in Comparable Digitate Structures from Columbia Hills in Gusev Crater, Mars."

Mackenzie Boyd '24

This summer I participated in a 10-week Noblett-Witter internship with the Denver Museum of Nature and Science. I worked in the fossil preparation laboratory with two full time fossil preparators, Natalie Toth and Salvador Bastien and developed so many new skills. Everyone at the museum was kind and knowledgeable and it was a great learning environment. I was taught how to use an air scribe and an air abrader, how to make plaster jackets and archival cradles, and so much more! My biggest project was prepping a triceratops squamosal and partial parietal. I also got to spend time in the field with Dr. Tyler Lyson see the K-Pg boundary for the first time in person! I am so grateful to have had this opportunity and really enjoyed my time at DMNS.



Mackenzie Boyd '24 touching the K-Pg boundary.

Emory Pollatsek '24

I completed an internship at the Denver Museum of Nature and Science's paleontology lab with the preparators Natalie Toth and Salvador Bastien with support from the Noblett-Witter Family Fund. Over the course of internship, I used an air scribe and air abrader to prep and clean fossils and glue fossils together with epoxy, as well as build and cut the archival cradles used to store fully prepped fossils. While in the field, I helped break open leaf fossils and prospect for vertebrate fossils. Lastly, while in collections, I helped cata-

logue casts of fossils made by the museum and sort trilobite fossils that had been donated to the museum.



Emory Pollatsek '24 during their internship.

Spencer Shaw '23

I conducted Noblett-Witter internship-funded research with Laura Hempel PhD of the Colorado Water Science Center with the USGS. I collected aerial images spanning 66 years to create a long-term record of geomorphic change in Fountain Creek, Co. GIS analysis yielded interesting results with regards to channel migration responses to high flow events and subsequent recovery. Flow record analysis reveals an increasing trend of annual average flow which may be due to transmountain diversions bringing non-native water into the drainage via urban runoff and wastewater discharge. This provides an exciting point of future study and I plan to investigate developing urban area stream responses with Professor Sarah Schanz for my thesis.

Cade Quigley '23

This summer, I worked at the Alaska Earthquake Center (AEC) in Fairbanks, Alaska with AK state seismologist and research professor Michael West '93 and other geologists and professionals at the AEC, made possible by the Witter grant. I was tasked with identifying and characterizing controls on background seismic noise (i.e. microseisms) in the Arctic. My work involved using AEC and the Incorporated Research Institutions in Seismology

(IRIS) data repositories to identify the most important controls on seismic noise. During my internship, I was able to visit several AON stations in the Brooks Range via helicopter, which was an amazing way to inspire research and see the incredible Brooks Range and North Slope! I shared my findings from this internship and other research on continental rifting at the AGU fall meeting in New Orleans and GSA in Portland.



Cade Quigley '23 in the field in Alaska.

Jackson Kohn '23

Over the summer, I had the opportunity to participate in both a Noblett-Witter internship and an NSF-funded Keck research internship. My Witter experience took place at RHIZE Mountain Retreats in the mountains near

Victor, CO. While I was there, I worked to instill (and install) principles of permaculture across the property. This included building a large A-frame greenhouse/meeting place, digging drainages to supply the greenhouse with spring water, creating mushroom swales along north-facing aspects, and planting fruit bushes throughout the property. My Keck internship was based out of Fresno State and my collaborators and I investigated groundwater contaminants in the Central Valley. I was responsible for performing numerous chemical extractions on sediment cores to determine concentrations of uranium, arsenic, NO₃, and other contaminants. My group presented our findings at AGU 2021 in New Orleans.



Jackson Kohn '23 in the lab during his Keck internship.



Geology Gender Minorities Soup Night, October 2021—with two soup varieties!

GY400 Investigates Impact of Urbanization on Local Creek

For their Block 6 2022 class, Professor Sarah Schanz, and 4 students are conducting a geomorphic investigation of Mesa Creek with an end goal of delivering a technical report to the city of Colorado Springs. Mesa Creek is located only 5-10 minutes from Colorado College and drains the Mesa Road area, flowing through Sondermann Park and joining Monument Creek just north of Uintah. During the 1960's, the Kissing Camels Golf Course was built over the headwaters of the stream, and the watershed has undergone significant urbanization since then. According to the team, urbanization can have major impacts on sediment flux, flow regimes and biodiversity. These changes cause streams to deviate from previous patterns, potentially resulting in downstream infrastructure damage if left unmonitored. The students cited remediation work done in 2019 on another local stream, Pine Creek, as an example: surveying revealed a travelling headcut that may have caused several million dollars of damage had it been left unchecked.

What is the 2022 GY400 topic?

- ▶ Geomorphic analysis of an urban stream
- ▶ Development of a pre-construction baseline for the area
- ▶ Comparison between pre- and syn-urbanization of the watershed

Where is the research site?

- ▶ Mesa Creek in Sondermann Park
- ▶ 5-10 minutes from Colorado College



The GY400 student team...

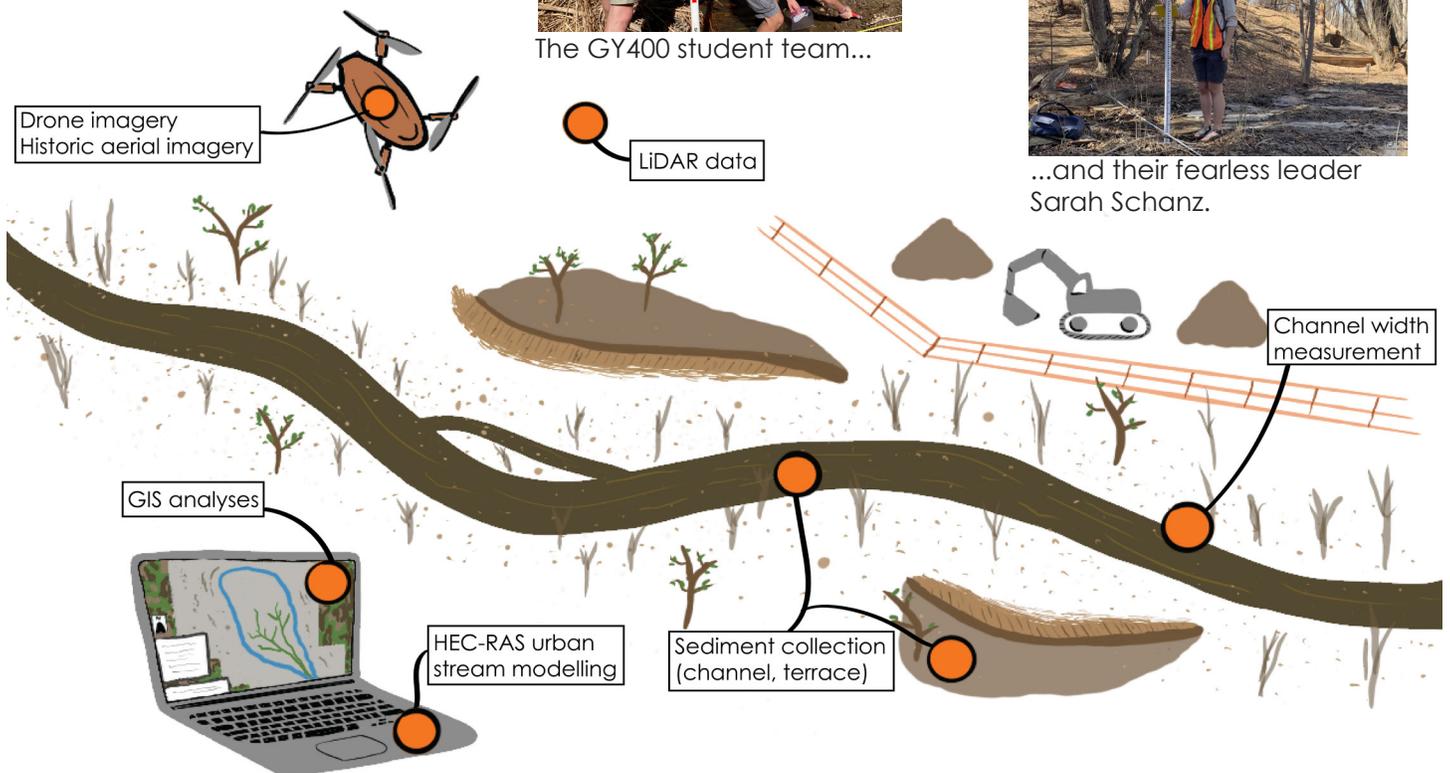
Why is this important?

- ▶ Monitor potentially hazardous fluvial changes
- ▶ Protect a uniquely vegetated and accessible Colorado Springs greenspace
- ▶ Add to the somewhat sparse research on arid streams



...and their fearless leader Sarah Schanz.

How will they go about this?



In Fall 2021, construction to connect Centennial Blvd. and Fontanero St. through Sondermann Park and over a portion of Mesa Creek began. The construction has involved devegetation within 2 meters of the stream and incited displeasure in many who use the park. The GY400 class is using a combination of field, modeling, and GIS methods to investigate the impacts of urbanization over the past 60 years as well as develop a pre-road construction baseline for the stream.

In addition to group analyses, each student selected one aspect of the investigation to focus on individually:

Fiona Swope '22 Modern Bedload Grain Size

- ▶ Investigate how grain size changes with vegetation, slope, channel classification, and other parameters.
- ▶ Develop pre-construction grain size baseline

John Beyers '23: Pre-Urbanization Grain Size

- ▶ Examine grain size on fluvial terraces >50 years old
- ▶ Compare **Fiona's** modern grain size analysis to historical bedload



John, Ren and Sarah collecting field data near the new construction in Sondermann Park.



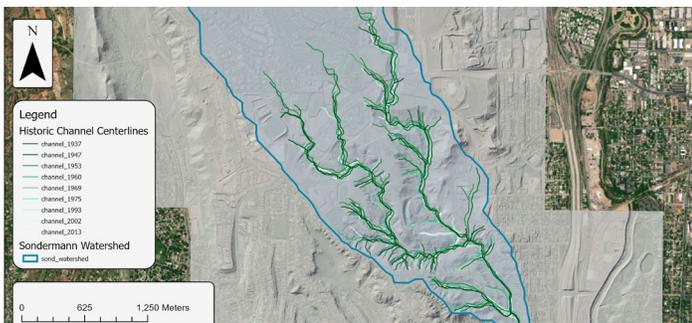
Fiona and John collected a LOT of sediment that they then processed (loudly) back in Palmer.

Jack-Henry Kent '23 Channel Complexity

- ▶ Describe channel complexity over the study area, which typically decreases with urbanization.
- ▶ Characterize pre-construction channel complexity baseline

Ren Carroll '22: Modeling Mesa Creek

- ▶ Model Mesa Creek with HEC-RAS, a program designed for urban streams.
- ▶ Calculate basal shear stress and maximum grain size for different flow conditions.
- ▶ Compare bedload grain size calculations to **Fiona** and **John's** measurements.



Mesa Creek watershed (blue) with historic channel centerlines, courtesy of Ren Carroll.

At the end of the block, the team will synthesize their analysis from these investigations, as well as information gathered from LiDAR data, drone imagery (obtained with help from Matt Cooney), historical aerial imagery, and other sources into a technical report to deliver to the city of Colorado Springs.

Back to the Field!

After a year of only local field trips due to COVID-19 risk, the college relaxed its policies and students were able to use the Gilmore Stabler Cabin, Baca, and camp and cook together on overnight field trips.

We dusted off our camping gear and kicked off the year with a 6-day camping trip to Wyoming for the GY212 Earth as a Physical System class with Professors Christine Siddoway and Zhiyang Li.



GY212 at the Great Unconformity near Alcova Reservoir, WY during Block 1.

Both Sarah Schanz's Geomorphology class and Henry Fricke's Intro course made good use of Baca during Block 2 and visited a fault scarp in the Crestone area.



Geologizing interrupted by 100 head of cattle near Nathrop, CO.



All these field trips put a strain on the department's field supplies, and we reordered A LOT of field notebooks, hand lenses, and acid bottles at the end of Block 2.



Students making stratigraphic columns in Pueblo.

In Block 3, Sedimentology and Stratigraphy left for a 4-day trip to Utah with Zhiyang Li. As the weather got colder and days got shorter, classes took day trips or cabin-based overnights to Wilkerson Pass, the Upper and Lower Arkansas Valleys, Cañon City.

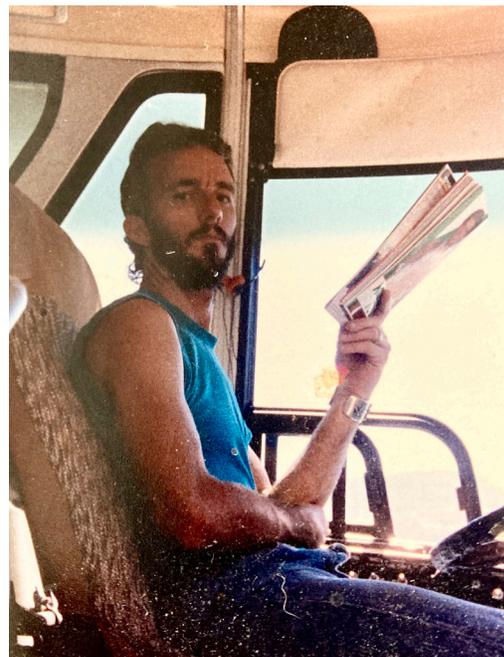


Igneous Petrology looking for metamorphics in the Arkansas River Valley during Block 5.

The department and students are looking towards field time this Spring—and the Para-profs cleaned the cage and vans to get ready for more trips!

Bob Winkelblech Completing 34 Years with CC Transportation

This winter, the Paraprofs sat down for a beer with Bob Winkelblech, who is retiring this year after 34(!) years of working at Colorado College Transportation. During his time here, he has driven for many, many geology field trips and been an integral part of getting students into the field— as well as rescuing those same students and professors. Bob Winkelblech was willing to share some of his stories and memories of field trips while working for CC.



Bob Winkelblech. All photos courtesy of Bob.

How did you come to start working at CC?

Before I started, I was working at a sanitation company that a friend of mine owned, driving a roll off truck. I also had a partnership with my brother-in-law as part of a roofing company. I was either driving a truck or roofing in the mid eighties, and the economy here was absolutely horrible— so there was no work. I was just looking for something that was more steady. A friend of mine worked in the facilities paint shop [at CC]. [He said], “Hey, they got this job open for a mechanic and then you also drive the bus for the classes sometimes.” I think, “okay, that sounds like that’ll work until I can find something better.” Five years later, I figured out that this was the something better I had been looking for. I’ll just stay here. After that I thought, this is my home. This is where I’m gonna stay.

Do you have kids?

I have two boys and they both live [in the Springs]. When the boys were little, they used to go on the field-trips with me. That was when CC had the summer programs for the summer starts. We would be on a field trip for three weeks out of a month. We would go through Southern Colorado over to the parks in Utah, like Arches, and Canyonlands. My oldest son loved it. He would buddy up with the students [and] be in the back of the bus. Then they would take off to do their hikes and he would take off with them. He had a lot of geology when he was a little kid.

Can you tell us about the regional studies trip to the Canadian Rockies?

That was with Christine, Eric, and Paul—they were all there at different points of the trip. We went all up to Banff National Park, and took us 3 days to work our way up there, a typical geology trip making stops in Wyoming and Montana along the way. All in all it was 14 days on the bus. That was in the years when they were trying to curtail drinking on field trips. Before that it was kind of out of control so this trip was okay, no drinking, it’s a dry trip. So the kids all knew they weren’t supposed to drink. When we got up to Banff, we were camping in the park, but just down the road was the town of Banff. The students figured out they could walk to town and after dinner they would say, “Hey, you want ice cream? We’re gonna go get some ice cream.” And they would all disappear. Paul got wind of it a few days in, and that was the night that the US hockey team was playing the Canadian team. And our students were not nice to the Canadians. I mean, they told the Canadians at the



bar, "you guys suck, you can't play this game". You don't tell Canadians they can't play hockey. The next morning we got up and we were heading out of camp, and Paul came up to the front of the bus and said, "Pull the bus over for a second." So I pulled the bus over. He goes, "okay, everybody out", he gets them out, and he lines them up, and then he just reads them the riot act. I mean, he just shames them so bad. I can see their heads are up high when he started, and by the

end, they're all hanging low. They don't wanna look at Paul, no eye contact. And then we loaded up for the rest of the trip.

What were field trips like before they started to crack down on drinking?

I wouldn't say field trips were out of control but drinking wasn't necessarily controlled. The intro class used to do the same loop down in New Mexico. Jeff Noblett and Paul used to teach that a lot and the last night used to always be margarita night. For the first part of the trip people are sitting around with fire, having a beer, kind of regular camping stuff. And then on the last night they had one or two bottles of tequila and they mixed it up with concentrated lemon-lime juice. It wasn't even a Margarita mix. And that would get a little out of control. That was one of the trips when I convinced a couple students to go move Jeff Noblett's tent. I said, "Hey, Jeff's tents right over there. Why don't you guys go over and move it, go put it where he can't see it." "and then after you do that, draw a little map that will guide him to his tent." They move his tent way far off. They left a little notebook page under a rock where his tent was and said go find your tent.

Did he find it?

Oh, yeah—he finally found it. Took him a while, but he got it.

Did the bus ever break down?

We had [a] summer trip when we had the old bus that was built in 1957. We were down near Mesa Verde and when we pulled into town I noticed the gauge showed the battery voltage was dropping. We pulled into the Safeway, and I checked and the mounting for the alternator had broken, so it wasn't charging the batteries. While everyone was grocery shopping I took the alternator bracket off, and unbolted everything, and then I just started walking around town carrying the two parts in my hands looking for a welder. I'm walking down the street and I look in this one guy's garage and I see a welder in there. So I went to knock on his door and ask to use the welder, but he said, "I don't know how to use that welder. But if you know how to use it, have at it." So I hooked it up, welded the alternator back together, and brought it back to the bus, but the batteries were still dead. This was a manual transmission. I told the students, "You guys gotta push this bus across the parking lot till I get up enough speed to put it in gear and pop the clutch." All 25 kids got behind the bus and started pushing this Coach bus across the parking lot. It started up, and drove to Mesa Verde.

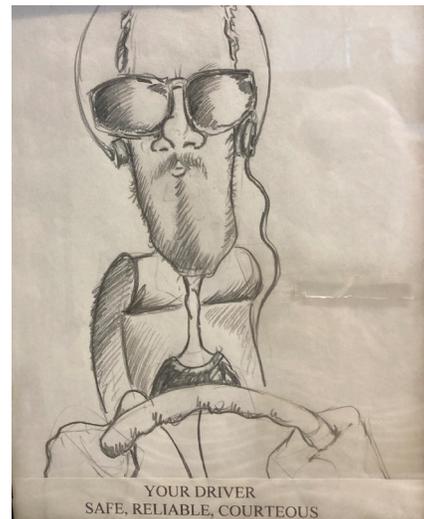


Were you in Utah for the infamous Golf Cart Seven incident?

Oh yes. I was there... [redacted]. And Paul didn't go back to Green River for a few years after that.

What do you have know to be a geology bus driver?

Most important is to memorize your stops. The stops are very repetitive— Jeff was notorious for going to exactly the same place for 30 years. It took me five years of driving for him before he would trust me enough to continue talking to students while I was making the stops. He used to sit there and go, "okay, pull up a little farther, couple feet up, stop, stop." It was the exact same stops. You know they'll go up that hill, then off to the right a little bit for about 45 minutes, then they point at that rock over there. The other thing is expecting everything to change all the time. There's always changes around there. And if you get upset and all worked up about it, it doesn't go well.



We've had a lot of good times—we've been all over the place. I've been to the Grand Canyon five or ten times. Actually, we took a vacation that was inspired by a CC trip with my two boys and my wife and we made several stops— Bryce Canyon, Zion, and went to the Grand Canyon and hiked from rim to rim. We did a lot of vacations like that. I would go on Geo trips and think "Oh, I know where we're gonna go on vacation now."

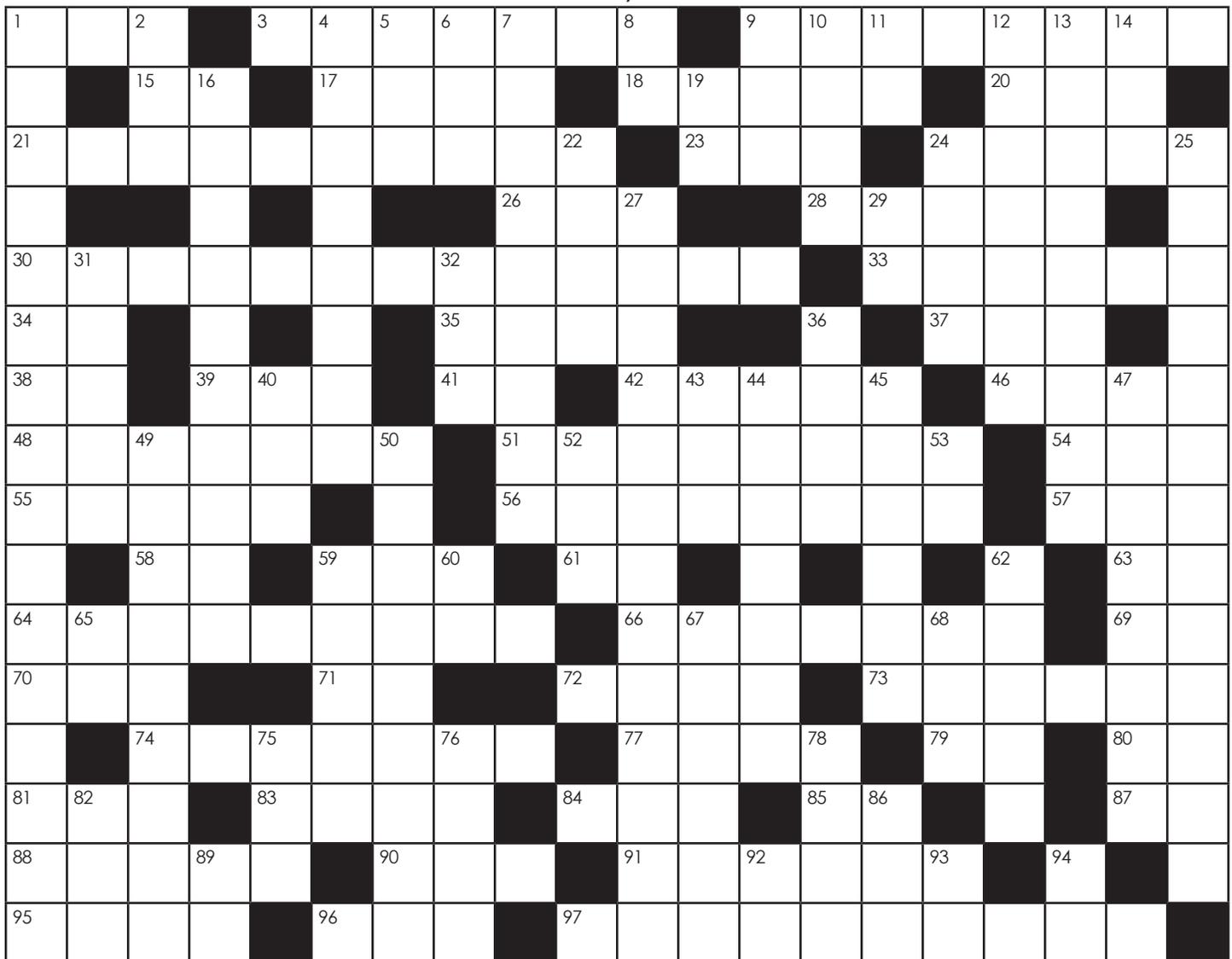
In retirement, Bob wants to travel with his wife and plans to go to Greece soon. They have also been looking at RVs to take them camping closer to home.

Thank you, Bob, for 34 years of putting up with CC Geology—we'll miss you!



From left to right: Jennifer Schwartz '86, , Debbie Gevirtzman (Paraprof), Andy Cohen, David Williams '87, Scott Allen '87 and Gwen Bell during Historical Geology at the Grand Canyon, 1984.

A Rocky Puzzle



ACROSS

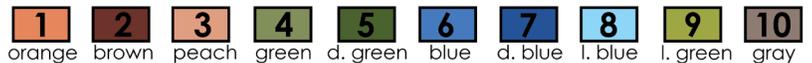
1. CaMg(CO₃)₂ abbr.
3. metamorphic history route
9. invertebrates lack (colloq.)
15. Mg pyroxene abbr.
17. frost
18. Oligocene or Miocene
20. with 37 across, element 88
21. thermal expansion cycles
23. _iology, _eology, _artography
24. ____al mineralogy uses light
26. precious stone
28. veins of ore
30. colorado state mineral
33. element in table salt
34. Greek letter for viscosity
35. tiny but mighty soil movers?
37. see 20 across
38. thermodyn__ics
39. Phanerozoic or Archean
41. irrationally tasty number
42. father of geology with principles
46. singular denim competitor to Carhartt
48. Lithified glacial sediment
51. M₂O₃
54. charged particle
55. like animals at La Brea?
56. relating to global sea level
57. _ewton's _aws of _ravitation
58. home to ANWR
59. often 3 or 10 m
61. atomic number 76
63. atomic number 85
64. type of mathematical modeling
66. relating to a narrow land strip
69. clay structure of serpentine
70. water inlet
71. iron oxyhydroxide abbr.
72. hydrated amorphous silica
73. deformation due to stress
74. unhappy Fe?
77. GY 140: Intro. To ____ Geo.
79. atomic number 34
90. atomic number 3
81. new
83. weight of your rock collection?
84. lava travels ___ pyroduct
85. map symbol for a tertiary basalt
87. __ al.
88. comparatively less hydrous
90. neo
91. relating to the north pole
95. acid + base crystalline product
96. science research funder (govt.)
97. activities without oxygen

DOWN

1. tiny faults, commonly in sand stone (rock-and-roll groups?)
2. opposite of stoss
4. how do t-rexs brush their teeth?
5. pyrophyllite or talc sheet structure
6. ___oehoe lava
7. calcite polymorph
8. element 2
9. place to preserve soft tissue
10. -imitize
11. bond common in organic material
12. theropod walking behavior
13. direction of geode growth
14. _on-_etallic _nclusion
16. acicular
19. element 82
22. part Antarctic Ice Sheet melting rapidly
24. distinguishing feature of sulfur
25. potentially inappropriate amphibole
27. age of the crinoids
29. element 76
31. soil organic matter insoluble in alkali
32. genre of Paul Myrow's next album (hopefully)
36. cm, kg, K, mol, etc.
40. ancient sunlight used for energy?
43. same as 5 down
44. best way to use a brunton?
45. anagram of 33 across
47. dissolved gas
49. gardener's ideal dirt (balance of sand, silt, and clay)
50. little bits of negativity
52. ruthenium oxide minus one O
53. -ology
59. theropods had 3 of these (sing.)
60. short way to mean a long time
62. loose pile of pebbles on a slope
65. loc. of major US thermochron lab
67. largest modern eolian landscape
68. go here for computer troubles
75. -winism
76. what 'hornels' is missing
78. _ue_he _ _rex (she's a famous dino)
82. Cenozoic or Paleozoic
86. life prefix
89. ___ cetera
92. element 58
93. short for carbonate
94. element 89

answers page 40

PCB Color-By-Number: An Iconic Colorado Springs Site



Van Wombell '85

Once you get on that Geo field trip bus, do you ever really get off? Hopefully not! I still enjoy digging into the occasional geo-related topic that catches the eye. A few years ago I heard an investment pitch for a small company in Canada with a seemingly-unique deposit of igneous-derived graphite which the founders believe is an advantaged source of precursor material for the

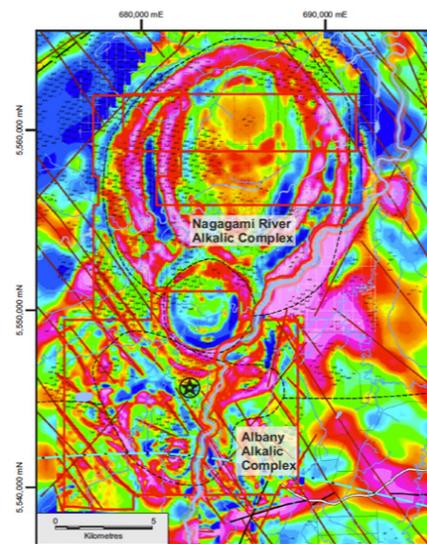


Fig. 1. Calculated vertical gradient aeromagnetic (composite) map of the Nagagami River Alkalic complex and the Albany Alkalic complex (Courtesy Zentek Ventures Ltd.). Magnetic data are from multiple datasets that have not been merged and leveled. Locations of the AI graphite deposit is marked with the star. UTM zone 21E, NAD83.

production of graphene for use in all sorts of whizzbang nanotech miracles. After much procrastination, I got curious enough to do some research and even reached out to Jeff Noblett for reactions on this elegant paper: [Geology](#)

[ore characteristics and origin of the Albany graphite deposit](#)

Jeff graciously wrote back on the merits of Conly and Moore's analysis and it was fun to hear his thoughts on mantle-derived magmas, wall rock alteration, and graphite precipitation. Today, the company is called Zentek (www.zentek.com) and is focused on intellectual property, not mining. Their first commercial product is an antimicrobial silver-graphene-oxide ink which enables surgical masks to capture and kill COVID particles. How cool is that? Geology saves the world?! Note: this does not constitute investment advice. Objects in geo bus mirror are closer than they appear. Stay curious.

PS: for anyone who has not discovered it, this is a wonderful account on Instagram to follow: [geomorphological_landscapes](#)

Jen Pierce '95

Dr. Pierce is on the faculty at Boise State U. She recently founded the [Idaho Climate Literacy Education Engagement & Research \(i-CLEER\) network](#). i-CLEER empowers Idahoans and their communities to take action to address the causes, consequences and solutions to the Earth's changing climate. i-CLEER develops and promotes existing strengths in climate change education, research and engagement throughout the state of Idaho, connects research with community-driven needs, and provides a platform for growth and leadership in climate literacy into the future. By developing proactive resilience and climate justice, we will support climate leaders and climate solutions within our own communities. Dr. Pierce was named a Geological Society of America Fellow in 2020.

Matt Seitz '97

My 1997 CC geology degree led me to a career in hydrogeologic consulting that I've been enjoying for the last 22 years. Components of this were an independent Hydrogeology study block in particular, and internship at Bishop Brogden as Junior. I look back with appreciation on my time at CC.

For the last few years, I've been working with a team of dedicated student volunteers and mentors from the Colorado School of Mines, Rotary International, Rotary District 5450 / Westminster club), and Engineers Without Borders USA (Eveling Rodriguez, Francisco Javier López Cerón & others) to bring safe and reliable water to a community of 200 in rural Nicaragua. After many challenges, the new water system (a 250' well, water tanks, chlorinator,



miles of pipeline, water line suspension crossings, taps at each home, etc...) are finally done! I encourage you to learn more about the above organizations and contribute financially or share your expertise. Email me if you'd like to attend a Feb. 9th presentation (online available) on this project or to find out how to get involved with similar volunteer water and sanitation projects. Thanks also for tech help from Franklin Electric, Xylem Inc., and In-Situ Environmental Muller Engineering Company, and The Groundwater Project.

Michelle (Segal) Smith '98



Christine Siddoway, Michelle (Segal) Smith '98 & husband Doug Smith: Monday, Dec 6, 2021 Tabarin Peninsula, Antarctic Peninsula

This is from the CC Alumni Total Solar Eclipse in Antarctica trip. Our ship traveled through very rough (10 meter!) seas to get to/from the South Orkney Islands to be in the Eclipse's path of totality. Unfortunately the weather didn't cooperate. We were so happy to finally set foot on land after that intense journey. It was incredibly special to be there with Christine since she inspired me to first dream about Antarctica nearly 25 years ago.

Mark Lesh '98

I'm currently a middle and high school Science, Technology, Engineer, Art, and Math teacher in Milton, Vermont and Vermont Master Naturalist in Richmond, Vermont.

Claire Lukens '04

This last year brought a lot of change for me. I married my partner, Jason Burge; moved from New Zealand to California; bought a wonderful house; and lost a long-time field adventure dog, Huxley, who some in the department knew. I also started a new position as an Assistant Professor in the Life and



Environmental Sciences Dept. at UC Merced. I am enjoying setting up a new lab, getting to know Merced's students in-person, and exploring the wonderful landscapes nearby (including Yosemite!).

A moment of hilarity popping champagne just after our tiny beach wedding ceremony at Makara Beach, New Zealand.

Justin Strauss '06

I hope all is well in the PCB! I am writing from Hanover, NH, where I am in my fifth year as an Assistant Professor in the Department of Earth Sciences at Dartmouth College. Tigers run thick in my research group here at Dartmouth – Tim Gibson was a recent postdoc, Tianran Zhang is a current PhD student, and Charlie Robinson is a current laboratory technician. In addition to working on fun problems in Earth History and Tectonics, my wife Elena Mihaly (Class of 2007) and I recently welcomed a baby boy named Vincent Rae Strauss into the world. His middle name is after John Rae, one of the most remarkable Arctic explorers for which geologists also named the Rae Craton. Best wishes to my fellow CC geologists out there and stay safe!

Jon Rotzien '07

Jon and colleagues are nearing completion of a textbook on deepwater depositional systems. And there is none better for the task: Jon has been providing an AAPG Master-class on this subject for many years. The new book should be out next September. A great work, Jon!

**Daniel Dalton '08**

Lots of cool rocks in Brazil! It's been fun to travel somewhere I've always wanted to go, and of course, check out some sweet granitic non-inselberg born-hardts!

Matthew Rosales '08

Hello! Hope everyone is safe and healthy! This year has brought a few changes to life for my wife Cate and I. After 9 months of work-from-home lockdown in a small 1 bedroom apartment in Manhattan, we decamped to the Hudson Valley in a 1890s brick house with many nearby trails and small ski hills to keep us sane. Feels nice to be closer to nature after 2 years in the city! I also moved companies from ING to French bank Société Générale



From left, my wife Cate, me, and our friends Joe and Mickie ~13m below surface in the Kazumura lava tube. Incredibly well preserved lava tube, highly recommend to any geo going to the island, though our guide had some very "unconventional" explanations for some of the processes 🤔

on their Mines, Metals, and Industries finance team. My role is the same - combined technical due diligence and loan origination/execution for mining projects in the Americas, with the expanded scope of Gigafactories and other downstream processing facilities covered in "Industries". This is pretty cool because not only are we financing lithium projects (most recently a spodumene-rich pegmatite in Brazil!) and now the battery manufacturers for EVs, mostly in Ontario and Quebec. On the fun side, with vaccines in arms Cate and I met up with 2 marine biologist friends for a trip to Hawaii! Thanks to Dan Woodell '09, who happened to have a copy of Steve Quane's GY230 Volcanology field trip guide, we were able to visit a lot of the same amazing outcrops and lava tubes as 14 years ago, and a few new ones!!! With incredible luck (and maybe a sign from Pele!) a new eruption started in the Halema'uma'u crater on Kilauea just a few weeks before our trip was planned. Being able to watch a new splatter cone forming as well as the "elusive pahoehoe texture" never gets old! It was super fun for me to play professor for my travelling companions and a really great first trip after the missed year+. Wishing the whole CC Geo family health, happiness, and plenty of field time!

Odd blade like textures in the Kazumura tube on an uvula like structure (allegedly formed by eddy currents in the flow). The blades dip down-tube, enlarged in the circle to show detail. Our guide thinks these are formed by superheated gasses trapped in the roof of the tube which are released and shoot towards skylights in the tube as the lava levels drop at the end of the eruption. Unsure about this explanation and I don't think these have been described in the literature so might be a good honors project for a keen volcanologist 🤔 if you want to chat about this email me at m@ttrosal.es



Robert Jacobsen '10

Some of you met my wife Hannah at Eric/Jeff fest 2019. We married one month before the pandemic, lol. We had to delay our honeymoon to Glacier National Park but were able to make it there in July 2021. Here's our picture on the trail to Iceberg Lake, MT. During the pandemic, I took a position with the Univ. of Tennessee's teaching & learning center. Much of my work focused on graduate student professional development, evidence-based teaching seminars, and inclusive teaching. This experience opened my eyes to the diversity of possibilities in education and my love for the classroom. Coincidentally, several faculty members retired during the pandemic leaving the geology department on the hook for large courses. I'm now a full-time lecturer. Currently, I teach Physical Geology, Planetary Geology, and Best Practices in Geoscience Education (graduate). I love the challenge of engaging large groups of students and the stimulating discussion at the graduate level. If anyone is interested in sharing lesson plans/activities or would like resources on graduate student professional development, please reach out - RJacobse@utk.edu. All the best!

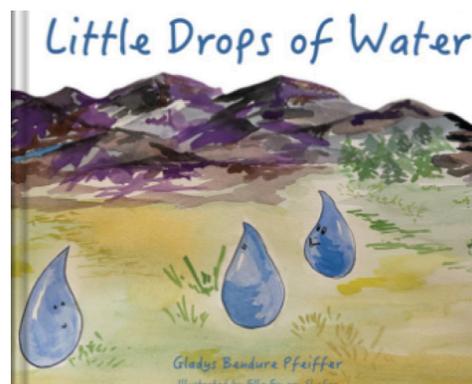
**Maggie Cowling '11**

I am living in Dallas with my dog, Peanut. I work for HDR, Inc. as a GIS Analyst. I am still very much a horse lady. I currently have a horse named Vanna as well as a dwarf mini horse named Lilly. When I am not working, playing with my dog, or riding my horse, I perform improv comedy at Dallas Comedy

Club. Improv has become a great joy in my life and I encourage anyone to at least take one class, it will change your life.

Elle (Emery) Shafer '12

Elle lives in Teton Valley, Idaho with her husband where she continues her work as an environmental educator and artist. This past year, she created the artwork for a children's illustrated story that her great-grandmother wrote. Her great-grandmother, Gladys Bendure Pfeiffer was a CC student in the early 1920s and was a librarian at Tutt Library late in her life. After graduating from Cal-Berkeley, Gladys and her husband had five children (all of whom graduated from CC) and, in addition to being a very dynamic mother, she became an author and a school librarian (at Palmer High School). She published a non-fiction book in the late 1930s and then wrote a children's story, titled "Little Drops of Water" in 1948, hoping to publish it. That dream never came to fruition in her lifetime, but Elle's grandfather, her son (Jack Pfeiffer, CC '51), was steadfast in his desire to have the book completed. He made a request of Elle a couple of times to illustrate the story (once towards the end of her Geology and Studio Art degree program at CC) and it wasn't until last year that Elle illustrated and self-published the story.

**Gabi Rosetto Harris '15**

Gabi will be teaching BLock A at CC: Intro Geology this upcoming summer 2022. Her daughter Ruby Harris '43 turns two this spring!



Fransiska Danneman Dugick '15

2021 was an exciting year for Fransiska Dannemann Dugick. She successfully defended her PhD dissertation in February. After four years at Los Alamos National Lab, she transitioned in August 2020 and is currently working as a member of the technical research staff at Sandia National Laboratories in the Geophysical Detection Technologies Department, focusing on ground-based and arial seismoacoustic applications for global monitoring efforts. She had the pleasure of bringing on a Witter Intern, Nora Wynn, during the summer of 2021. Nora had the opportunity to join in a field campaign with Oklahoma State University and the NASA Jet Propulsion Laboratory focused on recording



Nora Wynn '23 and Fransiska preparing for a balloon launch summer 2021

earthquakes on acoustic sensors from solar balloons (see photo). She and Nora are currently working on a peer-reviewed publication summarizing Nora's summer research. After two years of remote meetings, Fransiska was delighted to attend the 2021 American Geophysical Union meeting in New Orleans and reconnect with CC classmates. On a personal note, Fransiska and her husband are loving life in Albuquerque, New Mexico. They adopted their third dog, a foster fail puppy named Charlie in November and have been slowly incorporating him into their pack.

Charlie Russell '17

My first PCB update comes with exciting news! My wife, Gina, and I were married in June and welcomed Luca Peter Russell into the world in August! I work as an environmental scientist at Tighe & Bond, involved mostly with site assessment and remediation projects in the Boston area. I can't wait to take my family out to Colorado and retrace some of my favorite Geo field trips. Hope everyone is well!

**Ben Lloyd '19**

I have received admission to a graduate program at University of Washington, thank god. I have been working at the Smithsonian the past year in DC, studying plants and bugs. Future plans may include driving the zamboni at the new CC hockey rink—seems so fun.

Sam Bower '21

I am going to school at West Virginia University. I am working with remote sensing techniques and numerical modeling to predict the future of the heavily-mined southern coalfields of WV and Kentucky. I love what I'm doing because I get to use cool tools like LiDAR scanners, drones, and supercomputers to answer questions. In my spare time I'm biking, skating, climbing, playing in a punk band with some other geology majors, and hitting the pubs. What I miss about CC is socializing in Mandy's office and golfing tennis balls towards my professors on the quad. Here's a picture of me doing home repair with a rock hammer!

Claire Brandhorst '21

I'm currently living in Jackson Wyoming, continuing snow science education and skiing most days. Life is fun and cold, but I miss looking at rocks every day and hanging out with all of the majors. In particular, I miss the late nights in labs or on field trips when, in the moment, I suffered and wanted to go to sleep, but now bring a smile to my face.

**Jonny Norwine '21**

I live in Fort Collins, CO and I work remotely for a company called Seequent. I like that I get to work in a field that combines geo, math, and computers! I miss going on field trips and how all the geo students got to hang out in and out of class. One fond memory I have is going to rastall for lunch every day after ig pet lecture and then going back to do the labs together.



"Mira Lu '19 has received early admission to the Geology Master's of Science Program at NTNU in Taiwan"



Virginia Hill '15 and Dan Butler '15 at Alec Lee '15 & Maggie Bailey's '15 wedding in September 2021



Thank you for all of the updates this year! We love hearing from you.

**Alumni Photo ID:**

Professor Christine Sidoway has been rocking field style with CC Geology for more than 25 years. Can anyone identify the people in this photograph? What year was this trip? Notice that is vehicle number 66 (!).

A Rocky Puzzle Crossword Answers

D	O	L		P	T	T	P	A	T	H		B	A	C	K	B	O	N	E
E		E	N		H	O	A	R		E	P	O	C	H		I	U	N	
F	R	E	E	Z	E	T	H	A	W		B	G	C		O	P	T	I	C
O			E		Y			G	E	M			L	O	D	E	S		U
R	H	O	D	O	C	H	R	O	S	I	T	E		S	O	D	I	U	M
M	U		L		A		A	N	T	S			U		R	A	D		M
A	M		E	O	N		P	I		S	T	E	N	O		L	E	V	I
T	I	L	L	I	T	E		T	R	I	O	X	I	D	E		I	O	N
I	N	O	I	L		L		E	U	S	T	A	T	I	C		N	L	G
O		A	K		D	E	M		O	S		C		U		S		A	T
N	U	M	E	R	I	C	A	L		I	S	T	H	M	I	C		T	O
B	A	Y			G	T			O	P	A	L		S	T	R	A	I	N
A		S	A	D	I	R	O	N		P	H	Y	S		S	E		L	I
N	E	O		A	T	O	N		V	I	A		T	B		E		E	T
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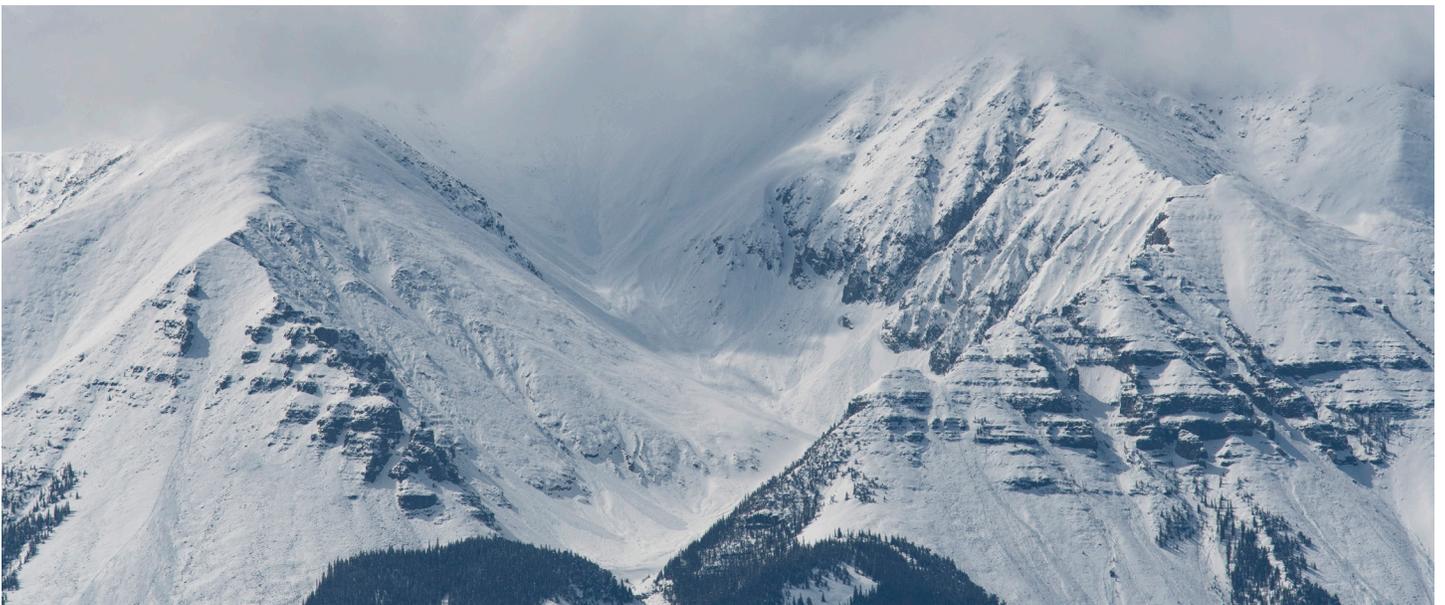


Photo by Stephen G. Weaver

Dear Colorado College Geology Alum:

We hope you have enjoyed the 2021-22 edition of the Precambrian Basement, CC Geology's annual alumni newsletter. We would love to hear what you're up to, where you've been, and where you are now. Please fill out this form and return it to:

The Precambrian Basement
Colorado College
Geology Department
14 E. Cache La Poudre St.
Colorado Springs, CO 80903

OR: email us at precambrianbsmt@coloradocollege.edu
We love pictures!

Last Name _____ First Name _____

Maiden Name or Nickname _____ Year of Graduation _____

Current Address (street) _____

City _____ State _____ Zipcode _____

Home Phone _____ Business Phone _____

Email _____ Website _____

Current Employment or Graduate School Info:

Recent Events, Exciting Adventures, and other Comments

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