

DENVER MUSEUM OF NATURE & SCIENCE EARTH SCIENCES



Greetings and Happy New Year! Although the world is still in tumult, and we miss our [fearless leader](#), we're grateful for the deep-time journeys we were able to pursue in 2021. In part these were possible because rocks and fossils are immune to COVID. But mostly it's because our community helped us thrive, and because our science was catalyzed by the bevy of postdocs, interns (18 in total!), and volunteers that joined (or rejoined) our team.



Together we acquired [new specimens](#), collaborated to publish [23 peer-reviewed papers](#), mentored dozens of students, gave a gazillion virtual presentations, showcased the DMNS' [most delectable crystal](#), uncovered new dinosaurs, and even discovered that one of [our local sandstones](#) isn't actually a sandstone. To

learn more, read on below, or just give us a shout. Thank you for all your support, and we look forward to seeing more and more of you in person.



STAFF

Our newest colleague is Postdoctoral Scholar and Alum [Gussie MacCracken](#). (Intern, Laboratory Assistant '10-'14). Welcome back, Gussie! As part of a three-year [NSF Biological Infrastructure Fellowship](#) with Alum [Ian Miller](#) and U. of Wyoming paleobotanist [Ellen Curran](#), Gussie is taking the paleontological world in new directions through study of insect-leaf interactions.



This year she helped publish four [peer-reviewed scientific articles](#), including one that highlights the first known fossil *Leucoptera*, a pesky moth best known for the blisters it leaves (pun) on pear leaves. Down in Corral Bluffs, Gussie excavated 12 new localities, including one with a new type of legume, shown below. Look out for the paper on these fossils next year!



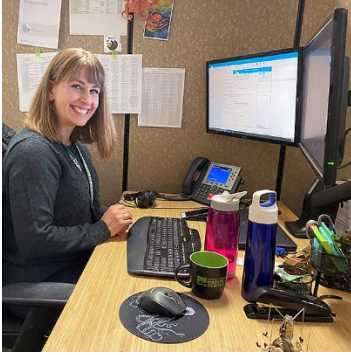
Curator [Dave Krause](#) worked on fossils near and far, including turtles from Madagascar (along with **Tyler Lyson** and the Swiss testudine mafia), [multituberculate mammals](#) from Colorado (with a strong DMNS contingent) and Australia (with a bunch of Aussies), and fishes from Canada (with some fellow Canadians). Dave collected these fish fossils 50 — yes, 50 — years ago!



Better late than never. Some of the multituberculates came from our very own [Corral Bluffs](#). When Dave, [David B. Jones Foundation](#) (DBJ) Collections Assistant **Ashley Lownsdale**, and DBJ intern **Spencer Pevsner** weren't curating the museum's Madagascar collections, Dave laid hands on the iconic K/Pg boundary at West Bijou (photo). What an astronomical thrill!

Business Support Specialist and calm-in-the-face-of-all-storms [Libby Couch](#) kept the wheels on the proverbial Earth Science bus this year. As the department returned to relatively normal activities, Libby anchored our team by drafting contracts, purchasing supplies, paying vendors, managing field vehicle schedules, and helping onboard new staff and interns.





If keeping tabs on 13 folks wasn't enough (can you say "herd cats"?), Libby also managed 13 Earth Science budgets. All in a day's work! When not at work or chauffeuring her two teenage boys around, Libby enjoyed spending some much-needed time with friends and family. In some ways the latter was fostered by one of the few pandemic positives--a hybrid work schedule.

Preparator [Salvador Bastien](#) began 2021 in a quiet lab, working on turtles and mammals from Corral Bluffs, and a surprising new hadrosaur skull from [Grand Staircase](#). With vaccinations, the lab started to hum again, as interns from across the U.S. and Canada joined the team. We were also allowed to start welcoming a handful of beloved volunteers back to the lab. Hooray!



Although [the lab](#) is still below pre-pandemic capacity, Salvador and team prepped ceratopsians [a Hell Creek Fm *Triceratops* and a Kirtland Fm *Pentaceratops* (or is it *Navajoceratops*?)], beefy Utah hadrosaurs, and dozens of turtles and crocs from Colorado and beyond! After revamping our microvertebrate station, Salvador and **Natalie Toth** are hoping to find lots of teeth in 2022.

Preparator [Natalie Toth](#) was excited to work with volunteers and interns again. In person! Together they prepared over 12 pallets worth of field jackets and fossil leaves from Colorado, Utah, New Mexico, North Dakota, and Madagascar. There were gargantuan ceratopsian skulls, colossal turtles, an exquisite croc tail, and mammal skulls from just down the road in the Springs.





In the process, Natalie helped interns learn new preparation techniques, gain field experience, and participate in outreach by hosting Science-on-the-Spot events for Museum visitors. Natalie and crew made a record number of archival cradles, including one for a seven foot long *Triceratops* skull, and helped reassemble Weld County's historic [Pops the Triceratops](#).

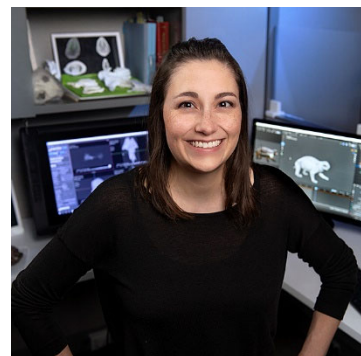
Curator [Tyler Lyson](#) spent 40 days in the field, mostly in Denver Basin exposures of the K-Pg D1 Sequence. Together with new [NSF-Funded](#) "Corral Bluffs" postdocs [Luke Weaver](#) and **Gussie MacCracken** (highlighted above), and other scholars, Tyler helped provide a field experience for ten interns, hosted an RMAG field trip, and co-published six [peer-reviewed papers](#).

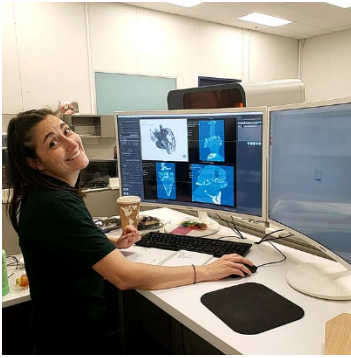


Tyler helped discover 52 new fossil localities and collected hundreds of new vertebrate fossils. He was even spotted collecting fossil plants, leaving us wondering if 'vertebrate paleobotany' may soon be the next big thing. Some of this work will be highlighted in a new [France TV](#) documentary, "*Stronger than dinosaurs? The flowers facing the last mass extinction*".



Christmas came early for Technician [Lindsay Dougan](#) when the [Digital Research Lab](#) (DRL) finally got an [NSF-funded](#) 3D printer. Was it functional and did it have all its parts when it arrived? Of course not! After much trial and tribulation, it's up and running, producing "exploded" skull bones, super-sized teeth, and other elements for study. Moreover, interns and volunteers are back in the lab!





[NSF Environmental Biology](#) Interns **Emily Burns** and **Eldon Panigot** learned digital segmentation, polishing, printing, and reconstruction--focusing on fossils that anchor our understanding of turtle diapsid origins. Lindsay and the interns also led a [Scientists in Action](#) broadcast, "*Imaging the Ancient World*" that reached 1361 students from 8 states! Next stop? [YouTube Live!](#)

[David B. Jones Foundation](#) (DBJ) Collections Assistant and Alum **Ashley Lownsdale** (Intern, '18) worked with DBJ Intern **Spencer Pevsner** to catalog over 750 new fossils from the Upper Cretaceous Ankazomihaboka Sandstone of Madagascar. Wow! One could say that it was a good year for teeth, too. Ashley and DRL interns **Emily Burns** and **Eldon Panigot** sent over 400



Ankazomihaboka lungfish and related tooth plates to collaborator and paleo-ichthyologist [Kerin Claeson](#). If that wasn't enough, Ashley cataloged and sent out over 140 Maevarano Formation titanosaur teeth for study. In between it all, she expanded her data-cleaning skills by learning to use and write expressions for [OpenRefine](#). Adios messy data!

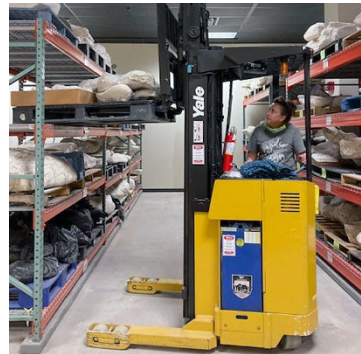


Collections Manager [Nicole Neu-Yagle](#) helped mentor seven Teen Science Scholars and several Interns. In addition to helping manage specimen and collections data, they are applauded for helping our department regain our derelict social skills in the wake of the pandemic. In person! With NSF and DBJ Interns **Jackson Prosser** and **Ashley Lockwood**, Nicole also



"cleaned up" after **Ian Miller's** departure. prepping loads of fossil plants and ushering them into organized storage. Now we know where the fossil beans are! With [BLM](#) Intern **Alexis Williams**, Nicole stewarded (pun) the Stew Hollingsworth collection. Together they unpacked and documented trilobites and other fossils from >800 different Nevada localities. And there are still more to go!

Collections Manager [Kristen MacKenzie](#) spent much of the year finding homes for large vertebrate fossils coming out of our prep labs. She and interns navigated the jigsaw puzzle of our collections, finding rack and cabinet space for dozens of archivally cradled specimens. The large size of these beasts afforded a good excuse to use the forklift on a regular basis.



Pandemic-reduced collection visitors provided opportunity to reorganize our burgeoning collections backlog, and to sink teeth into new Madagascar fossils with **Ashley Lownsdale** (see above). When she wasn't bagging 14ers with her dog Freya, or helping to scout a new locality near [Pawnee National Grasslands](#), Kristen expunged defunct locality gremlins from our database.

Curator [Joe Sertich](#) began 2021 by curating [SUE: The T. rex Experience](#) while teaching a paleo course at [CSU](#).

The class was replete with staples of pandemic pedagogy--zoom lectures and masked labs. Then he and **Natalie Toth** and **Salvador Bastien** led another crew of students to Utah for a hands-on field course, excavating a bonebed full of [horned dinosaur remains](#).



In between it all, Joe helped publish papers on a menagerie of dinosaurs, leveraging *Parasaurolophus* skulls, theropod eggshells, and tyrannosaurid bonebeds to learn more about the life and times of the Late Cretaceous. But the real question we all have is... when will we learn how old [“Tiny” the Torosaurus](#) was when it died? Looking forward to learning the answer in 2022!

Postdoctoral Scholar [Holger Petermann](#) finished his second year in the department, spending part of the time creating the Turtle Compaction Index, a creative new method for estimating pre-lithification burial depths of shallow continental basins like those that typify Colorado and the midcontinent. In short, turtles get flattened with progressively deeper burial. Talk about paleo-roadkill!



Holger also contributed to four [peer-reviewed scientific articles](#), including contributions on [mammals](#) and [turtles](#) from Corral Bluffs, and on how [gigantic sauropod evolution](#) was influenced by delayed skull growth strategies. Yowza! Other highlights included coring ceratopsian bones and, much to his partner’s chagrin, spending most of summer and fall in the field.

Curator [James Hagadorn](#) spent nearly as many days in the field as in the office this year, publishing [seven papers](#) and collaborating with community scientists to study rocks across the American West. He even turned his hand lens to Colorado's [amazing Cretaceous strata](#), and was wowed by their minimal induration, bodacious fossils, and weird concretions, depicted below.

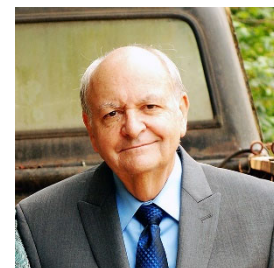


Once allowed to return onsite full-time, Dr. J stared down the specimen backlog with **Nicole Neu-Yagle**, gave tours (in person!), and assisted with the [Numbers in Nature](#) exhibit. In between grant proposals and manuscripts, James helped at his [wife's store](#), caught [waves with family](#) in California, and surfed his favorite thing at the museum--the salad bar. Yep, it's back!



PASSINGS

20+ year Volunteer [Alan Keimig](#) is dearly missed. Recipient of both of the department's legendary *Golden Brain* and *Golden Hard Hat* awards, Alan loved fossils even more than model trains. His first volunteer job at the museum? Unpacking books for a new curator, **Richard Stucky** (highlighted below).





Alan's legacy lives on, thanks to his dynamite dental skills. For the DMNS centennial, Alan built a model of the original Museum building, most of which is no longer visible because it has been enrobed in other infrastructure as the DMNS has grown. Come see it on the 3rd floor, between the Bird and S. America Halls.

WHATSIT

This is our most perplexing specimen. Nicknamed "Dalmatianite", we don't know where it comes from. If you know, please contact [James](#) - and win a VIP Tour for you and yours. A *clue*: spots on this fine-grained quartz arenite are Mn oxides akin to 3D dendrites.



FEATURED ALUMNI & ASSOCIATES



Like many of us, DMNS Research Associate and CDOT paleontologist [Nicole Peavey](#) (Volunteer, '10-'13) mostly worked remotely over the pandemic. Miraculously, her son's daycare and preschool remained open, allowing her to keep CDOT business on track. And in a pandemic upside, she was able to stay abreast of the field, attending conferences that were now virtual and free.

Along with managing resources, Nicole upped her GIS skills and cajoled the new CDOT locality database, created by DMNS Alum and CDOT Intern **Christy Hutchins** (highlighted below). Nicole has been getting out in nature wherever possible with family, including hauling her toddler to [Dino Ridge](#). Despite his obsession with... astronomy! See you in [Space Odyssey](#).



A highlight of [Richard Stucky's](#) (Volunteer, Curator, Chief Curator, VP Research & Collections, '71-'72, '89-'14) career was developing the [award-winning Prehistoric Journey](#). To collaboratively create this game-changing exhibit required 50+ staff, 100's of volunteers, and notable DMNSers [Kirk Johnson](#), [Ken Carpenter](#), [Logan Ivy](#), [Francis Kruger](#), [Bryan Small](#) and others.

Under Richard's leadership, the DMNS also developed its first top-tier [scientific research division](#). Since "retiring" in 2014, Richard continues to explore--but as a fine artist. Art has transformed his thinking about science and the history of life, which he expresses through paint and canvas. His work is available online and [exhibited locally](#), with proceeds benefitting the DMNS and [ASLD](#).





Emily Cleveland (Volunteer, '11-'12) lives in Bozeman, where she is Conservation Director for [Wild Montana](#), a conservation nonprofit. There she works with local stakeholders to protect the lands, waters and wildlife that make it such a unique place. One of the most exciting projects in that realm is the [Blackfoot Clearwater Stewardship Act](#). Stay tuned to see if it passes.

She appreciates how her DMNS field experiences and her background in natural science helped her to meld her love of the outdoors with a career in advocacy. When she's not engaging citizens in public land planning processes, or climate change challenges, she hangs out with her husband and their 14-year-old dog. And the big news ahead? A baby in April. Congratulations!



Vince Morris ('10-'12) started as a volunteer in [Prehistoric Journey](#) during his freshman year of high school, and then became a [Teen Science Scholar](#) in 2011 and 2012. Experiencing the awesomeness that was [Snowmastodon](#), he began studying paleontology at Northern Arizona University, eventually moving to [Colorado State University](#) to major in geology.

Vince is nearly finished with his degree and, since 2018, has been one of the museum's dynamic Educator Performers. Keep an eye out for him on the floor or in schools, where he brings science and nature to life. One of his new roles is to help create a partnership between [14'er Brewing](#) and DMNS. What fun!



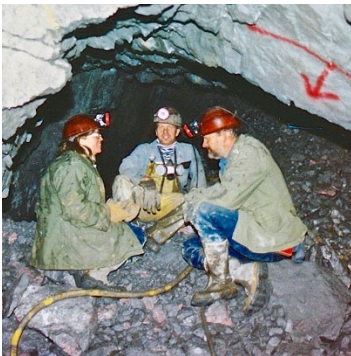


Since returning to Greensboro, NC, Volunteer **Mary Ann Johnson** ('03-'08) has been staying active, serving on the Board of Directors and as Activities Committee chair for her community. When not reading or playing corn hole and cribbage, she's an avid photographer who enjoys watching her son [transform old muscle cars](#) into beautiful classics. Vroom!

When Dee Kile and DMNS Research Associate **Dan Kile** are not prying crystals out of pegmatites near Lake George, mine dumps in Ouray, or the rolling hills of South Dakota, they're curating their world-class collection of microscopes, minerals, and other memorabilia. Look for specimens from these Colorado collectors on display in [Coors Hall of Gems & Minerals](#).



An award-winning author-historian after "retiring" from the USGS, Dan recently published articles on the [Berek compensator](#) and [educational chemistry, mineralogy, and geology sets](#). The latter are victims of liability aversion--impacts that dampen growth of the science community. Next up for Dan? Articles on [Lazard Cahn's](#) microscope and Pikes Peak batholith microminerals.



Tasha Anderson (DBJ Intern, '19) is clearly mad about mammoths. After leaving the DMNS she was an intern at [The Mammoth Site](#) of Hot Springs, SD, learning about 3D modeling through surface scans and printing models. She returned to The Mammoth Site for a winter gig in the 3D Lab but had to leave in March due to the pandemic. Sounds all too familiar!





Tasha returned in May to train the new batch of 2020 summer interns, and then left after the summer season concluded. But mammoths were still in her future. This past January she returned to The Mammoth Site once more, this time as their full time 3D technician and lab manager. Way to go Tasha! Stop by and see the new lab she's helping bring online.

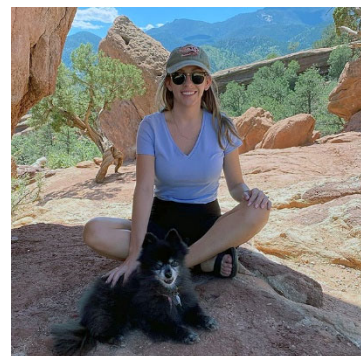
In 2016 [Scott Sampson](#) (Trustee, VP of Research and Collections, Chief Curator, '13-'16) headed to his hometown of Vancouver to serve as CEO of [Science World](#). A few years later, wife Toni, daughter Jade, and Scott headed back south of the border to the SF Bay Area, where Dr. Scott of [Dinosaur Train](#) fame joined the Cal Academy of Sciences as Executive Director & Chair.



There he helps steward the Academy's natural history museum, aquarium, planetarium, and rainforest, all under a vast living roof of native plants. Despite the challenges brought by COVID-19, this is Scott's dream job. Like his time at the DMNS, Scott is thrilled to work with an amazing team of scientists and educators to regenerate the natural world. Humans included!



When she's not hanging out in Palmer Lake, CO, **Stephanie Grossart** (Intern, '18) has been working in the field and paleo lab with [Josh Lively](#) at the Utah State U. Eastern Prehistoric Museum. There she's been working on Triassic phytosaurs, Early Cretaceous ankylosaurs, and Late Cretaceous turtles and dinos-- including every Thorntonite's favorite, [Torosaurus!](#)





Last year Stephanie built her own prep lab and founded a contract fossil prep company, [Half Life Fossil Co.](#) Sounds positively radioactive! Next steps for Stephanie are a return to grad school in museum studies. We know she'll do well, if nothing else because she's been known to describe Utah's North Horn Formation as "succulent". Can't wait to see its delicious strata!

Rob Lavie (Intern, '16-'18) followed his DMNS stint with an internship at the [National Park Service](#), and then obtained a M.A. in Applied Geography & Geospatial Science from CU-Denver. Since May of 2020, he's been a GIS Specialist at [Environmental Management and Planning Solutions](#). There he does NEPA consulting for the BLM, USFS, NPS, and Bureau of Reclamation.



Whether working on fish hatcheries, oil leases, endangered species management, or the impacts of trails on our national forests, Rob digs what he does. Outside of work he's chipping away at a GIS Professional certification, and enjoys disc golf, skiing, and checking out Denver breweries. That's even more fun of late, since he and Lizzy (see photo) got engaged!



Christy Hutchins (Intern, '19) has been working with our colleague and Alum **Nicole Peavey** at [CDOT](#) (see update above) and the NV Department of Environmental Conservation. In these roles she's been combining the field skills she learned at the DMNS with her GIS training to help them conserve public lands for recreation, while also saving a fossil or two!





Since returning to Denver, Christy has landed a full-time position as a GIS specialist at [Hydrologic](#), focused on hydrogeology and groundwater resources. In the future, she's thinking of returning to grad school and continuing in GIS or Remote Sensing. Or maybe Christy will become a raft guide. That sounds awesome and we are looking forward to seeing where life takes her!

Former Volunteer and Teen Science Scholar **Wyatt Hansen** ('12-'14) has been rocking it out since his DMNS days. He just finished a two year gig as lab manager for the [SIMSL](#) isotope lab at Kansas State U. and spent the summer backpacking the [Colorado Trail](#). He did it in only 37 days. With stats like that, who needs nonstop service between Denver and Durango?



This past fall, Wyatt started grad school in the [Department of Earth and Environmental Sciences](#) at University of Minnesota-Twin Cities. For his M.S. thesis, he'll be reconstructing paleoclimate records based on U/Th ratios and oxygen isotope proxies of calcite in Brazilian speleothems (e.g., stalagmites, stalactites). What a neat project!

Research Associate **Bob Reynolds** has been in librarian mode for the past year, assembling web based data archives on Kenya's Turkana Basin ([Turkanastratigraphy](#)) and the Siwaliks sediments at the foot of the Himalayas ([Siwalikstratigraphy](#)). Both projects springboard off his undergrad and grad studies, and on the [Coloradostratigraphy](#) web site.





The Siwalik site aims to help students in Pakistan, where Bob and his wife Mary were [Fulbright scholars](#) in 1980-1981. In between reminiscing about delightful teas in Peshawar (see photo), Bob is organizing a 2022 seminar on the Indus River watershed.

Last but not least... our [holiday video](#).





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