

# DENVER MUSEUM OF NATURE & SCIENCE EARTH SCIENCES



Howdy and here's to 2021! Although we miss the howling, we can't wait to put the pandemic in the rear-view mirror, and reopen the museum full-bore. In the meantime, we'd love to share news... and offer you a few prizes, too (below).



While COVID raged, our team made hay in new ways. Whether prepping fossils on kitchen tables or Zoom-teaching classes in our back yards, we learned to 'earth science' remotely. With your support, we published [26 scientific articles](#), gave over 200 talks, started a program with [CSU](#) and even led a few virtual field trips. Dusty fieldwork? No problem. We had stylish masks!



Once the museum reopened, we cradled and reorganized our Hell Creek Formation collections, securing them for centuries to come. Even with continued discoveries and gifts of specimens, we still have space for decades of growth! We've also pursued and received grants both large and small. Together with generous donations, these will allow us to continue our research, care for collections new and old, and connect community with our science.



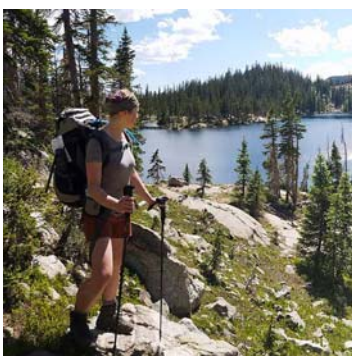
**STAFF**

Our newest colleague is Postdoctoral Scholar [Holger Petermann](#). Holger spent the year figuring out how turtle taphonomy reveals basin burial histories, deciphering systematics of fossil legumes (beans!), and segmenting CT-scans of fossils with unpronounceable names. During COVID lulls, Holger earned a black belt in R statistics and regaled us with [crazy sauropod lifestyles](#).



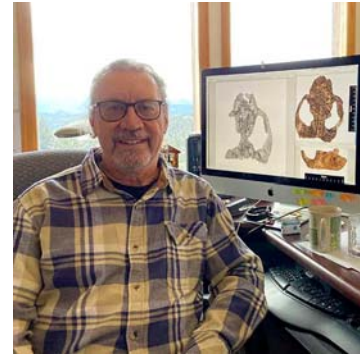
If that wasn't enough, Holger's a bit of a legend around here, having embarked on a cross-country trip a week after learning to drive. While we worried whether he'd survive, Holger was busy talking his way out of tickets with DC cops. Wow. Several road trips later, he's settling down with his longtime partner. Yep—they're engaged! Congrats and welcome, Holger!

Collections Manager [Nicole Neu-Yagle](#) sank her teeth into massive digital database projects. With Volunteer [Janet Hunter](#), she digitally pinpointed locations from which 15,800 of our rocks, minerals, and meteorites came. She also wrapped up our fern grant work ([PCC TCN](#)), transferring 7,450 new fossil images and 5,290 fossil records to the [Pteridophyte Portal](#). Spore-tacular.



These provenance and cataloging projects are hard to do in the normal interrupted workflow of our collections workshop, but are critical because they allow us to search for specimens efficiently. An upside of the pandemic! When not deep in data, Nicole backpacked and hiked in Indian Peaks. Plus, she and her partner bought their dream house. Its porch is at 8000'.

Chained to the computer in his "mountain retreat," Curator [Dave Krause](#) completed a project years in the making—working up *Adalatherium* ("crazy beast"), a bizarre mammal that illuminates deep time island evolution. One [Nature](#) paper and [six articles](#) later, this fossil generated 1.3 billion (yes, billion!) media impressions, and a 2nd floor exhibit (it closes Jan 10!).



Dave co-authored another [Nature paper](#) on a primitive toucan-looking bird, below. Its schnoz is anatomically similar to those of non-avian theropods. But could it eat [Froot Loops](#)? In pandemic hermitude, Dave's hair began to flow. He now occupies the hirsute niche vacated by the shorn Hagadorn, an early member of [LFHCS](#). Back to his hippie days, Dave's letting his "freak flag fly."



Collections Assistant [Ashley Lownsdale](#) ([David B. Jones](#) Intern, '18) dove into data, bringing the U. of Antananarivo (UA) Madagascar collections into [Arctos](#), one of the major collections data venues. UA now has its own Arctos portal and is the first international collection to have uploaded to it. When not databasing fossils, Ashley gets outdoors or works on programming skills.





Preparator [Salvador Bastien](#) grew his technical skills, prepping under the scope and learning new molding and casting skills. With the museum shuttered, he and Natalie worked atop a scissor-jack (see photo) to give our entryway plesiosaurs and *T-rex* the most thorough cleaning they've had in years. You wouldn't believe the dust up there. Not to mention the old paper airplanes!

When not at home prepping fossils from Madagascar, Montana, and South Dakota, Salvador carved crocodile and mammal fossils from concretions, reconstructed ancient braincases, shuttled "Pops the *Triceratops*" from Greeley, did fieldwork at Corral Bluffs, and helped assemble a seven foot long Madagascan sauropod femur. That's the largest bone in the museum!



Our Business Support Specialist [Libby Couch](#) did it all in 2020—from buying bolts of burlap to slicing and dicing the twelve pandemic-impacted budgets she manages. All the while, she fielded specimen identification requests, wrote contracts, migrated our internal forms to DocuSign and made sure we and our collaborators all got paid.

Although Libby misses seeing colleagues in person, remote learning (i.e., "home schooling" to all parents of tykes) has been great because it allowed her to reconnect with her teens. And for them to see and gain appreciation for what she does to earn a living. Kudos to Libby for keeping the wheels on the Earth Sciences bus!





When he wasn't getting a Ph.D. in budgets to help us navigate the pandemic, Chair [Ian Miller](#) peeled back new scientific layers in the [Colorado Springs Project](#). As part of that work, in 2021 he'll reunite with just-minted Ph.D. and former DMNS Intern [Dr. Gussie MacCracken](#), who will join us as a postdoctoral scholar. They plan to sink their teeth into insect damage in fossil leaves. Pun!

With COVID sidelining fieldwork for the first six months of the pandemic, Ian didn't get his normal outside time. Instead, Ian channeled his childhood backpacking days—exploring western mountain ranges that he'd yet to step foot in. There, amidst towering conifer forests, he witnessed streams roaring, trout teeming, and billion-year-old rocks doing what they do best—remaining stoic.



Collections Manager [Kristen MacKenzie](#) took the pandemic as opportunity to do what she normally doesn't have time for—systematic database cleaning. In tandem with Nicole and Volunteers Mike Richardson and Charles Nelson, she's nearly completed cleanup of the museum's historic vertebrate locality data. As a result, our collections have never been in better shape.

Kristen also completed the last of our collections rack repairs, helped write proposals and reorganized the Hell Creek collection. And she finally made time for trips to the mountains. This was, in large part, to raise a new member of her family, a blue heeler named Freya. At only six months old Freya made it to the top of Grays Peak—effortlessly. Can't wait for their next fourteenner!



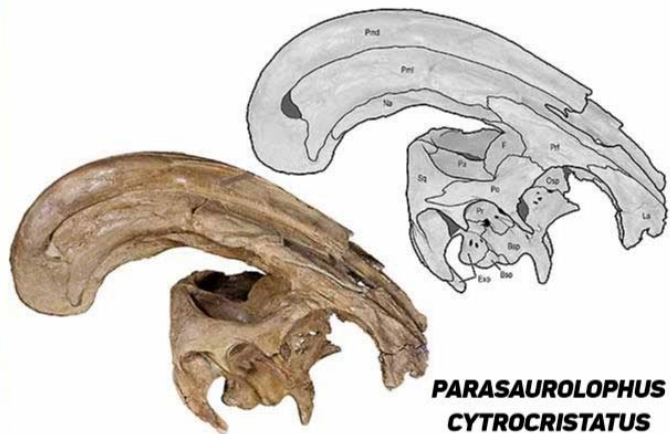
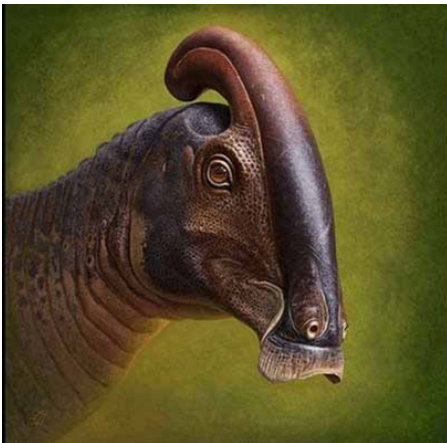


Curator [Joe Sertich](#) started the year on the road, visiting collections across the west and planning field research. Instead of fieldwork, Joe brought in grants, preserved the historic dinosaur "[Pops](#)" from Weld County, and ushered donations of sauropods from Chris Weege and David Schmude and an ankylosaur from [Andre LuJan](#). He also forged ahead on describing new dinos and crocs with former interns and our prep team.

Joe developed a five-year collaboration with his alma mater, [CSU Geosciences](#). He'll teach a course in paleontology, mentor interns, and host students in a dinosaur field experience each summer. Go Rams! He's also curating a new temporary exhibit, [SUE: The T. rex Experience](#). It showcases DMNS discoveries, including the first full skeletal mount of the [Thornton Torosaurus](#).



With colleagues, Joe described the skull of a rare, tube-crested dinosaur, *Parasaurolophus*, discovered by the DMNS [Laramidia Project](#) team in New Mexico. Artwork: Andrey Atuchin.





Preparator [Natalie Toth's](#) year started like any other—a bustling lab, an intern from the Netherlands, and even a research trip to the Royal Tyrrell Museum. When COVID hit, she and Salvador got creative, finding [new ways to prep fossils at home](#)—without compressed air! Turns out a kitchen table is perfect for prepping partial turtles from North Dakota and croc osteoderms from Madagascar!

When staff was allowed to return to the museum, access to dear old prep tools was much appreciated! Natalie began prepping a historic *Triceratops* skull from Greeley and a GIANT sauropod leg from Madagascar. She and Salvador also made oodles of archival cradles to support our oversized fossils—ranging from Cretaceous crocodiles to baby mammoth skulls.



When he wasn't working on his recent [NSF grant-funded research](#), Curator [Tyler Lyson](#) gave ~60 talks with Ian about the Colorado Springs discovery. Thanks to Zoom, they reached over 45,000 people. Tyler even wore shoes for a few of the talks. Pre-pandemic, Tyler trekked to Baja, where he tried his hand at collecting a different kind of scaly vertebrate--one that's much slipperier.

Tyler and fellow turtle nerds published an astonishing [eight papers](#), mostly focused on the evolutionary history of turtles and their bizarre body plan. Despite limited field time at Corral Bluffs, Tyler and the DMNS team collected a five-foot crocodile skeleton, several mammal skulls, fossil leaves (their favorite!) and... drum roll please... some turtles! Can't wait to see them in the lab.







Curator [James Hagadorn](#) surfed Colorado's Cambrian, Devonian, Permian and Cretaceous, both on the outcrop with colleagues, and digitally, with community scientists. With new ArcGIS and donated [Kingdom](#) and [EarthPoint](#) software, they modeled the acme of the Great Unconformity and the nadir of the Western Interior Seaway. Plus, James added a gnome to the museum!

In the short days of winter, James used a rangefinder to log steep sections on frozen Colorado peaks. Brrrrr. This made him appreciate Mondays, when he's onsite at the museum and spends time geologizing at 72°F, on the scope. James is dedicating 2021 to his parents, including his mom, at right, who passed away last month. They encouraged him to pursue his curiosity, and to dig dirt—literally, and to pursue the truth.



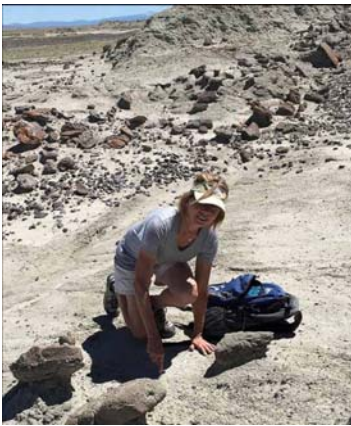
Technician [Lindsay Dougan](#) moved the [Digital Research Lab](#) to a newly remodeled room. The space is equipped with ample modeling, petrology, and GIS workstations, a conference table, an area for our 3D printer, and plenty of flexible nooks to accommodate visiting researchers, interns, and volunteers. It even has pandemic-friendly plexiglass dividers!

This work was completed just in time for arrival of Lindsay's Bebe Dos: Liam. Welcome! Liam's already spent many hours watching Lindsay segment and is honing his Zoom meeting skills. Lindsay took over the museum's photogrammetry station, giving us agency over generating such 3D models. With Kristen and Nicole, she hosted four [Teen Science Scholars](#), below.





## FEATURED ALUMNI & ASSOCIATES



Research Associate and Professor [Deb Anderson](#) of St. Norbert College is focusing on writing vertebrate paleontology papers. COVID made fieldwork in 2020 too risky, but she 'fondly' recalls her previous adventures finding fossil rodent teeth in alternately awesome but unpredictable Wyoming conditions. Like the rainy axle-burying slogs thru the Bridger Basin, the 105°F frying pan field season in the Bighorn Basin, or the Sand Wash Basin gnat-fest. But the fossils were oh-so-worth-it!

Teaching in a time of COVID was less than a fun adventure. Deb had to reimagine her cadaver lab, making it virtual. An upside for the students? No aroma! Deb will be on sabbatical in Spring 2021, and will write up the taxonomy of the Bighorn Basin rodents. If all goes well, she'll visit the Smithsonian, Carnegie, and DMNS. We look forward to seeing her in the collections!



Ace Preparator [Adam Behlke](#) ('15-'16) is still at the National Museum of Natural History after helping assemble specimens for the just-opened [David H. Koch Hall of Fossils - Deep Time](#). He works with the volunteers in the FossilLab, the research lab in the exhibit. At left he's prepping the pelvis of the type specimen of *Edmontosaurus annectens*.

Adam navigates as many museum catacombs as we do, and has noticed that all new cabinets seem to project a sterility that can only be described as 'hospital white'. He recently joined the Dunn Loring Volunteer Fire and Rescue Department, and connected with another DMNS alum, [Rich Barclay](#), to manage the CO<sub>2</sub> levels for the Gingko trees in the [Fossil Atmospheres](#) project.



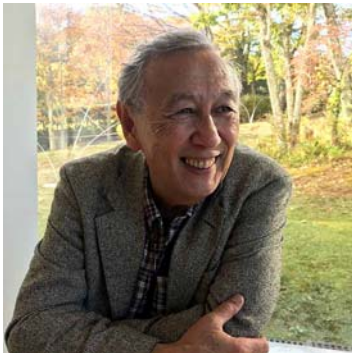
As a new Ph.D. student at CU Boulder, David B Jones Intern [Vanessa Gabel](#) ('18) thinks deeply about what caused the Arkansas and Platte rivers to start carving their valleys across the plains. Using the sedimentary record left by rivers that traversed the mountains and plains, she's able to represent what the landscape looked like before this fluvial incision kicked into action.

Vanessa has been learning numerical modeling. She's using such models to evolve the landscape from what it looked like at 5 Ma, up to present day. In doing this she's testing different hypotheses (climate change, tectonic uplift) to see what forces might have created our modern landscape and topography. As a new teaching assistant, she's also learned she loves teaching!



Former Teen Science Scholar [Lucia Guatney](#) ('10) is currently in the Computational Bioscience Ph.D. program at CU Anschutz. Given the shift to remote work, what a pandemic-amenable path that turned out to be! As a teen dreaming of being a paleontologist, she'd never have guessed she'd end up in this field, given her scant computer science background.

When not dressing up as CRISPR-Cas9 for Halloween, Lucia used her quarantine time to play with makeup, stream Star Trek with friends, and discover the relief of stress baking. The acme of quarantine boredom was when she wrote an R script to calculate the probability of getting the item she wanted if she spent a certain amount of money in a video game microtransaction.



Former Research Associate **Tom Hardy** ('98-'16) has been doing a lot of self-guided touring. In Japan, Tom found harmony with the people and will always remember riding at 250 mph on a cushion of air to the [Hakone Open Air Art Museum](#). As an artist and archaeologist, he found France's prehistoric art caves ([Grotte du Pech Merle](#)) to be marvelous beyond words.

We heard from **Pat Jablonsky**, our former Collections Manager ('85-'93), caver, and daughter of [WIPS](#) co-founder, DMNS Volunteer, and donor Bryan Cooney. Since retiring, Pat's had the travel bug, going to Europe (3 times), Iceland, Korea, Egypt, Norway, Alaska (3 times) and Canada. She flew to London to honor [Anne Boleyn](#)—on the anniversary of her beheading.



Pat's shared these wonderful activities with her daughter and husband, Bill—whom she married in front of the museum, near the fountain. After moving to Delta (CO), Pat and Bill restored their home themselves. And... they still speak to each other! Pat volunteers with the hospital, a hospice resale store, Volunteers of America, and as a BLM site monitor for historic/paleontology sites.

After myriad careers, including her time at the DMNS, Pat is most proud of her research on caves. This includes bat studies, excavating a giant sloth from Lechuguilla, and her research on human lint's impact on cave environments. Her [lint project](#) is still active and she consults with cave managers from time to time—even after 30+ years on the topic. Way to pay it forward, Pat!



[Phil Manning](#) (Research Associate, '08-12'), currently stranded across The Pond, misses Colorado and Wyoming like the dickens. Now Chair of Natural History at the University of Manchester, he's also Director of the Interdisciplinary Centre for Ancient Life. Since 2012, he has been spending far too much time working at synchrotrons, gently teasing chemical data from fossils.

Phil's goal is to unpick fossil taphonomy and identify biomolecules preserved within. However, the KPg boundary of North Dakota and the Big Horn Basin's Morrison Formation, where he works with [The Children's Museum of Indianapolis](#), are also keeping him busy. He can't wait until online teaching ends and is looking for new fossils to bathe in monochromatic X-rays!





As a kid, **Nicole Martinez** loved visiting the museum. After volunteering in [PJ](#) and the [Prep Labs](#) ('10-'11, '16-'17), she landed a job in the T-Rex Cafe, then at the School Desk, then in Security. She's now a Sergeant, so look for her smiling face next time you're at the museum! Nicole's path illustrates that the DMNS is a big family—one that often cross-promotes from within. Nicole's also maker who enjoys sewing and cooking and a fixer—especially for her kiddos. She's a member of the [Balarat Council](#), where she helps link learners to the outdoor world. Her top bucket list item? To crack open a fossil jacket like the ones at left. Let's make that happen!

Another alum from across The Pond, **Sarah Matthews** (Volunteer, '99-'10) has been living in the UK for years. She is thinking about getting her Ph.D., possibly in a field related to museums. Despite reconstruction of a smashed finger, she has been busy as an artist, mostly creating supplements to Dungeons and Dragons, aka DnD. Such art skills will come in handy!



Long-time DMNSer **Hannah O'Neill** (Teen Science Scholar, '08, '09; Snowmass Intern, '11) obtained a B.S. in Geology and Biology from Brown and a M.S. in Environmental Policy at CU Boulder. Now an environmental planner, she's interested in water supply and watershed health—having worked for the Colorado Water Conservation Board, Navy, and Denver Water.

Hannah just started a new role at the Department of the Interior, creating long-term restoration plans at the site of major chemical releases and oil spills. And, she just got engaged. Congrats! Hannah lives in Boulder and is using the lack of a commute during the pandemic to gravel bike as much as possible. She says "my time at DMNS was formative, inspiring, and so joyful."



Research Associate and geologist **Bob Reynolds** used Covid time to digitally map Kenya's Turkana Basin and to document the dating of sedimentary rocks that record uplift of the Himalayas. Maps that had been made with air photo overlays and [Zip-A-Tone](#) (remember that?) were digitally redone using Google Earth and Adobe Illustrator. Check 'em out at [Siwalikstratigraphy.org](#).

Bob and Space Sciences Curator [Ka Chun Yu's](#) *Digital Earth* programs moved to Zoom and are now the most popular science content in the division. Whereas the museum could only seat 120 people in the Planetarium's dome, their programs now reach six to eight times as many people and can be found on the Museum's [YouTube](#) channel. Gotta google that.



Former BLM-funded Intern and Volunteer [Elliott Armour Smith](#) ('11, '18) is a Ph.D. student in Biology at U. of Washington. There he anticipates studying the diversity of growth patterns in croc-line archosaurs in the Late Triassic. Although Elliott has mostly worked with Jurassic insect nests or on Cretaceous dinosaurs of Utah, it sounds like there'll be some Chinle in his future!

As a past volunteer on Joe's [Laramidia Project](#), Elliott explored and excavated dinosaur ecosystems of the Kaiparowits and Wahweap formations of Grand Staircase-Escalante National Monument, and the Fruitland and Kirtland formations of the San Juan Basin of New Mexico. Post-Ph.D., Elliott hopes to be a vertebrate paleontologist focused on reptile evolution.

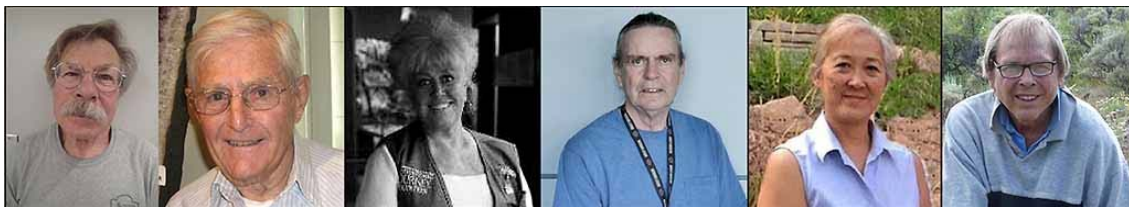


Teen Science Scholar **Colin Turner** ('11-'14) began volunteering at the DMNS in 8th grade. Now he's studying CAD Modeling and CNC Machining, aiming for a degree in Packaging Science. When he's not working, he's learned to hunt for mushrooms and fish. Colin's also gamified his life. Using [Habitica](#), he's worked hard in new ways, and become happier than ever before.

Native insect advocate, [Porcupine Caver](#) and ex-beetle-pinning Volunteer **Cathy Walp** ('04-'10) lives on the plains of eastern Colorado. There she continues her interest in things small. As a Colorado Master Gardener she teaches benefits of native pollinators, collects spiders for [DMNS Arachnology](#), and participates in the [Bumble Bee Watch](#) and [Nebraska Bumble Bee Atlas](#).



## PASSINGS



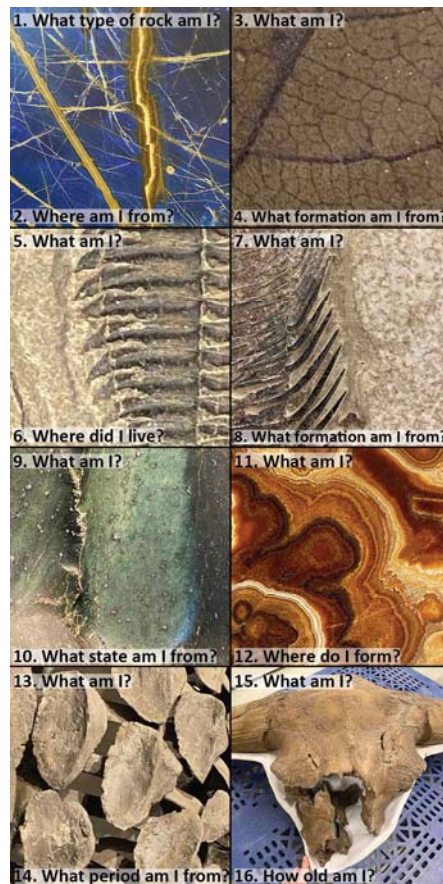
2020 was a year of unexpected losses. Our team was no exception. Several of our dearest colleagues passed—some to COVID while others from varied causes. Our hearts go out to the families and friends of **Paul Berdaus, Chuck Digby, Karen East, Tom Garner, Teresa Hill,**



and **Mike Yusas**. Some were DMNS lifers, and others were scholars in their own right. Our star shines brighter because of their contributions.

## ***The Puzzler: Solve to win DES gear!***

Test your sleuthing skills and win one of these sweet tumblers or travel mugs. Team up with family or forward to a friend! *Hint:* Many of these items are or were on display. One prize will be awarded in each entry category, including: A) Kids under 12; B) Students; C) Participants with avocational earth sci. expertise; and D) Vocational expertise. Send answers to [James](#) by Feb 1.



Need more? Check out our [end-of-year video](#).



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