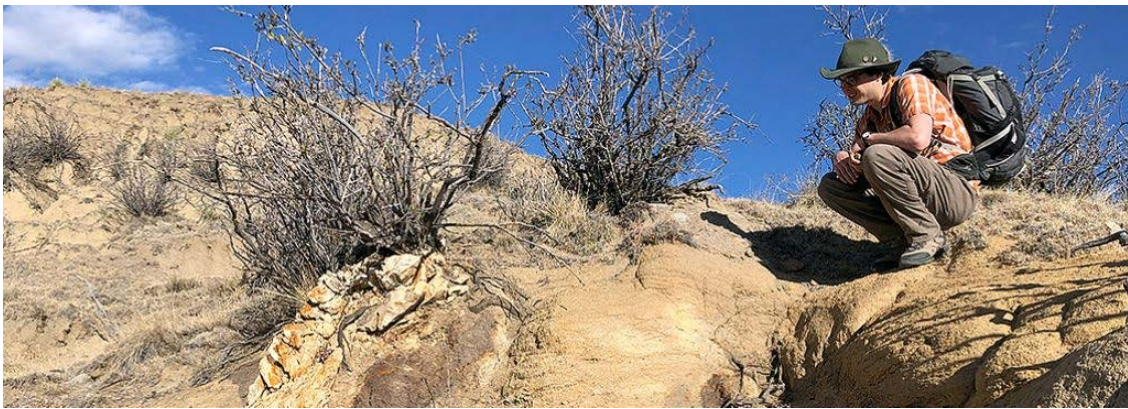


DENVER MUSEUM OF NATURE & SCIENCE EARTH SCIENCES



Happy New Year from your friends in Earth Sciences! As we reflect on 2018, geologic events from Alaska to Indonesia reminded us just how dynamic our planet is. Scientific discoveries such as diamond-bound ice and Jurassic flowers also rippled through the media, illustrating that Earth still has many secrets yet to be revealed.



Our Museum team helped peel back such mysteries as we dated previously [‘undatable’ rocks](#) in the Grand Canyon, discovered that [ground-dwelling birds](#) were the only ones to survive the K/Pg (Cretaceous-Paleogene) extinction, and learned how to estimate the [atmospheric impacts](#) of ancient rainforests. In addition to publishing a [stack of scientific papers](#), we mentored 39 paid Interns and Teen Science Scholars and worked closely with our 200 community science Volunteers to share our passion for earth science with the public. Many of these Interns and Volunteers are going on to careers in science, including some at the DMNS! (See their updates below)



In popular articles, we honored some of our recent [collections donors](#) while demonstrating why such legacies [make a profound difference](#) by helping scientists and the public to better understand our planet. Continuing this trend, last year we shepherded three massive donations of rocks, minerals and fossils by Emeritus Professors Lee Shropshire (U. of N. Colorado), Ken Rose (Johns Hopkins), and our late Volunteer Jim Hurlbut. Some of these collections, like the micromount minerals, are already accessible to the public. See for example, our first-ever published specimen [catalog](#). But watch out—it's 726 pages long!



As publicly accessible scientists, we're here to conduct and foster research, archive our planet's history, help our communities and get the word out. Please [reach out to us](#) any time, come to one of our [free scientific talks](#), or just stop by. We love hearing from you! For further news from our team, please read on.

STAFF & INTERNS



Between cacti and coyotes they found incredible Campanian (75 mya) *Lotus* leaves and a community that really celebrates its fossils—from ammonites to dinosaurs. Coahuilans even have a fossil-themed license plate. Maybe we need one of these in [Colorado!](#)



In between fieldwork in North Dakota, Montana and Colorado with Tyler Lyson, and New Mexico and Utah with Joe Sertich, Ian also shattered a paleobotanical record—morphotyping nearly a zillion fossil leaves spanning the K/Pg extinction. Former DMNS Curator and current NMNH head honcho [Kirk Johnson](#) might've been envious if he weren't involved in the work too!

In the Schlessman Family Earth Sciences Laboratory, Chief Preparator **Natalie Toth** led teams of Volunteers and Interns in the race to finish preparing the [Thornton *Torosaurus*](#), while developing new courses to train Volunteers in the nuances of fossil preparation. With these efforts, Natalie is extending the lab's capacity to do micro-prep and thin section preparation.





Natalie also inspired a record number of youngsters at our department's clubhouse at the Museum's [Girls & Science](#) event. Cowabunga! In the Molding & Casting Lab, the Volunteer team worked to replicate an Early Cretaceous long-necked dinosaur from Utah, and repaired many a [Prehistoric Journey](#) display specimen.

The lab bid adieu to term Preparator and soon-to-be grad student **Will Bullard**. No doubt he'll fondly remember his times working and occasionally goofing around in the giant cradling sandbox that Volunteer **Fritz Koether** built for our Oversize Prep Lab.



With a degree from [Colorado College](#), former Intern, Volunteer and now-Preparator **Salvador Bastien** began his position in true trial-by-fire Museum fashion. After only a couple of weeks on the job, Salvador joined Natalie and Joe Sertich to lead crews of Volunteers and Interns to prospect and quarry fossils in southern Utah. Back onsite, Salvador spent much of the year preparing fossils from these sites while getting to know our Volunteer armada.

A [Jedi Master](#) at making cradles to support delicate specimens, Salvador has also been building a Volunteer team to re-house at-risk fossils from our type collections. If you love plaster, fiberglass and giant sand boxes, please give him a shout!





When he wasn't running [Spartan](#) obstacle course races, Curator **Tyler Lyson** teamed up with Ian to kick off a massive project focused on the recovery from the K/Pg mass extinction. They also passed it forward, and with [Kent Hups](#) co-advised eight [Teen Science Scholars](#) who compared microvertebrate changes across the K/Pg boundary in Montana. Tyler clearly has a gift for writing letters of recommendation, as he helped four of his recent Interns to land plum spots in PhD programs.

Tyler and Joe Sertich also named a species of softshell turtle after its discoverer, our late Preparator, [Mike Getty](#). Channeling Mike's omnipresent circle of positive energy, something known to friends as the "Gettysphere", the fossil is called *Gilmoremys gettyspherensis*. Fitting!



Preparator **Justy Alicea** spent the first part of the year training us in micropreparation. He's working closely with Tyler on K/Pg fossils, including some of the most bizarre ones ever found in Colorado. Although it's too early to know the story there, Justy's meticulous preparation will hopefully give us some new insights into the life and times of the Early Paleogene. Stay tuned!

Curator **Joe Sertich** continued to piece together the diverse paleontology and biogeography of the Laramidian landmass, leading field crews to Upper Cretaceous strata in New Mexico, Utah, Colorado, and Wyoming. When he wasn't prospecting for fossils, establishing quarries, or jacketing giant dinosaur skulls in the American West, Joe coordinated helicopter lifts to remote field sites, visited museums in Spain, and drew incredible [Denver Paleontology](#) logos and t-shirts!



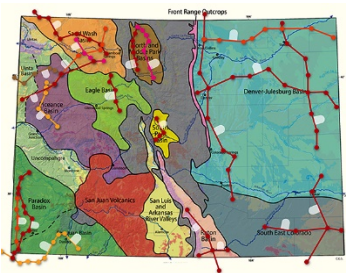


Joe mentored nearly a dozen Interns in the field, even bringing some of them to the SVP ([Society of Vertebrate Paleontology](#)) meeting. There, he landed with Richter scale impact—co-authoring ten presentations. Wow! No wonder he was promoted to Associate Curator earlier this year. Kudos, Joe! In quieter moments, he continued his African collaborations, publishing [papers](#) on fossils in Egypt, Kenya, and Madagascar.

Research Associate **Bob Reynolds** began the year in the U.A.E., sleeping on a pillow basalt while surveying his son's project on abandoned date grove water systems. Leveraging the Planetarium (often with Space Sciences Curator [Ka Chun Yu](#)) as well as 'traditional' DMNS classrooms, Bob taught classes on geology, earth imaging, planetary change, and the [origin of beer!](#)



Bob led field courses in Pakistan and Kenya's Turkana Basin and continued a project to understand the origin of [Pagosa Hot Springs](#). He continues to add new resources to [Coloradostratigraphy.org](#), catalyzing insights into the structure, strata, and evolution of Rocky Mtn. basins.



For Curator **Dave Krause**, 2018 was the year for cranking out scientific manuscripts. After visiting Beijing to study breathtaking fossil mammals, he led a herculean effort to analyze a mind-blowing Mesozoic mammal from the ancient Gondwanan supercontinent. The result will be Dave's fourth edited SVP Memoir—a record for the scientific community. This ~250 page colossus could become a Rosetta Stone for understanding early mammalian evolution.





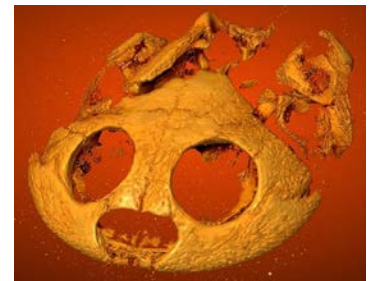
Channeling his inner Voltaire, Dave also completed manuscripts assessing the Mesozoic vertebrate biogeography of Gondwana, describing a Cretaceous mammal jaw from Tanzania, and analyzing Indian subcontinent biogeography.

In between these projects, Dave secured a grant from the [David B. Jones Foundation](#) to fund Interns and provide experience doing fieldwork, fossil preparation, collections work, and/or digital modeling. This is a major demonstration of our mission to pay it forward to the next generation of scientists!



Technician **Lindsay Dougan** continued to extend the impact of the Digital Imaging Lab, adding a third workstation while training nearly a dozen new Interns and Volunteers. Lindsay's team finished its collaborative project with [Ohio U.](#), contributed 3D models to some of Dave's papers, and began segmenting specimens for Tyler's work on the K/Pg boundary.

Perhaps the coolest way that lab is growing though, is—drum roll please—Lindsay is expecting her first child! It's due any day now. In true Museum fashion, Lindsay and baby have already done some fieldwork and given their first talk—at the recent [SVP meeting](#). Congrats!



Joining Lindsay in the lab is our first David B. Jones Intern, **Tasha Anderson**, who's learning the art and science of digital paleontology. Her 3D models range from a Cretaceous pug-nosed croc from Madagascar to toilet-shaped brachiopods from the Ordovician of Kentucky. Her animations of these fossils are helping us understand how these ancient beasts made a living.

As part of her internship, Tasha got her first field experience under her belt by joining Joe's crew to uncover a hadrosaur from the Wahweap Formation of Utah.



Not everything in 2018 was roses, as some after-market improvements needed to be made to the rack systems in the collections. As a result, Kristen and team had to unload and reload nearly the entire collection to accommodate the work. A monumental task! Kristen also did fieldwork in New Mexico and Colorado.

Collections Manager **Kristen MacKenzie** shepherded one of our biggest collections years, with 50,000+ specimens coming into the Museum from donors, research partners, and fieldwork. Yowza! She and the Collections team moved over 30 tons of field jackets out of the Land Bank, tucking them into every nook and cranny imaginable. The space is now a VR exhibit.



In a paleontological adventure that evoked [Planes, Trains & Automobiles](#), Kristen and new Assistant Collections Manager and former Intern **Nicole Neuyagle** drove cross-country to bring Ken Rose's Paleogene collection from Johns Hopkins to the DMNS. En route they picked up the Field Museum's Madagascar collection. For Nicole, it was trial-by-fire—a theme in our department. What a great way to build camaraderie with Kristen!

Nicole successfully defended her [CU Museum Studies](#) M.S. thesis in the fall, presenting the research at SVP. In between, Nicole and Volunteers sunk teeth into the massive Hollingsworth trilobite collection, and learned the intricacies of our [meteorite collection](#), including how ridiculously heavy they are. Welcome Nicole!





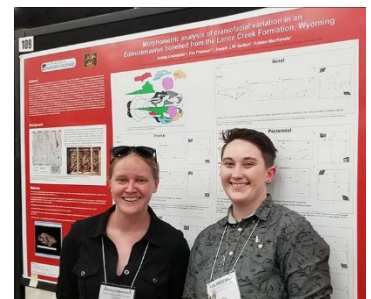
David B. Jones Collections Intern **Vanessa Gabel** joined us after completing an [AmeriCorps](#) stint in New York. At present, she's working to catalogue Cretaceous fossils from the Museum's Madagascar collection, and several boxes of enigmatic "whatsits". Like many of our Interns, Vanessa is hoping to head to grad school this fall, focusing on geomorphology or sedimentology.

Recent [UT](#) grad and Collections Intern **Jessica Johnson**, is also aiming for graduate school in the fall. Bitten by the bug of paleontology during summer field school, she's been upping her fossil chops by photo-documenting and re-cataloguing the 450+ specimens in our *Prehistoric Journey* exhibit. Soon these specimens will be 'virtually' accessible to all—on the web!



Ashley Lownsdale, one of our former collections and prep lab Volunteers, is another one of our David B. Jones Interns. She's focusing on cataloging recently acquired vertebrate paleontology collections, including dinosaurs from last year's [Hankla family donation](#) and the recently acquired Madagascar collection.

Ashley and former Intern **Fox Freeman** (at right), were part of the Museum team that took the SVP meeting by storm, presenting their research on how the Wyoming dinosaur *Edmontosaurus*' skull changed throughout its life history. They and 13 other DMNSers presented their work at that conference – a record!



Earth & Space Sciences Specialist **Samantha Sands** continued to up our outreach game. She added new hands-on activities and iconic fossils to our *Ancient Seas* display area and began to integrate our meteorites and rocks into the soon-to-be-overhauled *Space Odyssey* exhibition. Over the summer she led a [Dinosaurs by Canoe](#) trip on the Gunnison River.

In the fall, she married fellow Museum Specialist **Brian Hostetler** and showcased some epic baking skills with a mineral- and marble-themed wedding cake. On a [Yule Marble](#) cake stand, no less. Congratulations!



Curator **James Hagadorn** began the year on the Museum's [Innovation Team](#) studying how AR, VR, and other immersive approaches can enhance Museum experiences. Then he dove into the world of detrital zircons, stable isotopes, and microbialites, trying to suture together temporal and environmental frameworks for our region's stratigraphy.

Normally a deep time guy, the magnetic attraction of the Mesozoic was too strong to resist, and units like the Chinle, Jelm, and State Bridge drew his attention. Before he was completely brainwashed by redbeds and continental strata, James stole away for a few moments in good ol' Paleozoic marine rocks, including one that's sourcing [gold nuggets](#). And huge ones at that!



But fate intervened as Tyler and Ian lured him into studying even younger (Paleocene) rocks. At least the outcrops aren't red! In between it all, James and his Interns sorted thousands of rocks from the Shropshire donation and brainstormed how to help Research Associate **Paul Weimer** [animate ancient Colorado](#).

Intern and soon-to-be grad student **Patrick Sullivan** spent much of the summer making 3D models of new fossils from Colorado Springs with Tyler. Now he's experiencing a geology crash course, becoming an Adobe Illustrator Jedi and helping James and Bob make [paleogeographic maps](#). These reconstructions will update the legendary maps from [Ron Blakey](#) and RMAG's "[Big Red Book](#)," and are aimed at helping visualize evolution of our ancient landscapes.

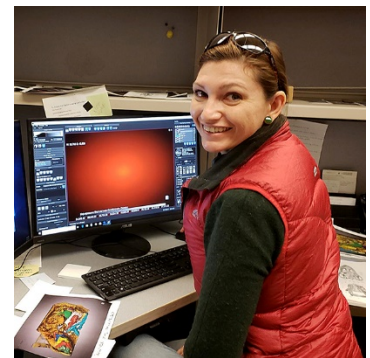


AWARDS



We're grateful to all the Volunteers who make the DMNS magic happen. This year we honored several with a wood-burned plaque made by DMNS Security Officer, **Don Johnson**. Each award is inscribed with Joe's rendition of the Thornton *Torosaurus*.

Adrienne Tecza (2018 Digital Imaging Lab Award) continues to extend our scientific reach. She's modeled sutures in mammal skulls, reconstructed Cretaceous birds, and digitally dissected Silurian brachiopods. With [Dragonfly](#) and similar programs, she's helped peers get up to speed, teaming with Lindsay to wow audiences at Museum [Science Lounges](#) and Open Houses.



Janet Hunter (2018 Collections Award) switched from making thin-sections to becoming our KE Emu database guru. Spearheading the cleanup of over a century's worth of locality information, Janet is integrating these data with specimen images and inventory so that we can make our collections available [online](#). Can't wait for that!

Mary Mathiowetz (2018 Prep Lab Award) helped prepare an undescribed duck-billed dino from Utah, as well as a new carnivorous dinosaur and [Majungasaurus](#) vertebrae from Madagascar. To top it off, she helped organize and catalog the museum's growing collection of fossil casts and molds. No small undertaking!



Doug Shore (2018 Field Award), returned for his third field season in New Mexico and Utah, helping the Museum team prospect and excavate fossils. Channeling the karma of mega-field-Volunteer **Fritz Koether**, Doug spent nine weeks in the field, tracking every imaginable type of fossil—from crocs to horned dinosaurs, and even a few forms new to science!

PASSINGS



In 2018 we honored the lives of longtime Volunteers **Sheila Burns, Marvin Daniel, Hal Kessler, Gerry Pawley, Lydia Toll, and Jan Tucker**. They were anchors of our labs, our field programs, and our community's exhibit experiences. Although they're sorely missed, their spirits are with us as we continue the journey to explore deep time.

ALUMNI SPOTLIGHTS

After leaving the Museum, **Peter Bucknam** (Collections Assistant, '94-'98, son of Volunteer [Susan Bucknam](#), and grandson of legendary Volunteer [Jim Hurlbut](#)) began a career in Denver's oil and gas exploration industry, where he currently works. When he's not in full "parent taxi" mode with his kids, he enjoys biking to breweries and exploring the mountains with his dogs.





Paleo has always had a special place in Peter's heart, and he still enjoys taking his kids to collect leaves or trilobites while on camping trips—despite their protests. To wit, when **Kirk Johnson** called him in 2011, saying “we need diggers”, he returned as a Volunteer to help unearth Snowmastodon. It was as if he was back on the K/Pg again—like the vintage moment in this photo!

After helping mentor fellow teens at the Museum, **Olivia Verma** (Teen Science Scholar, '08, '09, '11) completed a B.S. in Geosciences at Colorado State. From there she pursued a career in GIS, working with telecom companies to map routes for fiber optic cables throughout the U.S. Recently she joined one of our favorite Colorado companies, [DigitalGlobe](#), where she'll be monitoring and planning commercial satellites.



Big Bone Room alumna **Catherine Lo** (Volunteer, '10–'13) is pursuing her lifelong hobby of wood carving. Rather than preparing fossil animals out of rocks, she's releasing animal shapes from basswood! Once a Volunteer, always a Volunteer; in lieu of cataloging Museum specimens, Catherine helps out weekly at the [Boulder County Community Food Share](#).

Former [Colorado College](#) Intern and Collections Assistant **Gabi Rossetto** ('15–'17) is living the paleobotanical dream. She's nearly completed her M.S. at Penn State, focusing on leveraging Eocene monkey trees from Patagonian rainforests to understand Gondwanan paleogeography. She'll continue work there for her PhD, focusing on conifer paleoecology through the Eocene-Oligocene transition. Her work regularly takes her to museums and outcrops in Argentina, and to herbaria and botanical gardens across the U.S. to study modern plant analogues. To cap off what already seems like a banner year, Gabi got married this past fall, and is now Gabriella Rossetto Harris. Congratulations!





Since we last saw him, **Bryant Burciaga** (Teen Science Scholar, '10-'12) got his B.S. in Business Administration, traveled coast-to-coast, and enrolled in CU-Boulder's [Computer Science program](#). He's working for Janus Henderson Investors as a Technology Analyst and gearing up for a big move—to London! There he'll be on assignment for six months and hopes to continue to travel and get outdoors with friends and family.

Siyang Sun (Volunteer '10-'15) just finished his undergrad in Math and Economics at UCLA where he'll continue in the fall for a M.S. in Business Analytics. Recently he's been applying mathematical and statistical techniques to gain insights in other fields—including science! For example, he studied the impacts of tails on quadrupedal locomotion to improve robot design.



Geology major **Taylor Robertson** (Intern, '18) had little exposure to paleontology before coming to the Museum, but three months in the Prep Lab changed all that. Scaffolding on her experience here, she's about to start the Geographic Information Systems (GIS) program at the [University of Denver](#), and we wish her well as she launches her post-graduate career in Earth Sciences.

Hillary McLean (Volunteer, '11-'18) cut her teeth with our prep labs and field crews. She recently began her M.S. in Geosciences at Ft. Hays State U. with former Coloradan [Laura Wilson](#). There she helped set up the new fossil prep lab at the [Sternberg Museum of Natural History](#), aka "The Dome on the Prairie", and dove into the world of Mesozoic reptiles.





When she isn't mentoring undergrad majors in the field or in the lab, she moonlights as Dungeon Master for their D & D group. Hillary's big news is that soon she'll be moving to Dallas, where she'll be the [Fossil Lab Manager](#) at the [Perot Museum of Nature and Science](#). This is a lifelong dream for Hillary and we couldn't be more proud of her. But don't forget to finish your thesis!

Fellow museumophile [Jasmine Croghan](#) (TSS and Volunteer, '07-'09) is pursuing a career in paleobiology. While working on her B.S. in Paleontology from [Montana State](#), she studied Chinese dinosaur egg taphonomy, and then followed it up with a M.S. from the [U. of Alberta](#) in which she described a bizarre fossil snake assemblage from Wyoming. To stay sane through grad school, she climbs, makes fiber art, and plays with her nephews whenever possible. Currently she's getting her PhD at Ohio U., studying the functional morphology of turtle feeding, and traveling about the country CT-scanning museum specimens. Tyler is envious!



After her M.S. in Geosciences at [Colorado State](#), **Kajal Nair** (Intern, '18) launched her career in earth sciences, working with James on all sorts of crazy Permian-Triassic redbed projects. She now works for a Denver-based oil and gas company where she is constantly fascinated by the science and technology that drives the energy business.

Kajal is now a DMNS Research Associate, and in her spare time she enjoys riding horses, spending time outdoors, and continuing her work on the Triassic (or is it Jurassic?) Jelm Formation. This little-known unit is a vestigial remnant of a vast dune field that once covered Colorado, Wyoming and beyond.





For the last 20 years, Research Associate **Jason Hicks** (Volunteer, '99–present) has helped us study the K/Pg boundary and spread the good word of the Museum far and wide. Throughout this time, he's spent part of each year surfing our planet's poles while conducting geology and climate change outreach on cruise ships. As 2019 rung in, Jason was on Antarctica's Half Moon Island—where it's summer! Here the ice shatters rocks, forming jointed, jagged outcrops. There are also strange beaches covered in plate-like volcanic cobbles. The latter ring like broken glass when you walk across them—thus they're called phonolites (*trans*: "sounding stones").

Thanks for your support and have a terrific 2019!

