

# 2021 ANNUAL REPORT SCIENCE DIVISION



# CONTENTS

1. INTRODUCTION.....	4
1.1. SUMMARY STATEMENT .....	4
1.2. METRICS SUMMARY .....	4
1.3. BOTTOM LINE.....	4
2. PERSONNEL .....	5
2.1. STAFF NEWS.....	5
2.2. SCIENCE DIVISION STAFF .....	5
2.3. VOLUNTEERS.....	5
3. DIVERSITY, EQUITY, ACCESS, & INCLUSION .....	5
4. RESEARCH.....	6
4.1. HIGHLIGHTS .....	6
4.2. PUBLICATIONS .....	8
4.2.1. SCIENTIFIC BOOKS AUTHORED & EDITED .....	8
4.2.2. SCIENTIFIC JOURNAL ARTICLES .....	8
4.2.3. SCIENTIFIC BOOK CHAPTERS .....	10
4.2.4. NON PEER-REVIEWED SCIENTIFIC PUBLICATIONS .....	10
4.2.5. ABSTRACTS.....	10
4.3. EMERITI STAFF .....	11
4.4. RESEARCH ASSOCIATES .....	11
4.5. DEPARTMENT ASSOCIATES .....	12
5. COLLECTIONS .....	12
5.1. HIGHLIGHTS .....	12
5.2. SIGNIFICANT ACCESSIONS:.....	14
5.3. SIGNIFICANT DEACCESSIONS: .....	14
6. COMMUNICATING SCIENCE.....	15
6.2. PUBLICATIONS .....	15
6.2.1. POPULAR ARTICLES .....	15

7. SERVICE TO DISCIPLINE.....	16
7.1. HIGHLIGHTS .....	16
7.2. EXTERNAL SERVICE.....	17
8. APPENDICES .....	18
8.1. APPENDIX A - SUMMARY OF 2021 ACTIVE GRANTS .....	18
8.2. APPENDIX B - SUMMARY OF 2021 SUBMITTED, AWARDED, & DECLINED GRANTS .....	20
8.3. APPENDIX C - SUMMARY OF GIFTS RECEIVED (TRNA).....	24
8.4. APPENDIX D - SCIENCE DIVISION STAFF LIST .....	26
8.5. APPENDIX E - COLLECTION COUNT.....	29
8.6. APPENDIX F - COLLECTION ACTIVITY.....	33
8.7. APPENDIX G - COLLECTION ACCESS .....	36
8.8. APPENDIX H - OUTREACH METRICS.....	40
8.9. APPENDIX I - EDUCATION COLLECTIONS PROGRAMS SUPPORTED .....	41
8.10. APPENDIX J - INTERNS .....	41
8.11. APPENDIX K - EDITORSHIPS .....	43
8.12. APPENDIX L - COMMITTEES, BOARDS, & OFFICER POSITIONS.....	43
8.13. APPENDIX M - AFFILIATE POSITIONS .....	45
8.14. APPENDIX N - PROFESSIONAL CONFERENCES.....	45

## EXECUTIVE SUMMARY

Science Division staff continued to remain flexible and resilient while enduring a second year under the global COVID-19 pandemic. While the Museum remained open, many staff members continued to largely keep hybrid schedules, balancing on-site and remote work. Collection growth remained slow as field schedules were limited and travel remained difficult, but some pre-pandemic activities returned. Science Division staff offered a limited amount of tours, invited some visiting researchers back in to the collections, engaged in some fieldwork, and near the end of the year, began to welcome back a limited amount of volunteers to work on critical projects.

The Science Division has 38 staff members (28 regular operations and ten term grant, initiative and TRNA). The Science Division raised \$3,307,477 and expended \$4,373,024 for a bottom line of (\$1,065,547). The Science Division submitted 16 government grant proposals for \$2,915,949, received ten grants totaling \$887,631, raised \$3,125,522 in foundation grants and corporate and individual gifts.

Most notably, the Museum received a historic \$25M donation (\$22.5M endowment and \$2.5M initial gift), the largest in the Museum's history, from an anonymous donor. The funds will support inclusive conservation work inside and outside the Museum's walls.

## DIVERSITY, EQUITY, ACCESS, & INCLUSION (DEAI)

Gabriela Chavarria served as VP Champion for the Museum's Equity Initiative and led the Living Our Values team. Dominique Alhambra, Andie Carrillo, Baylee Hughes, and Kathryn Reusch served on the Living Our Values team as well, and Andie Carrillo and Jeff Stephenson served on the Conversations about Community team. Paula Cushing continued to lead Skirts in Science. Externally, Science Division staff joined DEAI committees and working group for numerous professional societies within their respective disciplines.

## RESEARCH

The Museum has 13 curators. Science Division staff published 38 peer-reviewed papers, books, and book chapters. Curators led 37 research field excursions over 316 days and continued to implement seven grant-funded research projects.

## COLLECTIONS ACTIVITY & ACCESS

The number of objects under the care of the Science Division staff remained 4.3 million objects, with 0.13% of the Museum's collections on permanent display. There were 103 collection accessions, four deaccessions, 19 incoming loans, and 83 outgoing loans. Staff members continued to implement six grant-funded collections projects. Curators and collections staff fielded research requests from 473 researchers both inside and outside of the museum over the course of 505 days. 200 guests attended collection open houses, 962 attended behind the scenes tours, and staff members interacted with 1,396 guests at event tables.

## COMMUNICATING SCIENCE

Joseph Sertich served as curator for *SUE: The T. Rex Experience*, Erin Baxter served as curator for *Stonehenge*, James Hagadorn served as curator for *Numbers in Nature: A Mirror Maze*, Frank Krell served as curator for *Survival of the Slowest*, Steve Nash served as curator for *Guitar: The Instrument that Rocked the World*. Science Division staff offered a total of 453 courses, events, lectures, fieldtrips, and virtual programs to 65,983 attendees. Staff published 14 popular articles and continued to implement one grant-funded outreach project.

## SERVICE TO DISCIPLINE

Science Division staff members attended and/or presented at 47 professional conferences. Science Division staff members held memberships with 64 professional organizations, served as editors or on editorial boards for 12 journals, served as committee members, board members, and officers for a total of 39 professional associations and societies, served on 14 grant review panels, and peer reviewed 61 articles and book chapters for academic journals and other publishers. The Science Division supported a total of 24 internships, hosted 20 Teen Science Scholars, and mentored 27 undergraduate and graduate students.

# 1. INTRODUCTION

## 1.1. SUMMARY STATEMENT

This document provides a summary of the staff, work, and achievements of the Science Division during 2021. The division quarterly attendance reports, annual narrative reports, and collection activity reports contain additional detail.

## 1.2. METRICS SUMMARY

	2017	2018	2019	2020	2021
<b>FINANCE</b>					
\$ Value of grants awarded - Appendix B	\$383,082	\$701,865	\$430,949	\$512,776	\$887,631 <sup>1</sup>
\$ Value of grants sought - Appendix B	\$1,114,353	\$722,402	\$1,187,370	\$693,436	\$2,915,949
\$ Value of gifts received (TRNA/DMNS Foundation) - Appendix C	\$211,315	\$257,668	\$409,398	\$912,057	\$25,625,522 <sup>2</sup>
<b>PUBLICATIONS &amp; ACCESS</b>					
# Scientific books, articles, & chapters	32	24	34	47	38
# Popular books & articles	91	25	17	15	14
Program Attendance - Appendix H	75,798	60,336	109,475	113,742	65,983 <sup>3</sup>
<b>COLLECTION ACTIVITY</b>					
# Objects in Collections - Appendix E	4,366,495	4,366,495	4,366,495	4,366,495	4,366,495 <sup>4</sup>
#Accessions (#Deaccessions) - Appendix F	171(6)	173(14)	159(3)	74(11)	103(4)
#Annual Incoming Loans (#Outgoing Loans) - Appendix F	20(173)	25(169)	25(178)	4(55)	19(83)
<b>COLLECTION ACCESS</b>					
#Total Objects on Loan	11,051	11,771	13,078	22,906	26,676
#Researchers (Researchers measured in days) - Appendix G	(1,496)	(1,343)	(644)	(511)	473(505)
#Ed Coll-Supported Museum Programs (Attendance) - Appendix I	2,952 (60,236)	1,654 (58,700)	1,448 (48,514)	No data	236 (5,064) <sup>5</sup>
Tours & Open House Attnd. (included in Program Attnd. above) - Appendix G	12,671	19,720	10,656	2,992	1,162
Event Table Attnd. (included in Program Attnd. above) - Appendix G	28,937	17,208	11,449	505	1,396

<sup>1</sup>The full value of multi-year grants is listed in the year they were awarded.

<sup>2</sup>This includes the \$22.5M endowment, though this fund will not be available for use until 2023.

<sup>3</sup>Fewer virtual programs were scheduled in 2021 and we saw waning attendance at those offerings, as compared to 2020.

<sup>4</sup>For consistency, we will continue to report an object count of 4.3 million. Variation in counting methods caused us to overestimate our count in the 2017 RCD Annual Report.

<sup>5</sup>Education Collections use lower due to staff layoffs in 2020, some programs not actively using collections, and missing data for some programs.

## 1.3. BOTTOM LINE

		2021 FORECAST	2021 ACTUAL	VARIANCE	2022 BUDGET
REVENUE	Gifts & Grants	\$384,524	\$334,265	(\$50,259)	\$440,142
	Foundation Support	\$491,153	\$419,565	(\$71,588)	\$442,957
	TRNA Released	\$465,140	\$607,244	\$142,104	\$501,756
	Other Revenue	\$43,065	\$1,946,403	\$1,903,338	\$1,200
	<b>Net Support &amp; Revenues</b>	<b>\$1,383,882</b>	<b>\$3,307,477</b>	<b>\$1,923,595</b>	<b>\$1,386,055</b>
EXPENSES	Personnel	3,288,022	\$3,287,401	(\$621)	\$3,594,664
	Purchases	1,166,405	\$1,085,623	(\$80,782)	\$1,287,995
	<b>Total Expenses</b>	<b>4,454,427</b>	<b>\$4,373,024</b>	<b>(\$81,403)</b>	<b>\$4,882,660</b>
FUND GAIN/(LOSS)		(\$3,070,545)	(\$1,065,547)	\$2,004,998	(\$3,496,604)



## 2. PERSONNEL

### 2.1. STAFF NEWS

In January, the Anthropology Department welcomed Megan Salas, a former Conservation Intern, as Objects Conservator funded through the IMLS Northwest Coast Collection grant.

Also in January, Ashley Lownsdale transitioned from working on Dave Krause's NSF Madagascar grant to the David B. Jones Foundation funded Paleontology Collections Assistant grant.

Colleen Carter returned in April in a new role, Zoology Collections Assistant, working with Paula Cushing through funding from a generous donor.

In June, Sam Schiller left his position as Archivist after over 11 years of service.

Also in June, Ian Miller left his position as Director of Earth and Space Sciences after 15 years of service. Following Dr. Miller's departure, Steve Nash stepped in as Acting Director.

Daren Fischer left her position in October as term Archives Collections Assistant after one year with the Museum.

Also in October, Baylee Hughes ended her term position working as Anthropology Collections Assistant on the NEH Archaeology grant and transitioned to work on the NEH WS Ranch grant.

In December, Lindsay Dougan transitioned from working on Tyler Lyson's NSF Turtle Body Plan grant to work on the Colorado Springs Project through a generous donation from a private foundation.

Jeff Phegley celebrated over seven years with the Museum, and departed as Anthropology Assistant Collections Manager at the end of December.

### 2.2. SCIENCE DIVISION STAFF

EMPLOYEE TYPE	HEAD COUNT	FTE
Operations	28	26.86
Grant	5	5.0
TRNA/Foundation	4	3.13
Initiatives	1	1.0
<b>TOTAL</b>	<b>38</b>	<b>35</b>

\*See Appendix D for a list of staff

### 2.3. VOLUNTEERS

CONTENT AREA	VOLUNTEER HOURS	VOLUNTEER COUNT
Anthropology	2,881.75	22
Earth Sciences	15,374.75	85
Education Collections	0	0
Health Sciences	381.75	3
Library & Archives	0	0
Space Sciences	62.50	1
Zoology	2,282.50	41
<b>TOTAL</b>	<b>20,983.25</b>	<b>152</b>

\*Includes Teen Science Scholars and interns.

## 3. DIVERSITY, EQUITY, ACCESS, & INCLUSION

All Science Division staff engaged in Diversity, Equity, Access, and Inclusion (DEAI) work in some way over the course of the year, through DEAI Town Halls, Museum sponsored trainings, Science Division discussions and workshops, and through small group discussions and informal conversations.

Staff made individual commitments by serving on internal DEAI teams. As part of her work on the Living Our Values (LOV) team, Dominique Alhambra developed a recruitment document, an Anti-Asian violence statement, and a DEAI toolkit. Also, in partnership with the LOV team, Baylee Hughes created a DEAI holidays and events calendar and provided bias review for exhibitions. Andie Carrillo hosted numerous Conversation About Community sessions for Museum staff, discussing a variety of DEAI-related topics. Andie was also invited to facilitate department-specific discussions to give staff a better understanding of the DEAI work around the Museum and how they fit into that work. Steve Nash led more than a dozen tours of the Native American Indian Cultures hall for staff across the Museum to talk about DEAI and decolonization.

In addition, the Division as a whole continues to demonstrate its commitment to DEAI work as evidenced by the new anonymous gift to fund inclusive conservation and the collaborative work done through the IMLS Northwest Coast Collection grant, both detailed in section 5.1, which both demonstrate our desire to embrace different ways of knowing.

Science Division staff also engaged in DEAI efforts through their external scientific organizations. Paula Cushing was involved in DEAI work with the American Arachnological Society (AAS) and revised codes of conduct for the AAS and the International Society of Arachnology. Michele Koons assisted the Colorado

Council for Professional Archaeologists in developing an ethics statement, and David Krause continues his work as CEO of the Madagascar Ankizy Fund, providing education and medical care for girls and boys in remote areas of Madagascar.

## 4. RESEARCH

Science Division staff returned to the field in 2021, working sites across Colorado and the Southwest all the way to France. Staff were also busy publishing, with 38 peer-reviewed, scientific publications. In addition, staff were cited 2,395 times, and at the time this report was compiled, there were 1,464 mentions of Museum publications in various social media outlets, news articles, blogs, and various other sources.

### 4.1. HIGHLIGHTS

Paula Cushing, Ryan Jones, and Erika Garcia carried out a cumulative two months of successful fieldwork, collecting solifuges from type localities throughout the western United States. Ryan Jones successfully completed and defended his Master's thesis project, resulting in two peer-reviewed manuscripts and was accepted into the University of Colorado, Denver doctoral program. Erika Garcia defended her comprehensive exam and is now a Ph.D. candidate.



In continuation of his research on the genomics of speciation in Brown Creepers, Garth Spellman, with Joseph Manthey at Texas Tech, published a paper in the journal *Genome Biology and Evolution* examining how genomic architecture shapes genetic divergence in allopatry and identifies two genomic regions in these newly formed species that is extremely important in maintaining species boundaries.

In a publication for *Papers in Palaeontology*, Frank Krell named a beautiful new species of beetle, *Pulchritudo attenboroughi*, or “Attenborough’s Beauty” as a dedication to the English broadcaster and naturalist, Sir David Attenborough. The fossil

frog-legged leaf beetle from the Green River Formation had been on exhibit in the DMNS Prehistoric Journey exhibit for decades without being correctly classified.



The Digital Research Lab continued to contribute to the ongoing research in the Department of Earth Sciences and training the next generation of scientists. The Lab received a brand new 3D printer, with funding through the NSF Turtle Body Plan grant, which has produced about three dozen prints since it first got up and running in May. Lindsay Dougan was invited to present several guest lectures to students in the Clinical Anatomy Summer Program at Stanford University, reaching about 100 students, and Holger Petermann reached over 300 middle schoolers as the guest lecturer at the Envision Experience Explore STEM event.

In August, Michele Koons and Erin Baxter traveled to northern France on a mission sponsored by the Department of Defense POW/MIA Accounting Agency. This year marks the 77th anniversary of the crash of an American bomber in Northern France that occurred in the summer of 1944. The pilot's remains have gone un-recovered in the European country for decades, and Michele and Erin spent six weeks on a mission to recover the remains.





In March, the University of Colorado Press published *The Egyptian Mummies and Coffins of the Denver Museum of Nature & Science: History, Technical Analysis, and Conservation*, a volume detailing the reexamination of the Museum's two mummies and three coffins using innovative, inexpensive, and accessible techniques. Michele Koons co-edited the volume and contributed chapters along with former conservators Jude Southward and Jessica Fletcher.

Ka Chun Yu continued to explore K-band luminosity function of the young star forming cluster W40. He is focused on creating a theoretical cluster model to compare with observations. The model features the ability to explore cluster evolution over time using different initial mass functions, stellar evolutionary tracks from a variety of different models, different types of star formation scenarios (bursts vs. continuous), and the ability to generate large numbers of instances to allow for Bayesian analysis of observed cluster properties.

Joseph Sertich, with Natalie Toth and Salvador Bastien, led a three-week field investigation to Grand Staircase-Escalante National Monument as part of a new, annual Colorado State University field course, conducted under an MOU between DMNS and the CSU Warner College of Natural Resources. Students learned how to measure geologic sections, prospect for new fossil localities, excavate and collect vertebrate fossils, and observe taphonomic indicators in a quarry.



The Colorado Springs Project continued to build on its previous successes with a truly collaborative effort in the publication on *Taeniolabis taoensis*, an iconic Paleocene multituberculate mammal, in the highly regarded *Journal of Mammalian Evolution*. Co-authors included four staff members and four research associates (see citation below). The project also

claimed the lead paper and cover of the *Journal of Vertebrate Paleontology* twice, first, describing a new species of hard-shelled turtle and the second, describing a new species of soft-shelled turtle. In addition, new field excursions to Corral Bluffs yielded 55 new vertebrate localities, including several mammalian crania, turtle skeletons, and numerous alligator skulls from the early Paleocene of the Denver Basin.



With support through the NSF Cretaceous Vertebrates from Madagascar grant, David Krause and Tyler Lyson were co-authors on a description and analysis of the most complete fossil turtle specimen from the late Cretaceous of the entire southern supercontinent Gondwana, published in *Royal Society Open Science*. This specimen is now the holotype of a new genus and species of pelomedusoid turtle, *Sahonachelys mailakavava*, a specialized suction feeder. This adaptation is unique among crown pelomedusoids and convergent upon that seen in numerous other groups of turtles.

James Hagadorn received two research grants to study the Lyons Sandstone in Colorado, one from Jefferson County Open Space and the other from Larimer County Open Space. He also received the 2021 Best Paper Award by the Rocky Mountain Association of Geologists for "Sedimentology, petrography, and deposition of the Upper Cretaceous Codell Sandstone in the Denver Basin" and the 2021 Outstanding Scientist Award from the Rocky Mountain Association of Geologists.





## 4.2. PUBLICATIONS

### 4.2.1. SCIENTIFIC BOOKS AUTHORED & EDITED

**Koons, M.** & Arbuckle MacLeod, C. (eds.) 2021. *The Egyptian Mummies and Coffins of the Denver Museum of Nature & Science*. Louisville, Colorado: University Press of Colorado. 218 pp.

### 4.2.2. SCIENTIFIC JOURNAL ARTICLES (PAPER/ ONLINE PEER-REVIEWED)

Ahrens, D., Ah Yong, S.T., Ballerio, A., Barclay, M.V.L., Eberle, J., Espeland, E., Huber, B.A., Mengual, X., Pacheco, T.L., Peters, R.S., Rulik, B., Vaz-de-Mello, F., Wesener, T. & **Krell, F.-T.** 2021. Is it time to describe new species without diagnoses?—A comment on Sharkey *et al.* *Zootaxa* 5027(2): 151–159. <https://doi.org/10.11646/zootaxa.5027.2.1>

Blais, B.R., Smith, B.E., Placyk Jr., J.S., Casper, G.S. & **Spellman, G.M.** 2021. Phylogeography of the smooth greensnake, *Opheodrys vernalis* (Squamata: Colubridae): divergent lineages and variable demographics in a widely distributed yet enigmatic species. *Biological Journal of the Linnean Society* 134(4): 940–957. <https://doi.org/10.1093/biolinnean/blab124>

Carpenter, A.M., Graham, B.A., **Spellman, G.M.**, Klicka, J. & Burg, T.M. 2021. Genetic, bioacoustics and morphological analyses reveal cryptic speciation in the warbling vireo complex (*Vireo gilvus*: Vireonidae: Passeriformes). *Zoological Journal of the Linnean Society*, zlab036 (20 pp.). <https://doi.org/10.1093/zoolinnean/zlab036>

Fabbri, M., Navalón, G., Mongiardino Koch, N., Hanson, M., **Petermann, H.** & Bhullar, B.A. 2021. A shift in ontogenetic timing produced the unique sauropod skull. *Evolution* 75: 819–831. <https://doi.org/10.1111/evo.14190>

Gates, T.A., Evans, D.C. & **Sertich, J.J.W.** 2021. Description and rediagnosis of the crested hadrosaurid (Ornithomimidae) dinosaur *Parasaurolophus cyrtocristatus* on the basis of new cranial remains. *PeerJ* 9: e10669 (35 pp.). <https://doi.org/10.7717/peerj.10669>

Gent, V.A., Longman, M.W., Bottjer, R.J. & **Hagadorn, J.W.** 2021. Stratigraphic distribution of the Codell Sandstone in the Denver Basin using wireline logs and core. *The Mountain Geologist* 58(3): 305–330. <https://doi.org/10.31582/rmag.mg.58.3.305>

Graham, M.R., **Garcia, E.L.**, Hendrixson, B.E. & **Cushing, P.E.** 2021. Pliocene origins, Pleistocene refugia, and postglacial range expansions in southern devil scorpions (Vaejovidae: *Vaejovis carolinianus*). *Organisms Diversity & Evolution* 21: 575–590. <https://doi.org/10.1007/s13127-021-00505-z>

**Hagadorn, J.W.**, Longman, M.W., Bottjer, R.J., Gent, V.A., Holm-Denoma, C.S. & Sumrall, J.B. 2021. The type section of the Codell Sandstone. *The Mountain Geologist* 58(3): 211–248. <https://doi.org/10.31582/rmag.mg.58.3.211>

Hinojosa, L., Riedy, R., Polman, J., Swanson, R., **Nuessle, T.** & Garneau, N. 2021. Expanding public participation in science practices beyond data collection. *Citizen Science: Theory and Practice* 6(1): 11 (15 pp.). <http://doi.org/10.5334/cstp.292>

Hodgin, E.B., Nelson, L.L., Wall, C.J., Barron-Diaz, A.J., Webb, L.C., Schmitz, M.D., Fike, D.A., **Hagadorn, J.W.** & Smith, E.F. 2021. A link between rift-related volcanism and end-Ediacaran extinction? Integrated chemostratigraphy, biostratigraphy, and U-Pb geochronology from Sonora, Mexico. *Geology* 49: 115–119. <https://doi.org/10.1130/G47972.1>

**Jones, R.R.** & **Cushing, P.E.** 2021. An assessment of function, intraspecific variation, and taxonomic reliability of eremobatid ctenidia (Arachnida: Solifugae). *Zoologischer Anzeiger* 295: 43–54. <https://doi.org/10.1016/j.jcz.2021.09.002>

Joyce, W.G., Anquetin, J., Cadena, E.-A., Claude, J., Danilov, I.G., Evers, S.W., Ferreira, G.S., Gentry, A.D., Georgalis, G.L., **Lyson, T.R.**, Pérez-García, A., Rabi, M., Sterli, J., Vitek, N.S. & Parham, J.F. 2021. A nomenclature for fossil and living turtles using phylogenetically defined clade names. *Swiss Journal of Palaeontology* 140: 5 (45 pp.). <https://doi.org/10.1186/s13358-020-00211-x>

Joyce, W.G., Rollot, Y., Evers, S.W., **Lyson, T.R.**, Rahantarisoa, L.J. & **Krause, D.W.** 2021. A new pelomedusoid turtle, *Sahonachelys mailakavava*, from the Late Cretaceous of Madagascar provides evidence for convergent evolution of specialized suction feeding among pleurodires. *Royal Society Open Science* 8: 210098 (32 pp.). <http://doi.org/10.1098/rsos.210098>

**Koons, M.L.**, Mitchell, M.D., **Hernandez-Bravo, M.**, **Hitte, T.**, **Moss Logan, J.** & **Baxter, E.** 2021. The Magic Mountain community archaeology project. *Journal of Community Archaeology & Heritage* 8(4): 213–228. <https://doi.org/10.1080/20518196.2021.1972560>

- Krause, D.W., Hoffmann, S., Lyson T.R., Dougan, L.G., Petermann, H., Tezca, A., Chester, S.G. B. & Miller, I.M.** 2021. New skull material of *Taeniolabis taoensis* (Multituberculata, Taeniolabidae) from the early Paleocene (Danian) of the Denver Basin, Colorado. *Journal of Mammalian Evolution* 28: 1083–1143. <https://doi.org/10.1007/s10914-021-09584-3>
- Krell, F.-T.** 2021. Suppressing works of contemporary authors using the Code's publication requirements is neither easy nor advisable. *Bulletin of Zoological Nomenclature* 78: 61–67. <https://doi.org/10.21805/bzn.v78.a021>
- Krell, F.-T.** 2021. Taxonomy and distribution of *Orubesa* in the Arabian Peninsula and surrounding areas (Coleoptera: Scarabaeoidea). *Zoology in the Middle East* 67(4): 332–343. <https://doi.org/10.1080/09397140.2021.1957209>
- Krell, F.-T. & Vitali, F.** 2021. Attenborough's Beauty: exceptional pattern preservation in a frog-legged leaf beetle from the Eocene Green River Formation, Colorado (Coleoptera: Chrysomelidae: Sagrinae). *Papers in Palaeontology* 7(4): 2101–2112. <https://doi.org/10.1002/spp2.1398>
- Longman, M.W., Hagadorn, J.W. & Gent, V.A.** 2021. Sedimentology, petrography and deposition of the Upper Cretaceous Codell Sandstone in the Denver Basin. *The Mountain Geologist* 58: 249–304. <https://doi.org/10.31582/rmag.mg.58.3.249>
- Lyson, T.R., Petermann, H. & Miller, I.M.** 2021. A new plastronid trionychid turtle, *Plastomenus joycei*, sp. nov. from the earliest Paleocene (Danian) Denver Formation of south-central Colorado, U.S.A. *Journal of Vertebrate Paleontology* 41(1): e1913600 (11 pp.). <https://doi.org/10.1080/02724634.2021.1913600>
- Lyson, T.R., Petermann, H., Toth, N., Bastien, S. & Miller, I.M.** 2021. A new baenid turtle, *Palatobaena knellerorum*, sp. nov. from the lower Paleocene (Danian) Denver Formation of south-central Colorado, U.S.A. *Journal of Vertebrate Paleontology* 41(2): e1925558 (11 pp.). <https://doi.org/10.1080/02724634.2021.1925558>
- Manthey, J.D., Klicka, J. & Spellman, G.M.** 2021. The genomic signature of allopatric speciation in a songbird is shaped by genome architecture (Aves: *Certhia americana*). *Genome Biology and Evolution* 13(8): evab120 (21 pp.). <https://doi.org/10.1093/gbe/evab120>
- Maccracken, S.A., Sohn, J.-C., Miller, I.M. & Labandeira, C.C.** 2021. A new Late Cretaceous leaf mine *Leucopteroptera spiratae* gen. et sp. nov. (Lepidoptera: Lyonetiidae) represents the first confirmed fossil evidence of the Cemiostominae. *Journal of Systematic Palaeontology* 19(2): 131–144. <https://doi.org/10.1080/14772019.2021.1881177>
- Nash, S.E., Towner, R.H. & Dean J.S.** 2021. The curious Douglas-fir (*Pseudotsuga menziesii*) trees in Schulman Grove, Mesa Verde National Park, southwestern Colorado, U.S.A. *American Antiquity* 86(3): 549–568. <https://doi.org/10.1017/aaq.2021.4>
- Oser, S.E., Chin, K., Sertich, J.J.W., Varricchio, D.J., Choi, S. & Rifkin, J.** 2021. Tiny, ornamented eggs and eggshell from the Upper Cretaceous of Utah represent a new ootaxon with theropod affinities. *Scientific Reports* 11: 10021 (15 pp.). <https://doi.org/10.1038/s41598-021-89472-1>
- Over, D.J., Wistort, Z., Soar, L.K., Bullocks, C.J. & Hagadorn, J.W.** 2021. Conodonts and the Devonian-Carboniferous transition in the Dyer Formation, Colorado. *Rocky Mountain Geology* 56(2): 51–67. <https://doi.org/10.24872/rmgjournal.56.2.51>
- Robison, H.W., Tumilson, C.R., Cushing, P.E. & Dorris, P.R.** 2021. An updated checklist of the spiders (Arachnida: Araneae) of Arkansas. *Journal of the Arkansas Academy of Science* 75: Article 5 (pp. 6–19). <https://doi.org/10.54119/jaas.2021.7516>
- Santibáñez-López, C.E., Cushing, P.E., Powell, A.M. & Graham, M.R.** 2021. Diversification and post-glacial range expansion of giant North American camel spiders in genus *Eremocosta* (Solifugae: Eremobatidae). *Scientific Reports* 11: 22093 (11 pp.). <https://doi.org/10.1038/s41598-021-01555-1>
- Santibáñez-López, C.E., Farleigh, K., Cushing, P.E. & Graham, M.R.** 2021. Restriction enzyme optimization for RADseq with camel spiders (Arachnida: Solifugae). *Journal of Arachnology* 48(3): 346–350. <https://doi.org/10.1636/JoA-S-20-040>
- Sarver, B.A.J., Herrera, N.D., Sneddon, D., Hunter, S.S., Settles, M.L., Kronenberg, Z., Demboski, J.R., Good, J.M. & Sullivan, J.** 2021. Diversification, introgression, and rampant cytonuclear discordance in Rocky Mountains chipmunks (Sciuridae: *Tamias*). *Systematic Biology* 70(5): 908–921. <https://doi.org/10.1093/sysbio/syaa085>

Salem, B.S., O'Connor, P.M., Gorscak, E., El-Sayed, S., **Sertich, J.J.W.**, Seiffert, E. & Sallam, H.M. 2021. Dinosaur remains from the Upper Cretaceous (Campanian) of the Western Desert, Egypt. *Cretaceous Research* 123: 104783 (10 pp.). <https://doi.org/10.1016/j.cretres.2021.104783>

Sinha, S., Brinkman, D.B., Murray, A.M. & **Krause, D.W.** 2021. Late Paleocene fishes of the Ravenscrag Formation, Roche Percée area, southeastern Saskatchewan, Canada. *Journal of Vertebrate Paleontology* 41(3): e1957907 (18 pp.). <https://doi.org/10.1080/02724634.2021.1957907>

Titus, A.L., Knoll, K., **Sertich, J.J.W.**, Yamamura, D., Suarez, C.A., Glasspool, I.J., Ginouves, J.E., Lukacic, A.K. & Roberts, E.M. 2021. Geology and taphonomy of a unique tyrannosaurid bonebed from the upper Campanian Kaiparowits Formation of southern Utah: implications for tyrannosaurid gregariousness. *PeerJ* 9: e11013 (50 pp.). <https://doi.org/10.7717/peerj.11013>

Woodruff, D.C., Goodwin, M.B., **Lyson, T.R.** & Evans, D.C. 2021. Ontogeny and variation of the pachycephalosaurine dinosaur *Sphaerolithus buchholtzae*, and its systematics within the genus. *Zoological Journal of the Linnean Society* 193(2): 563–601. <https://doi.org/10.1093/zoolinnea/zlaa179>

Ziani, S., Bezděk, A., **Krell, F.-T.** & Sommer, D. 2021. Authorship and date of publication of the name *Scarabaeus stercorosus* (currently *Anoplotrupes stercorosus*) (Coleoptera: Scarabaeoidea: Geotrupidae). *Zootaxa* 5067(4): 593–599. <https://doi.org/10.11646/zootaxa.5067.4.7>

#### 4.2.3. SCIENTIFIC BOOK CHAPTERS (PEER-REVIEWED)

Salad Hersi, O., Landing, E., Franzi, D. & **Hagadorn, J.** 2021. Cambrian–Lower Ordovician of SW Quebec–NE New York. Pp. 1–32 in Cousens, B.L. & Riggs, N. (eds.): *GSA in the Field in 2020; Geological Society of America Field Guide* 60. [https://doi.org/10.1130/2021.0060\(01\)](https://doi.org/10.1130/2021.0060(01))

Schultze, H.-P., Ballecks, J., Soar, L.K. & **Hagadorn, J.W.** 2021. Devonian fish from Colorado's Dyer Formation and the appearance of Carboniferous faunas in the Famennian. Pp. 247–256 in Pradel, A., Denton, J. S. S. & Janvier, P. (eds.): *Ancient Fishes and Their Living Relatives: a Tribute to John G Maisey*. Munich, Germany: Verlag Dr. Friedrich Pfeil.

#### 4.2.4. NON PEER-REVIEWED SCIENTIFIC PUBLICATIONS (LETTERS, BOOK REVIEWS, TECHNICAL COMMENTS, DMNS REPORTS, EDITORIALS)

Longman, M. & **Hagadorn, J.** 2021. Introduction to this focused issue on the Codell Sandstone. *The Mountain Geologist* 58: 208–209.

**Nash, S.E.**, Redman, K. & Bruseth, J. 2021. A Word on SAA Finances. *The SAA Archaeological Record* 21(5): 62.

Poelen, J.H., Seltmann, K.C., Campbell, M., Orlofske, S.A., Light, J.E., Tucker, E.M., **Demboski, J.R.**, McElrath, T., Grinter, C.C., Diaz-Bastin, R., Bush, S.E., Delapena, R., Cook, J., Gall, L.F., Whiting, M.F., Clark, S.M., Cameron, S.L., Replogle, C.R., Rund, S.S.C., Young, D., Brabant, C., Sullivan, K., Turcatel, M., Shuman Baquiran, R., Albion, Z., Austin, K., Rubinoff, D., Cognato, A.I., Caywood, A. & Colby, J. (2021). *Terrestrial Parasite Tracker indexed biotic interactions and review summary. Version 0.5* [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.3685364>

Sweitzer, J., Wyatt, R., **Yu, K.C.** & McConville, M. 2021. Planetary and the satellite constellation challenge. *SATCON2 Community Engagement Working Group Report* 32–35.

**Yu, K.C.** 2021. Storytelling in astronomy. *Proceedings of the Communicating Astronomy with the Public*, May 2021 Virtual Edition.

#### 4.2.5. ABSTRACTS

Androski, A., **Demboski, J.R.** & Cook, J.A. 2021. Historical Biogeography of the Montane Shrew: Phylogeography of *Sorex monticola*. *International Biogeography Society. Amsterdam* (Virtual).

Androski, A., **Demboski, J.R.** & Cook, J.A. 2021. Cryptic diversity within *Sorex monticola* reflects complex climate disruption in the past. *American Society of Mammalogists. Virtual*.

Askelson, K.K., **Spellman, G.M.** & Irwin, D.E. 2021. Genome-wide patterns of divergence in an avian species complex. *Evolution. Virtual*.



Askelson, K.K., **Spellman, G.M.** & Irwin, D.E. 2021. Introgression and cryptic speciation in a North American passerine. *American Ornithological Society Annual Meeting*. Virtual.

DeSaix, M.G., George, T.L., Seglund, A., **Spellman, G.M.**, Zavaleta, E.S. & Ruegg, K.C. 2021. Local adaptation and gene flow across an alpine archipelago. *American Ornithological Society Annual Meeting*. Virtual.

DeSaix, M.G., George, T.L., Seglund, A., **Spellman, G.M.**, Zavaleta, E.S. & Ruegg, K.C. 2021. Persistence of an alpine-obligate species across a climate-threatened alpine archipelago. *Evolution*. Virtual.

Farrell, T., Cothren, H., Crossey, L.J., Dehler, C., Foster, J.R., **Hagadorn, J.W.**, Karlstrom, K.E., Sundberg, F.A., Schmitz, M.D. & Webster, M. 2021. Numerical calibration of western Laurentian Cambrian stratigraphic successions into the global geologic time scale. *Geological Society of America Abstracts with Programs* 53(6). Portland, OR.

Ferreira, M.S., Thurman, T.J., Jones, M.R., Farelo, L., Kumar, A.V., Mortimer, S.M.E., **Demboski, J.R.**, Mills, L.S., Alves, P.C., Melo-Ferreira, J. & Good, J.M. 2021. The evolution of seasonal camouflage in white-tailed jackrabbits in response to past and future climates. *Society of Molecular Biology and Evolution*. Virtual.

Herrera, N.D., Sarver, B.A.J., Callahan, C., Bell, K.C., Sullivan, J., **Demboski, J.R.** & Good, J.M. 2021. The complex evolutionary history of a cryptic chipmunk species. *Evolution*. Virtual.

Hunnicut, K.E., **Demboski, J.R.** & Larson, E.L. 2021. Investigating hybridization in overlapping cottontail species. *American Society of Mammalogists*. Virtual.

**Koons, M.** 2021. The Magic Mountain Community Archaeology Project. *78<sup>th</sup> Plains Anthropological Society Conference*. Boulder, CO.

Plotnick, R., **Hagadorn, J.** & Young, G. 2021. Jelly roles: The importance of gelatinous zooplankton in Phanerozoic marine ecosystems. *Geological Society of America Abstracts with Programs* 53(6). Portland, OR.

**Salas, M.** 2021. Picking up the pieces: stabilization and repair of a mask from Papua New Guinea. *49<sup>th</sup> Annual Conference of the American Institute for Conservation*. Virtual.

**Salas, M.**, Gillies, J. & Knutås, P. 2021. Phantom thread: research and preparation for the installation and care of a delicate silk and metal sculpture by Doris Salcedo. *49<sup>th</sup> Annual Conference of the American Institute for Conservation*. Virtual.

Schiffbauer, J., Pulsipher, M., Selly, T. & **Hagadorn, J.** 2021. Opening an old can of (tube)worms: Reevaluating *Wyattia* Taylor 1966 from the Ediacaran of southwestern Laurentia and conical fossils from the Cambrian of Missouri: *Geological Society of America Abstracts with Programs* 53(6). Portland, OR.

Schramm, D.J., Burg, T.M., **Spellman, G.M.** & Friesen, V.L. 2021. Migration genomics of Golden-crowned Kinglets (*Regulus satrapa*) and Red-breasted Nuthatches (*Sitta canadensis*). *American Ornithological Society Annual Meeting*. Virtual.

Sneddon D., Sarver, B.A.J., Herrera, N.D., Hunter, S.L., Settles, M.L., Kronenberg, Z., **Demboski, J.R.**, Good, J.M. & Sullivan, J. 2021. Diversification, introgression, and rampant cytonuclear discordance in Rocky Mountain chipmunks (Sciuridae: *Tamias*). *Evolution*. Virtual.

### 4.3. EMERITI STAFF

#### Anthropology:

- Joyce Herold, Curator Emerita, Native American ethnology

#### Earth Sciences:

- Jack Murphy, Curator Emeritus, Colorado mineralogy
- Richard Stucky, Curator Emeritus & Research Associate, Paleogene mammals & paleoecology

#### Library & Archives:

- Liz Clancy, Archivist Emerita
- Kathie Gully, Librarian Emerita
- Kris Haglund, Archivist Emerita

### 4.4. RESEARCH ASSOCIATES

Research Associates are appointed by curators (the Associate's sponsor) and are affiliated with an active research program or project. They must have a Ph.D. or be a recognized authority in their field and have a peer-reviewed publication record. At the time this report was written, there were 13 active Research Associates. This number is lower than previous years, as there were new requirements put in place to bring Research Associates back to the Museum, in alignment with their volunteer status. At the time of this report, some associates

had not completed these requirements. We expect to have a more accurate list in time for the 2022 Annual Report as more associates have the opportunity to complete these steps and reinstate their Research Associate Status.

#### 4.5. DEPARTMENT ASSOCIATES

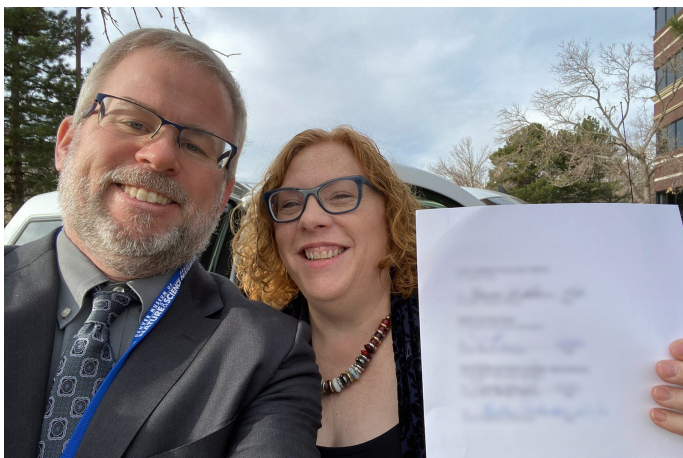
Department Associates are also appointed by curators (the Associate's sponsor) and should have a proven ability in a special museum technique and/or subject area. They should demonstrate significant and notable participation in a department's projects. At the time this report was written, there were 5 active Department Associates. This number is lower than previous years for the same reasons as described in the previous section. A list of active Department Associates will be included in the 2022 Annual Report.

### 5. COLLECTIONS

There were 14,181 objects added to the collections in 2021, with 4,021,631 total objects in the collection. Due to variation in counting methods which caused us to overestimate our count in the 2017 RCD Annual Report, we continue to communicate a total object count of 4.3M to the public. See Appendix E for object counts by collection. Collection activity returned to near pre-pandemic levels, with 104 new accessions, over 5,000 objects sent out on loan to other institutions (see Appendix F), and research requests from nearly 500 internal and external researchers (see Appendix G). Our conservation staff completed condition documentation on 266 objects and performed treatment on 49 objects, largely from the Anthropology collections.

We also made advances in tracking collections database queries, allowing clearer tracking of digital connections between researchers and the general public and the objects in our collections. We recorded over 50,000 unique queries of objects in our collections in 2021.

#### 5.1. HIGHLIGHTS



In December, an anonymous donor gave the largest gift in Museum history. Steve Nash and Jill Viehweg secured a \$22.5M endowment and \$2.5M initial gift to fund culturally-inclusive conservation, and will be used to better equip the Avenir Conservation Center, hire new staff, including two conservator positions and a Digital Archivist, and make environmental fixes to dioramas and the HVAC system in the Avenir Collections Center. The funds will also be used to engage in programming and research to develop culturally-inclusive conservation practices.

The IMLS Northwest Coast Collection grant kicked off in earnest in January with the hire of Megan Salas as Objects Conservator. She immediately established routine communication with Tribal Nations, including hosting two workshops with Haida and Tlingit representatives with Kathryn Reusch, and sharing detailed images and transparent inventories of cultural items with the Tribal Nations and responding to subsequent inquiries. The conservation team completed detailed condition survey, including condition reports and treatment proposals for 222 objects, including information from tribal representatives when available. As part of this grant work, 27 items were also deinstalled from the North American Indian Cultures Hall and brought into the Conservation Lab for condition assessment and community viewing.



In March, the Anthropology team marked an important milestone. They completed moving the remaining objects in the World Ethnology collection into the Avenir Collections Center. In addition, they successfully wrapped up a four-year NEH Sustaining Cultural Heritage Collections grant, rehousing 154,998 archaeological objects and updating 29,942 records. On the heels of completing this grant, the team transitioned to working on two newly awarded major collections grants. The first is an IMLS Save America's Treasures grant to help preserve and conserve the Jones-Miller Bison Kill Site collection, and the second is from the National Endowment for the Humanities to process and rehouse the WS Ranch Archaeological Project collection. When the WS Ranch grant was awarded, plans



moved forward to move this collection from the University of Texas, Austin to DMNS. In September, Dominique Alhambra, Jeff Phegley, Baylee Hughes, and Kathryn Reusch traveled to Austin to pack the collection into 560 boxes on 18 pallets, load them onto a freezer for pest mitigation, and then onto two trucks for delivery to DMNS. Prior to this, 54 Native American ancestors and 30 associated funerary objects from the WS Ranch Archaeological Project excavations were successfully repatriated and reburied, the culmination of work begun under a NAGPRA grant awarded in 2018.



2021 was a year of collaboration for the Zoology team. Zoology and Integrative Collections staff worked together to create new herpetology preparation policies and procedures. In addition, the Zoology prep lab prepared over 1,100 specimens with the support of numerous staff, volunteers, and interns. Among these were some notable new species for the Zoology collection. With the help of the DMNS Genetics Lab, they were able to prepare and accurately identify the first ever record of long-tailed jaeger (*Stercorarius longicaudus*) in Colorado. The Prep Lab also had the opportunity to prepare the Museum's first mountain tapir (*Tapirus pinchaque*) specimen. This individual was one of nine mountain tapirs found in captivity. The Genetics Lab DNA barcoded select mammal specimens, allowing identification of species of voles, shrews, mice, and bats and even the specific DNA lineages they belong to. Tiffany Nuessle extracted and sequenced genes of 573 birds (12,912 vials) and 318 mammals (10,455 vials).

The Earth Sciences prep lab staff, Natalie Toth and Salvador Bastien, built archival cradles for three massive ceratopsian skulls, a *Pentaceratops*/*Navajoceratops* collected from Dine/Navajo lands as part of Joe Sertich's Laramidia Project, a Giant Hell Creek *Triceratops* collected through Tyler Lyson's K/Pg Boundary Project, and "Frosty" the *Triceratops* from the Hell Creek Formation, also for the K/Pg Boundary Project. In addition, lab staff completed the re-preparation of "Pops" the *Triceratops*, collected near Greeley, CO in the late 1980's, using updated techniques and re-positioning important bones in the skull and skeleton to accurately reflect the dinosaur's anatomy.

"Pops" is now being mold, cast, and prepared for display in Weld County.



The Education Collections were in a year of transition, following the staff layoffs in 2020, but with support from Melissa Bechhoefer and Courtney Scheskie, collections access for Field Trip Adventures, Teacher Professional Development, the Curiosity Cruiser, and other programs were fulfilled as requested. The Space Sciences and Zoology staff assessed the Education Collections, transferring appropriate collections to the research collections. In December, Jeff Stephenson was appointed as Science Liaison to act as collections manager and liaison to Experiences & Partnerships for all projects involving the Education Collections. Jeff will move to this new position in early 2022, and Andrew Doll serving in an acting capacity in his vacated Zoology Collections Manager position.

Melissa Bechhoefer succeeded in securing funds from the National Endowment for the Humanities through the American Rescue Plan (SHARP) to assess humanities digital assets and



select and implement a Digital Asset Management System (DAMS). This grant will provide funds to support a Digital Archivist and hire an Assistant Archivist, and allow us to engage a consultant to help us select the appropriate DAMS for our needs.

The Earth Sciences collections team tackled the SE Collections Annex jacket storage, completely overhauling and organizing the collections in that space. They also overhauled, organized, and inventoried 70% of our current Hell Creek Formation collections. Nicole Neu-Yagle, James Hagadorn, Kristen MacKenzie, and intern, Alex Templeton made significant progress on the Hollingsworth collection, including completely unpacking and organizing the collection, uploading 400 localities for data sharing with BLM NV, and building a framework for understanding our holdings. This project is supported by a grant from the Bureau of Land Management.



## 5.2. SIGNIFICANT ACCESSIONS:

- **Thomas Van Zandt:** 176 objects, including ceramics, textile, and metals from ancient coastal cultures of Peru, collected by Thomas Van Zandt between 1965 and 1968
- **Lodaiska:** 200 lithic and soil sample materials from an Archaic to Middle Ceramic archaeological site near Morrison, CO transferred from CU-Boulder Museum of Natural History to DMNS to join the existing DMNS Lodaiska materials
- **Keith Stephenson:** ~200 lots of mollusks from Keith Stephenson collected during the 1980's from Sulawesi
- **Stacy Litchfield:** 100-150 specimens acquired 1960-1980 from TX, CA, and FL added to the Marine Invertebrate collection
- **Weld County Ceratopsian ("Pop" the *Triceratops*):** Specimen likely represents a very rare horned dinosaur *Eotriceratops*, collected from the Laramie Formation near Briggsdale, CO.
- **Montana Ceratopsian:** Partial skeleton including skull of a centrosaur dinosaur similar to *Styracosaurus*, transferred from Triebold Paleontology, Inc.

## 5.3. SIGNIFICANT DEACCESSIONS:

- **WS Ranch Ancestors:** 54 Native American ancestors and their 30 associated funerary objects from the WS Ranch Archaeological Project collection
- **False Face Mask:** Returned to the Seneca-Cayuga Nation of Oklahoma as a sacred object and object of cultural patrimony
- **Marine Invertebrates:** 539 lots deaccessioned in 2020 and ready for final disposition with the Sanibel Shell Club

## 6. COMMUNICATING SCIENCE

While in-person outreach efforts were still largely curtailed due to the ongoing pandemic, Science Division staff took advantage of virtual platforms, reaching 61,872 people through virtual lectures, classes, career interviews, trainings, and even podcasts and social media videos. Staff reached an additional 4,226 people through in-person engagements, like fieldtrips, open houses, on-site lectures, and event tables. See Appendix H for more details.



### 6.1. HIGHLIGHTS

John Demboski partnered with stakeholders across the Museum on updating the Zoology changing case which now explores wolf reintroduction in Colorado. The updates were timed in conjunction with the ballot initiative passed in November 2020 which permits the Colorado Parks and Wildlife Commission to develop a plan for gray wolf reintroduction west of the continental divide.

James Hagadorn, Kristen MacKenzie, and Nicole Neu-Yagle assisted the Future First team with content, concerns, and scope for the earth sciences-related aspects of the project, specifically the revamp of the Coors Gems & Minerals Hall.

Michele Koons, with Erin Baxter, led a community archaeology project at the Astor House in Golden, CO from May to July, providing tours of the site for over 400 people and engaging at least 5,000 people with the project through updates on social media.

Michele Koons hosted the Rocky Mountain Pre-Columbian Association meeting at DMNS in September, bringing in experts and people interested in the field to the Museum for a day of talks and networking.

Led by the Anthropology Department and Experiences & Partnership staff, the Museum began systematic discussions

on how to revamp the problematic North American Indian Cultures Hall, offering financial backing through approving a decision package. The decision package will fund a multi-year effort, partnering with the community to determine the best way to move forward.

Ka Chun Yu, in partnership with Experiences & Partnerships, broadcasted eight new *Digital Earth Academy* programs and five pre-videos reaching at least 4,000 students.

### 6.2. PUBLICATIONS

#### 6.2.1. POPULAR ARTICLES

- Cushing, P.E.** 2021. Spiders in space: without gravity, light becomes key to orientation. *Catalyst, Denver Museum of Nature & Science Magazine* Spring 2021: 12–13.
- Hagadorn, J.W. & Neu-Yagle, N.M.** 2021. Gems in the pandemic rough: New acquisitions from Colorado, Mars and beyond: *Catalyst, Denver Museum of Nature & Science Magazine* Fall 2021: 10–11.
- Koons, M. & Mitchell, M.** 2021. Magic Mountain Community Archaeology Project: connecting people, place and the past. *Historically Jeffco* 42: 50–51.
- Krell, F.[-T.]** 2021. Attenborough's Beauty: spectacular fossil discovered after decades in Prehistoric Journey exhibition. *Catalyst, Denver Museum of Nature & Science Magazine* Fall 2021: 12–13.
- Nash, S.E.** 2021. Do twins share a soul? *SAPIENS* January 12, 2021. <https://www.sapiens.org/column/curiosities/do-twins-share-soul/>
- Nash, S.E.** 2021. The phantom forests that built Mesa Verde. *SAPIENS* February 17, 2021. <https://www.sapiens.org/column/curiosities/mesa-verde-ancestral-puebloan/>
- Nash, S. E.** 2021. How museums can do more than just repatriate objects. *SAPIENS* May 13, 2021. <https://www.sapiens.org/column/curiosities/propatriation-nagpra/>
- Nash, S.E.** 2021. Do stolen sacred objects experience culture shock? *SAPIENS* October 11, 2021. <https://www.sapiens.org/column/curiosities/vigango-collection/>
- Nash, S.E.** 2021. The blockbuster exhibit that shouldn't have been. *SAPIENS* November 30, 2021. <https://www.sapiens.org/column/curiosities/magdalenian-girl/>



**Sertich, J.** 2021. Jurassic Park and the dinosaur renaissance. Pp. 131–136 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

**Stephenson, J.T.** 2021. Gigantic animals. Pp. 152–158 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

**Yu, K.C.** 2021. The science of communicating with aliens. Pp. 16–22 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

**Yu, K.C.** 2021. How easy is interstellar colonization? Pp. 39–48 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

**Yu, K.C.** 2021. Catching HAL. Pp. 59–72 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

**Yu, K.C.** 2021. The Martian: fact, fiction or fantasy? An interview with Steven Lee. Pp. 174–186 in Piturro, V. (ed.): *The Science of Sci-Fi Cinema: Essays on the Art and Principles of Ten Films*. Jefferson, NC: McFarland.

## 7. SERVICE TO DISCIPLINE

Science Division staff members served as mentors for 24 interns, providing important experience for these students in their pursuit of a future career in science. Stipends were provided for nearly all of these internships through funding by grants (BLM, David B. Jones Foundation, and NSF), generous private donors, and through colleges and universities. In addition, we welcome 20 Teen Science Scholars from around the Denver-metro area to complete hands-on summer internships with Science Division staff. See Appendix J for more details on all 2021 interns and Teen Science Scholars.

### 7.1. HIGHLIGHTS

Frank Krell and Jeff Stephenson hosted two Teen Science Scholars who began to build a reference collection for a specific section of City Park. The Museum's Nearby Nature initiative will transform this area into a nature play area, with native plants and interesting features representing the life zones of Colorado. This reference collection will help us

determine any changes in the arthropod fauna that might occur with this transformation.



Megan Salas and Kathryn Reusch mentored two teen scholars in the Conservation Lab, observing and documenting the condition of items from the Northwest Coast Collection belonging to five tribal nations: the Kwakwaka'wakw, the Nuuchah-nulth, the Makah, the Haida, and the Tlingit, to support the IMLS Northwest Coast Collection grant. The students also participated in the Snowmass Conifer Cones Project, recording quantitative and qualitative data for a series of experimental modern cones being tested to determine which solution will best preserve ancient, damaged conifer cones.



The Earth Sciences Teen Science Scholars experienced a wide range of Paleontology topics, including preparation, curation, collections management, and research. Their projects emphasized collections and Digital Imaging projects, curating and digitizing fossils for research and exhibition access. Kristen MacKenzie, Nicole Neu-Yagle, Lindsay Dougan, and Holger Petermann served as co-mentors for these teens, with lots of support from NSF postdoc, Gussie Maccracken.





During the summer of 2021, the Zoology Prep Lab partnered with the Genetics Lab to give three teen interns a well-rounded view of the ornithology work done at the museum. The teens started in the prep lab with mentor, Andie Carrillo, where they prepared animal specimens by collecting tissue samples, and documenting important physical identifiers to group the species by relatedness. The interns then took their tissue samples to the Genetics Lab where they extracted, amplified, and sent out DNA for sequencing, under the guidance mentor, Tiffany Nuessle. Once the results were returned, they trimmed the sequences and performed species identification in an effort to match their groups described by physical description to the groups determined through genetics.



Erin Baxter mentored six Teen Science Scholars. Together, they ran the Online Ancient Sandal College, using the extensive array of 800-2000 year old sandals in the Anthropology collections from the US Southwest as reference to engage in a research project to discover how long sandals lasted. The students received help from 10 guest speakers, including indigenous artists, weavers and engineers, archaeologists, collection managers, staff at the Denver Botanical Gardens and museum professionals.



## 7.2. EXTERNAL SERVICE

Science Division staff members serve as editors for scientific journals and hold committee, officer, and board memberships for numerous professional associations and societies. The details of these appointments are listed in Appendix K, L, and M. In addition, staff members hold affiliate faculty positions at 10 universities or museums. Details of these appointments can be found in Appendix M.

Science Division staff also attended and presented at 47 professional conferences, many still virtual due to continued precautions surrounding the pandemic. Details are listed in Appendix N.

## 8. APPENDICES

### 8.1. APPENDIX A - SUMMARY OF 2021 ACTIVE GRANTS

PI	DEPARTMENT	SPONSOR	PROPOSAL NAME	CATEGORY	
Koons	Anthropology	Colorado Historical Society	2018 Magic Mountain	Research	
Cushing	Zoology	National Science Foundation	DEB: 2017: ARTS Camel Spiders	Research	
Lyson	Earth Sciences	National Science Foundation	2019 DEB: Origin of the Turtle Body Plan (w JHMI)	Research	
Hagadorn	Earth Sciences	National Science Foundation	2020 EAR SGP: CR w/BSU   Cambrian Earth	Research	
Nash	Anthropology	Institute of Museum and Library Services	MFA: FY20: NWCC: Building Bridges & Conservation	Collections	
Hagadorn	Earth Sciences	Bureau of Land Management	2020 NV: Cultural and Paleontological Resource Management	Collections	
Yu	Space Sciences	National Aeronautics and Space Administration	2020 OpenSpace Phase II w/ AMNH	Outreach	
Hagadorn	Earth Sciences	Jefferson County Open Space	2021 Lyons Sandstone	Research	
Sertich	Earth Sciences	Bureau of Land Management	2021 L20AC00275-01 UT Cultural and Paleo Resources (Year 2 of 3)	Collections	
Lyson	Earth Sciences	National Science Foundation	2021: DEB: Lyson: REPS Supplement	Research	
Nash/Alhambra	Anthropology	National Endowment for the Humanities	2021 SCHC: WS Ranch Collection Processing	Collections	
Nash/Alhambra	Anthropology	Institute of Museum and Library Services	SAT: FY20: Jones-Miller Collection	Collections	
Bechhoefer	Integrative Collections	National Endowment for the Humanities	2021 NEH ARPHO: Protecting Humanities Staff and Digital Assets through DAMS Implementation	Collections	

\*Grant amounts do not include indirect, as this is tracked outside of Science Division financial statements

	<b>AWARDED TOTAL *</b>	<b>COST CENTER</b>	<b>START DATE</b>	<b>ORIGINAL END DATE</b>	<b>EXTENDED END DATE</b>
	\$106,521	03-0217	05/01/18	04/30/20	03/31/22
	\$408,013	03-0218	08/01/18	07/31/22	
	\$116,110	03-0226	01/01/20	12/31/23	
	\$99,665	03-3801	08/01/20	07/31/23	
	\$185,185	03-3802	09/01/20	08/31/22	
	\$38,315	03-3803	09/24/20	09/24/23	
	\$54,441	03-0208	01/01/21	12/31/25	
	\$4,433	03-3712	06/01/21	05/31/23	
	\$28,269	03-3810	10/01/21	09/30/22	
	\$36,763	03-0225	01/15/20	12/31/23	
	\$228,670	03-3825	10/01/21	09/30/23	
	\$159,179	03-3832	10/1/2021	9/30/2023	
	\$330,345	03-3840	12/1/2021	11/30/2022	



## 8.2. APPENDIX B - SUMMARY OF 2021 SUBMITTED, AWARDED, &amp; DECLINED GRANTS

PI	DATE SUBMITTED	DECISION DATE	STATUS	DEPARTMENT	SPONSOR	
Hagadorn	1/12/21	7/29/21	Active	Earth Sciences	Jefferson County Open Space	
Hagadorn	1/11/21	2/23/21	Declined	Earth Sciences	City of Boulder Open Spaces & Mountain Parks	
Hagadorn	1/11/21	2/10/21	Declined	Earth Sciences	Boulder County Parks and Open Space	
Sertich	9/1/21		Expired	Earth Sciences	Bureau of Land Management	
Sertich	9/1/20	7/28/21	Expired	Earth Sciences	Bureau of Land Management	
Sertich	5/4/21	7/29/21	Active	Earth Sciences	Bureau of Land Management	
Lyson	7/1/21	7/29/21	Active	Earth Sciences	National Science Foundation	
Sertich	6/16/21	10/5/21	Declined	Earth Sciences	Bureau of Land Management	
Lyson	11/18/21		Pending	Earth Sciences	National Geographic Society	
Hagadorn	11/18/21		Pending	Earth Sciences	National Geographic Society	
Nash/Alhambra	1/26/21	9/15/21	Active	Anthropology	Institute of Museum and Library Services	
Sertich/MacKenzie	11/15/21		Pending	Earth Sciences	Institute of Museum and Library Services	
Nash/Alhambra	1/14/21	9/2/21	Active	Anthropology	National Endowment for the Humanities	
Bechhoefer	5/14/21	9/28/21	Active	Integrative Collections	National Endowment for the Humanities	

	PROPOSAL NAME	CATEGORY	SUBMITTED 2021	DECLINED 2021	AWARDED 2021 <sup>1</sup>
	2021 Lyons Sandstone	Research	\$8,750		\$8,750
	2021 Lyons Sandstone	Research	\$9,965	\$9,965	
	2021 Lyons Sandstone	Research	\$9,965	\$9,965	
	2021 GSENM L19AC00230 Cooperative Agreement (Year 3 of 5)	Research	\$21,277		\$21,277
	2020 GSENM L19AC00230 Cooperative Agreement (Year 2 of 5)	Research	\$21,277		\$21,277
	2021 L20AC00275-01 UT Cultural and Paleo Resources (Year 2 of 3)	Collections	\$28,269		\$28,269
	2021: DEB: Lyson: REPS Supplement	Research	\$36,763		\$36,763
	2021 CO Cultural and Paleo Resources	Collections	\$42,525	\$42,525	
	2022 Tree of Life	Research	\$93,305		
	2022 Paleoart (Deep time cartography)	Research	\$93,306		
	SAT: FY20: Jones-Miller Collection	Collections	\$159,179		\$159,179
	MFA FY22: CS&A: Jurassic Giants	Collections	\$209,004		
	2021 SCHC: WS Ranch Collection Processing	Collections	\$228,670		\$228,670
	2021 NEH ARPHO: Protecting Humanities Staff and Digital Assets through DAMS Implementation	Collections	\$330,345		\$330,345

PI	DATE SUBMITTED	DECISION DATE	STATUS	DEPARTMENT	SPONSOR	
Krause	7/18/21	12/1/21	Declined	Earth Sciences	National Science Foundation	
Lyson/Miller/ Krause	2/3/21		Declined	Earth Sciences	National Science Foundation	
Yu	4/10/20	2/25/21	Active	Space Sciences	National Aeronautics and Space Administration	
Demboski	10/8/20		Declined	Zoology	National Science Foundation	
Petermann/Miller	10/8/20	5/1/21	Declined	Earth Sciences	Life Sciences Research Foundation	
Hagadorn	9/11/20	3/2/21	Expired	Earth Sciences	Larimer County	
<b>TOTALS</b>						

<sup>1</sup>Grant amounts (submitted, declined, and awarded) do not include indirect, as this is tracked outside of Science Division financial statements



	PROPOSAL NAME	CATEGORY	SUBMITTED 2021	DECLINED 2021	AWARDED 2021 <sup>1</sup>
	2021 ICBR: Madagascar Fossil Collection w/ Univ. of OH	Collections	\$573,381	\$573,381	
	2021 FRES: Paleo Research w/ CU et al	Research	\$1,054,285	\$1,054,285	
	2020 OpenSpace Phase II w/ AMNH	Research			\$54,441
	2020 TCN: Collaborative Research: Digitization TCN: Ranges	Research		\$12,057	
	2021 After the Asteroid	Research		\$201,000	
	2021 Lyons Sandstone	Research			\$2,977
			<b>\$2,920,266</b>	<b>\$1,903,178</b>	<b>\$891,948</b>

## 8.3. APPENDIX C - SUMMARY OF GIFTS RECEIVED (TRNA)

DEPARTMENT	RESPONSIBLE	PURPOSE	GIFTS IN 2021	BALANCE 12/31/21
ANTHROPOLOGY	Nash	Anthropology General	\$50,000.00	\$78,124.25
		Avenir Conservation Center	\$2,000,000.00	\$2,000,000.00
		Pine Cone Conservation Project	\$3,000.00	\$3,000.00
		Native American Science Internships		\$12,010.21
		Special Projects	\$50,000.00	\$23,410.59
		Akerley Internship	\$21,500.00	\$9,330.77
		Native American Programs		\$627.00
		Konovalenko Hall Upgrades	\$68,000.02	\$68,000.02
		Pre-Columbian Symposium		\$20.70
<b>ANTHROPOLOGY TOTAL</b>			<b>\$2,192,500.02</b>	<b>\$2,194,523.54</b>
EARTH SCIENCES	Krause	Earth Sciences - Paleo Internship Program		\$20,092.00
		Earth Sciences - Paleontology Collections Asst	\$206.45	\$69,672.97
	Lyson	CO Springs Project	\$1,676.99	\$424,523.36
		K/Pg Boundary Research (Preparator/Intern)	\$230,000.00	\$230,000.00
	Hagadorn	Earth Sciences - Geology Shropshire Collection		\$1,455.00
		Earth Sciences - Geology		\$20,000.00
		Earth Sciences - Geology - Glen Eyrie Formation		\$2,003.32
		Earth Sciences - Geology - Larimer County SGCP Grant	\$2,977.00	\$0.00
	Nash	Earth Sciences - General	\$128,799.96	\$164,479.60
		Earth Science - Geology	\$2,000.00	\$1,246.42
		Earth Sciences - Fieldwork	\$8,000.00	\$8,000.00
		Earth Sciences - Paleo Lab	\$60,000.00	\$58,129.90
<b>EARTH SCIENCE TOTAL</b>			<b>\$433,660.40</b>	<b>\$999,602.57</b>
INTEGRATIVE COLLECTIONS	Bechhoefer	Zoology Assistant Collections Manager	\$333,000.00	\$333,000.00
		Integrative Collections General	\$250.00	\$250.00
		Library & Archives Intern		\$8,750.00
<b>INTEGRATIVE COLLECTIONS TOTAL</b>			<b>\$333,250.00</b>	<b>\$342,000.00</b>
SPACE SCIENCES	Yu	Space Sciences General	\$41,000.00	\$40,531.78
		Space Sciences - Digital Earth		\$4,636.61
<b>SPACE SCIENCES TOTAL</b>			<b>\$41,000.00</b>	<b>\$45,168.39</b>

DEPARTMENT	RESPONSIBLE	PURPOSE	GIFTS IN 2021	BALANCE 12/31/21
ZOOLOGY	Krell	Zoology - Entomology		\$74.81
	Spellman	Zoology - Ornithology		\$27,832.89
	Demboski	Zoology - DNA Barcoding	\$5,000.00	\$5,000.00
		Zoology - General	\$35,000.01	\$42,244.89
	Cushing	Zoology - Arachnology	\$25,112.00	\$15,906.34
		Zoology - Marine Invertebrates	\$60,000.00	\$72,946.41
<b>ZOOLOGY TOTAL</b>			<b>\$125,112.01</b>	<b>\$164,005.34</b>
<b>GRAND TOTAL</b>			<b>\$3,125,522.43</b>	<b>\$2,745,697.27</b>



## 8.4. APPENDIX D - SCIENCE DIVISION STAFF LIST (AS OF 12/31/21)

LAST NAME	FIRST NAME	DEPARTMENT	TITLE
Alhambra	Dominique	Integrative Collections	Anthropology Collections Manager
Bastien	Salvador	Earth Sciences	Preparator
Baxter	Erin	Anthropology	Acting Assistant Curator of Anthropology
Bechhoefer	Melissa	Integrative Collections	Director of Integrative Collections
Bradmon	Carla	Chief Curator's Office	Business Support Supervisor
Carrillo	Andrea	Zoology	Zoology Preparator
Carter	Colleen	Zoology	Zoology Collections Assistant
Chavarria	Gabriela	Chief Curator's Office	Vice President & Chief Curator
Couch	Libby	Chief Curator's Office	Business Support Specialist, Anthropology, Earth Sciences, & Space Sciences
Cushing	Paula	Zoology	Senior Curator of Invertebrate Zoology
Demboski	John	Zoology	Director of Zoology & Health Science Branch & Senior Curator of Mammals
Doll	Andrew	Integrative Collections	Zoology Assistant Collections Manager
Dougan	Lindsay	Earth Sciences	Digital Preparator
Garcia	Erika	Zoology	Research Assistant
Hagadorn	James	Earth Sciences	Senior Curator of Geology
Hughes	Baylee	Integrative Collections	Anthropology Collections Assistant
Jones	Ryan	Zoology	Research Assistant
Koons	Michele	Anthropology	Associate Curator of Archaeology
Krause	David	Earth Sciences	Curator of Vertebrate Paleontology
Krell	Frank	Zoology	Senior Curator of Entomology
Lownsdale	Ashley	Earth Sciences	Earth Sciences Collections Assistant
Lyson	Tyler	Earth Sciences	Associate Curator of Vertebrate Paleontology & Lab Manager
MacKenzie	Kristen	Integrative Collections	Earth Sciences Collections Manager
Nash	Steve	Chief Curator's Office	Director of Anthropology Branch & Senior Curator of Anthropology
Neu-Yagle	Nicole	Integrative Collections	Earth Sciences Assistant Collections Manager
Nuessle	Tiffany	Health Sciences	Research Manager
Petermann	Holger	Earth Sciences	Research Scientist
Phegley	Jeff	Integrative Collections	Anthropology Assistant Collections Manager
Reusch	Kathryn	Anthropology	Conservation Technician
Salas	Megan	Anthropology	Objects Conservator
Scheskie	Courtney	Chief Curator's Office	Business Support Specialist, Zoology, Health Sciences & Integrative Collections
Sertich	Joe	Earth Sciences	Associate Curator of Dinosaurs
Spellman	Garth	Zoology	Associate Curator of Ornithology
Stephenson	Jeff	Integrative Collections	Zoology Collections Manager
Toth	Natalie	Earth Sciences	Preparator
Truckey	Meghan	Chief Curator's Office	Registrar
Wicker	Rick	Integrative Collections	Photographer
Yu	Ka Chun	Space Sciences	Assistant Curator of Space Sciences



## 8.5. APPENDIX E - COLLECTION COUNT

DEPARTMENT	COLLECTION	DOCUMENTED <sup>1</sup>			
		# of documented objects & specimen lots in collection on 1/1/21	# of documented objects & specimen lots added to the collection in 2021	# of documented objects & specimen lots in collection on 1/1/22	
Anthropology	World Ethnology	5,534	2	5,536	
Anthropology	American Ethnology	21,214	(10)	21,204	
Anthropology	American Archaeology	30,079	2,095	32,174	
Anthropology	World Archaeology	2,171	0	2,171	
<b>ANTHROPOLOGY</b>	<b>TOTAL</b>	<b>58,998</b>	<b>2,087</b>	<b>61,085</b>	
Earth Sciences	Micromount minerals	22,583	0	22,583	
Earth Sciences	Mineral Collection	18,876	(2)	18,874	
Earth Sciences	Rock Collection	1,504	0	1,504	
Earth Sciences	Meteorites	690	(6)	684	
Earth Sciences	Vertebrate Paleontology	293,946	3,863	297,809	
Earth Sciences	Paleobotany	95,700	1,155	96,855	
Earth Sciences	Invertebrate Paleontology	24,717	113	24,830	
<b>EARTH SCIENCES</b>	<b>TOTAL</b>	<b>458,016</b>	<b>5,123</b>	<b>463,139</b>	
Education Collections	Anthropology	4,641	(70)	4,571	
Education Collections	Biology	6,491	(267)	6,224	
Education Collections	Geology	2,580	(23)	2,557	
Education Collections	Health Sciences	1,653	(163)	1,490	
Education Collections	Museology	58	0	58	
Education Collections	Paleontology	3,170	(20)	3,150	
Education Collections	Space Sciences	176	18	194	
Education Collections	Scientific Instruments	0	3	3	
<b>EDUCATION COLLECTIONS</b>	<b>TOTAL</b>	<b>18,769</b>	<b>(522)</b>	<b>18,247</b>	
Zoology	Arachnology	40,361	430	40,791	
Zoology	Marine Invertebrates	31,089	678	31,767	
Zoology	Entomology	875,301	0	875,301	
Zoology	Botany	4,531	0	4,531	
Zoology	Mammalogy	21,189	643	21,832	
Zoology	Ornithology	55,145	2,037	57,182	
Zoology	Eggs & Nests	6,946	0	6,946	
Zoology	Parasites	1,320	134	1,454	
Zoology	Herpetology	145	6	151	
<b>ZOOLOGY</b>	<b>TOTAL</b>	<b>1,036,027</b>	<b>3,928</b>	<b>1,039,955</b>	
Health Sciences	Health sciences	57	0	57	
Health Sciences	Genetics of Taste DNA	8,422	0	8,422	



	BACKLOG <sup>2</sup>			TOTAL
	estimated # of objects & specimen lots in backlog on 1/1/21	estimated # of objects & specimen lots added to backlog in 2021	estimated # of objects & specimen lots in backlog on 1/1/22	Total (documented + backlog)
	5	(5)	0	5,536
	55	(55)	0	21,204
	542,250	(150)	542,100	574,274
	0	0	0	2,171
	<b>542,310</b>	<b>(210)</b>	<b>542,100</b>	<b>603,185</b>
	7,830	(740)	7,090	29,673
	0	0	0	18,874
	200	(1)	199	1,703
	0	0	0	684
	1,269,570	3,000	1,272,570	1,570,379
	58,364	17	58,381	155,236
	9,478	83	9,561	34,391
	<b>1,345,442</b>	<b>2,359</b>	<b>1,347,801</b>	<b>1,810,940</b>
	60	0	60	4,631
	350	0	350	6,574
	200	0	200	2,757
	0	0	0	1,490
	0	0	0	58
	100	0	100	3,250
	0	0	0	194
	0	0	0	3
	<b>710</b>	<b>0</b>	<b>710</b>	<b>18,957</b>
	12,894	437	13,331	54,122
	13,024	120	13,144	44,911
	212,597	1,375	213,972	1,089,273
	40	150	190	4,721
	400	(347)	53	21,885
	1,000	(646)	354	57,536
	0	0	0	6,946
	9,500	(71)	9,429	10,883
	495	3	498	649
	<b>249,950</b>	<b>1,021</b>	<b>250,971</b>	<b>1,290,926</b>
	0	0	0	57
	0	0	0	8,422

DEPARTMENT	COLLECTION	DOCUMENTED <sup>1</sup>			
		# of documented objects & specimen lots in collection on 1/1/21	# of documented objects & specimen lots added to the collection in 2021	# of documented objects & specimen lots in collection on 1/1/22	
Health Sciences	Human Histology	2,573	0	2,573	
Space Sciences	Scientific Instruments	71	0	71	
Archives	Archives: EMu records (ER) / linear feet (LF)	39,338 ER	383 ER	39,721 ER	
Archives	Image Archives: EMu records (ER) / linear feet (LF)	188,406 ER	0 ER	188,406 ER	
Archives	Archives Over-sized: EMu records (ER) / linear feet (LF)	3,168 ER	0 ER	3,168 ER	
Archives	Rare Books: EMu records (ER) / Titles (T)	2,525 ER	0 ER	2,525 ER	
Library	Library Books: EOS records (EOS) / Linear feet (LF)	29,962 EOS	0 EOS	29,962 EOS	
Library	Library Periodicals: EOS records (EOS) / linear feet (LF)	5,960 EOS	0 EOS	5,960 EOS	
<b>ALL SCIENCE DIVISION TOTAL</b>		<b>1,852,157</b>	<b>11,134</b>	<b>1,863,291</b>	

	BACKLOG <sup>2</sup>			TOTAL
	estimated # of objects & specimen lots in backlog on 1/1/21	estimated # of objects & specimen lots added to backlog in 2021	estimated # of objects & specimen lots in backlog on 1/1/22	Total (documented + backlog)
	16,686	0	16,686	19,259
	0	0	0	71
	14 LF	0 LF	14 LF	39,721
	12 LF	3 LF	15 LF	188,406
	9 LF	(5) LF	4 LF	3,168
	150 T	(148) T	2 T	2,525
	0 LF	0 LF	0 LF	29,962
	10 LF	(10) LF	0 LF	5,960
	<b>2,155,293</b>	<b>3,047</b>	<b>2,158,340</b>	<b>4,021,631<sup>3</sup></b>

<sup>1</sup>The total documented objects in Archives and Image Archives are measured in number of EMu records. Library Books and Periodicals are measured in EOS records.

<sup>2</sup>Backlog estimates for Archives, Image Archives, and Library Books and Periodicals are measured in linear feet.

<sup>3</sup>For consistency, we will continue to report an object count of 4.3 million. Variation in counting methods caused us to overestimate our count in the 2017 RCD Annual Report.



## 8.6. APPENDIX F - COLLECTION ACTIVITY

DEPARTMENT	COLLECTION	ACCESSIONS & DEACCESSIONS				
		# donations	# purchases	# transfers	# field collections	
Anthropology	World Ethnology	0	0	0	0	
Anthropology	American Ethnology	1	0	0	0	
Anthropology	American Archaeology	1	0	0	1	
Anthropology	World Archaeology	1	0	0	0	
<b>ANTHROPOLOGY</b>	<b>TOTAL</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	
Earth Sciences	Micromount minerals	0	0	0	0	
Earth Sciences	Mineral Collection	0	1	0	0	
Earth Sciences	Rock Collection	0	0	0	0	
Earth Sciences	Meteorites	0	1	0	0	
Earth Sciences	Vertebrate Paleontology	6	0	1	15	
Earth Sciences	Paleobotany	3	0	0	6	
Earth Sciences	Invertebrate Paleontology	5	0	0	5	
<b>EARTH SCIENCES</b>	<b>TOTAL</b>	<b>14</b>	<b>2</b>	<b>1</b>	<b>26</b>	
Education Collections	Anthropology	0	0	0	0	
Education Collections	Biology	0	0	0	0	
Education Collections	Geology	0	0	0	0	
Education Collections	Health Sciences	0	0	0	0	
Education Collections	Museology	0	0	0	0	
Education Collections	Paleontology	0	0	0	0	
Education Collections	Space Sciences	0	0	0	0	
Education Collections	Scientific Instruments	0	0	0	0	
<b>EDUCATION COLLECTIONS</b>	<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Zoology	Arachnology	1	0	0	18	
Zoology	Marine Invertebrates	2	0	0	1	
Zoology	Entomology	0	0	0	10	
Zoology	Botany	0	0	0	0	
Zoology	Mammalogy	2	0	7	0	
Zoology	Ornithology	0	0	4	2	
Zoology	Eggs & Nests	0	0	0	0	
Zoology	Parasites	0	0	0	0	
Zoology	Herpetology	0	0	1	0	
<b>ZOOLOGY</b>	<b>TOTAL</b>	<b>5</b>	<b>0</b>	<b>12</b>	<b>31</b>	
Health Sciences	Health sciences	0	0	0	0	
Health Sciences	Genetics of Taste DNA	0	0	0	0	
Health Sciences	Human Histology	0	0	0	0	

ACCESSIONS & DEACCESSIONS			NEW LOANS		ACTIVE LOANS	
# salvage	# other	# deaccessions	# incoming loans	# outgoing loans	# incoming loans	# outgoing loans
0	0	0	0	0	3	0
0	0	2	0	0	0	1
0	0	1	0	3	0	5
0	0	0	0	1	0	1
<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>3</b>	<b>7</b>
0	0	0	0	0	0	2
0	0	0	0	6	1	17
0	0	0	0	5	0	9
0	0	0	0	1	0	5
0	0	1	2	22	20	93
0	0	0	1	10	8	39
0	0	0	3	5	23	13
<b>0</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>49</b>	<b>52</b>	<b>178</b>
0	0	0	0	0	0	0
0	0	0	0	1	1	3
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>3</b>
1	0	0	3	3	53	42
0	0	0	0	1	0	1
0	0	0	4	1	51	41
0	1	0	0	0	0	0
1	1	0	1	9	3	37
1	0	0	2	12	3	28
0	0	0	0	0	0	0
0	0	0	0	1	0	1
1	0	0	0	0	0	0
<b>4</b>	<b>2</b>	<b>0</b>	<b>10</b>	<b>27</b>	<b>110</b>	<b>150</b>
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

DEPARTMENT	COLLECTION	ACCESSIONS & DEACCESSIONS				
		# donations	# purchases	# transfers	# field collections	
Space Sciences	Loans & Exhibits (Permanent & Temporary)	N/A	N/A	N/A	N/A	
Space Sciences	Scientific Instruments	0	0	0	0	
N/A	Exhibitions	0	0	0	0	
Library & Archives	Archives	1	0	0	0	
Library & Archives	Image Archives	0	0	0	0	
Library & Archives	Archives Over-sized	0	0	0	0	
Library & Archives	Rare Books	1	0	0	0	
Library & Archives	Library Books	0	0	0	0	
Library & Archives	Library Periodicals	0	0	0	0	
<b>TOTAL</b>		<b>25</b>	<b>2</b>	<b>13</b>	<b>58</b>	

ACCESSIONS & DEACCESSIONS			NEW LOANS		ACTIVE LOANS	
# salvage	# other	# deaccessions	# incoming loans	# outgoing loans	# incoming loans	# outgoing loans
N/A	N/A	N/A	3	0	4	0
0	0	0	0	0	4	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	2	1	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
4	2	4	19	85	176	340



## 8.7. APPENDIX G - COLLECTION ACCESS

DEPARTMENT	COLLECTION	RESEARCHERS <sup>1</sup>				
		INTERNAL: Research Requests - visiting the Collections	EXTERNAL: Research Requests - visiting the Collections	INTERNAL: Research Requests - virtual requests	EXTERNAL: Research Requests - virtual requests	
Anthropology	World Ethnology	5	0	0	5	
Anthropology	American Ethnology	11	6	1	38	
Anthropology	American Archaeology	5	9	1	25	
Anthropology	World Archaeology	1	0	0	2	
	<b>TOTAL</b>	<b>22</b>	<b>15</b>	<b>2</b>	<b>70</b>	
Earth Sciences	Micromount minerals	0	1	0	0	
Earth Sciences	Mineral Collection	4	3	0	9	
Earth Sciences	Rock Collection	1	1	1	2	
Earth Sciences	Meteorites	1	1	0	1	
Earth Sciences	Vertebrate Paleontology	2	1	0	72	
Earth Sciences	Paleobotany	3	5	5	46	
Earth Sciences	Invertebrate Paleontology	0	3	1	50	
	<b>TOTAL</b>	<b>11</b>	<b>15</b>	<b>7</b>	<b>180</b>	
Education Collections	Anthropology	Education Collections Access measured through program metrics (see Appendix K)				
Education Collections	Biology					
Education Collections	Geology					
Education Collections	Health Sciences					
Education Collections	Museology					
Education Collections	Paleontology					
Education Collections	Space Sciences					
Education Collections	Scientific Instruments					
	<b>TOTAL</b>					
Zoology	Arachnology	2	0	0	1	
Zoology	Marine Invertebrates	0	1	0	4	
Zoology	Entomology	1	2	0	7	
Zoology	Botany	0	0	0	0	
Zoology	Mammalogy	1	1	0	31	
Zoology	Ornithology	0	4	0	4	
Zoology	Eggs & Nests	0	0	0	0	
Zoology	Parasites	0	1	0	2	
Zoology	Herpetology	0	0	0	2	
	<b>TOTAL</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>51</b>	

EXHIBITS		VISITORS		
	Specimens on Display at DMNS (incl. Temporary, Permanent, Changing Cases, & Touch Carts/Pop-Ups)	Visitors to Behind the Scenes Tours	Visitors to Open House Events	Visitors to Event Tables
	88	482	115	300
	1,136			
	307			
	74			
	<b>1,605</b>			
	0	327	See Multiple Collections	314
	989			
	4			
	10			
	201			
	134			
	229			
	<b>1,567</b>			
	0	<b>Education Collections Closed to Visitors in 2021</b>		
	0			
	0			
	0			
	0			
	0			
	0			
	0			
	<b>0</b>			
	20	94	See Multiple Collections	399
	228			
	972			
	15			
	387			
	789			
	117			
	5			
	34			
	<b>2,567</b>			

DEPARTMENT	COLLECTION	RESEARCHERS <sup>1</sup>				
		INTERNAL: Research Requests - visiting the Collections	EXTERNAL: Research Requests - visiting the Collections	INTERNAL: Research Requests - virtual requests	EXTERNAL: Research Requests - virtual requests	
Health Sciences	Health Sciences	0	0	0	0	
Health Sciences	Genetics of Taste	0	0	0	0	
Health Sciences	Human Histology	0	0	0	0	
	<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Library & Archives	Archives	62	5	7	19	
Library & Archives	Image Archives	23	3	1	55	
Library & Archives	Archives Over-sized	0	0	0	0	
Library & Archives	Rare Books	0	0	0	0	
	<b>TOTAL</b>	<b>85</b>	<b>8</b>	<b>8</b>	<b>74</b>	
Library & Archives	Library Books					
Library & Archives	Library Periodicals					
	<b>TOTAL</b>					
Space Sciences	N/A	0	0	0	0	
Multiple Departments	Multiple Collections					
	<b>GRAND TOTAL</b>	<b>122</b>	<b>47</b>	<b>17</b>	<b>375</b>	

EXHIBITS		VISITORS		
Specimens on Display at DMNS (incl. Temporary, Permanent, Changing Cases, & Touch Carts/Pop-Ups)		Visitors to Behind the Scenes Tours	Visitors to Open House Events	Visitors to Event Tables
0				
0		0	0	0
0				
0				
0				
0		0	0	0
0				
0				
0				
0				
Library Closed in 2021				
0		5	0	0
		18	200	383
5,739		926	315	1,396

<sup>1</sup>Some researcher visit more than one collection, so grand total will be larger than number of researchers noted in section 1.2



## 8.8. APPENDIX H - OUTREACH METRICS

DEPARTMENT	CATEGORY	SUM OF ATTENDANCE	SUM OF SESSIONS
<b>Anthropology</b>	Class	115	13
	Fieldtrip	232	7
	Media	31	1
	Mentoring	13	9
	Off-site Lecture	25,676	70
	On-site Event Table	300	1
	On-site Lecture	3,361	14
	Podcast	115	1
	Tour	400	53
	Volunteer Training	100	2
<b>Anthropology Total</b>		<b>30,458</b>	<b>170</b>
<b>Chief Curator's Office</b>	Off-site Lecture	311	6
	On-site Lecture	148	1
<b>Chief Curator's Office Total</b>		<b>459</b>	<b>7</b>
<b>Earth Sciences</b>	Fieldtrip	71	4
	Media	18	13
	Mentoring	8	7
	Off-site Lecture	4,038	45
	On-site Lecture	7,409	23
	Tour	297	19
	Volunteer Training	235	3
<b>Earth Sciences Total</b>		<b>12,076</b>	<b>116</b>
<b>Health Sciences</b>	On-site Lecture	178	1
<b>Health Sciences Total</b>		<b>178</b>	<b>1</b>
<b>Integrative Collections</b>	Fieldtrip	1	1
	Media	1,278	5
	Mentoring	9	7
	Off-site Event Table	45	1
	Off-site Lecture	658	12
	On-site Event Table	464	2
	On-site Lecture	165	5
	Tour	157	12
	Volunteer Training	5	1
<b>Integrative Collections Total</b>		<b>2,782</b>	<b>46</b>
<b>Multiple</b>	Class	15	1
	On-site Event Table	383	2
	On-site Lecture	337	1
	Open House	200	2

DEPARTMENT	CATEGORY	SUM OF ATTENDANCE	SUM OF SESSIONS
	Tour	14	2
<b>Multiple Total</b>		<b>949</b>	<b>8</b>
<b>Space Sciences</b>	Media	1	1
	Mentoring	4	2
	Off-site Lecture	1,315	15
	On-site Lecture	10,725	24
	Podcast	50	1
	Tour	5	1
<b>Space Sciences Total</b>		<b>12,100</b>	<b>44</b>
<b>Zoology</b>	Media	19	13
	Mentoring	16	7
	Off-site Lecture	931	7
	On-site Event Table	204	1
	On-site Lecture	5,848	24
	Tour	78	10
<b>Zoology Total</b>		<b>7,096</b>	<b>62</b>
<b>GRAND TOTAL</b>		<b>65,983</b>	<b>453</b>

## 8.9. APPENDIX I - EDUCATION COLLECTIONS PROGRAMS SUPPORTED

MUSEUM PROGRAMS SUPPORTED BY EDUCATION COLLECTIONS	2021 ATTENDANCE	2021 # TIMES DELIVERED
Field Trip Adventures	3,264	136
Camps	1,800	100
<b>TOTAL</b>	<b>5,064</b>	<b>236</b>

## 8.10. APPENDIX J - INTERNS

DEPARTMENT	LAST NAME	FIRST NAME	SUPERVISOR	INTERNSHIP PROGRAM/NAME
Multiple	Multip	Multipl	Multiple	20 Teen Science Scholars
Earth Sciences	Boyd	Mackenzie	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Burns	Emily	Lindsay Dougan, Holger Petermann	NSF Origin of Turtles and Diapsids Internship
Zoology	Channiago	Felix	Paula Cushing	Arachnology Internship
Earth Sciences	Gebhard	Jessica	Kristen MacKenzie, Nicole Neu-Yagle	Fossil Cast Collections Internship
Anthropology	Gover	Carlton	Steve Nash	Native America Science Internship
Earth Sciences	Hutchinson	Makayla	Natalie Toth, Salvador Bastien	BLM Utah Collections Internship
Earth Sciences	Johnson	Colter	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship

DEPARTMENT	LAST NAME	FIRST NAME	SUPERVISOR	INTERNSHIP PROGRAM/NAME
Anthropology	Kriebel	Elizabeth	Dominique Alhambra	Robert L. Akerley Internship
Earth Sciences	Lockwood	Ashley	Kristen MacKenzie, Nicole Neu-Yagle	David B. Jones Paleobotany Collections Internship
Anthropology	Mueldener	Alexandra	Baylee Hughes, Dominique Alhambra	Grinnell Internship
Earth Sciences	Panigot	Eldon	Lindsay Dougan, Holger Petermann	NSF Origin of Turtles and Diapsids Internship
Earth Sciences	Peele	Autumn	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Pevsner	Spencer	Ashley Lownsdale, Kristen MacKenzie, Nicole Neu-Yagle	David B. Jones Madagascar Collection Internship
Earth Sciences	Pfau	Jami	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Pharazyn	Sarah	Kristen MacKenzie, Nicole Neu-Yagle	BLM Utah Collections Internship
Earth Sciences	Plaza-Torres	Stephanie	Nicole Neu-Yagle	Paleobotany Internship
Earth Sciences	Pollatsek	Emory	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Prall	Jack	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Prosser	Jackson	Kristen MacKenzie, Nicole Neu-Yagle	Corral Bluffs Paleobotany Collections Internship
Earth Sciences	Sherman	Sadie	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Simon	Nikki	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Tamez-Galvan	Evan	Natalie Toth, Salvador Bastien	Fossil Preparation Lab Internship
Earth Sciences	Williams	Alexis	Kristen MacKenzie, Nicole Neu-Yagle	BLM Nevada Internship
Anthropology	Wylie	Marlon	Megan Salas	IMLS NWCC Internship

## 8.11. APPENDIX K - EDITORSHIPS

STAFF MEMBER	PUBLICATION	POSITION
Frank Krell	BMC Zoology, BioMed Central, UK	Editorial Board
Frank Krell	Denver Museum of Nature & Science Annals	Editor-in-Chief
Frank Krell	Denver Museum of Nature & Science Reports	Editor
Frank Krell	Diversity, MDPI, Basel, Switzerland	Editorial Board
Frank Krell	Israel Journal of Entomology, Israel	Editorial Advisory Board
Frank Krell	Science Editing, Seoul, Korea	Editorial Board
Frank Krell	VERNATE, Erfurt, Germany	Editorial Board
Garth Spellman	The Auk: Ornithological Advances	Associate Editor
James Hagadorn	Denver Museum of Nature & Science Annals	Subject Editor
John Demboski	Denver Museum of Nature & Science Annals	Associate Editor
Michele Koons	University of Pennsylvania Museum	Editorial Board
Paula Cushing	Insects	Editorial Board
Paula Cushing	ZooKeys	Editorial Board
Steve Nash	Denver Museum of Nature & Science Annals	Subject Editor

## 8.12. APPENDIX L - COMMITTEES, BOARDS, & OFFICER POSITIONS

STAFF MEMBER	ORGANIZATION	POSITION
Andrew Doll	Arctos Consortium	Treasurer
Baylee Hughes	Colorado-Wyoming Association of Museums	Communications and Marketing Team Leader
Baylee Hughes	Colorado-Wyoming Association of Museums	Social Media & Marketing Chair
Colleen Carter	MuseumExperts.org	Programs and Services Lead
David Krause	Madagascar Ankizy Fund	Founder and Executive Director
David Krause	Marmarth Research Foundation	Board Member
Erin Baxter	Society for American Archaeology	Finance Committee
Frank Krell	International Institute of Species Exploration	Scientific Advisor
Frank Krell	International Commission on Zoological Nomenclature	Commissioner and Councillor
Gabriela Chavarria	American Institute of Biological Sciences	Board Member
Gabriela Chavarria	Defenders of Wildlife	Board Member
Gabriela Chavarria	The Nature Conservancy Colorado Field Office	Board Member
Gabriela Chavarria	National Parks Conservation Association	Wildlife Advisory Council
Gabriela Chavarria	UCSC Doris Duke Conservation Scholars Program	Science Advisory Committee
Garth Spellman	Bird Conservancy of the Rockies	Science Advisory Committee
Garth Spellman	Bird Conservancy of the Rockies	Richard G. Levad Award Committee
Garth Spellman	American Ornithological Society	Student Presentation Award
Garth Spellman	Bird Conservancy of the Rockies	Board Member
Garth Spellman	Bird Conservancy of the Rockies	Chairperson Finance Committee
Garth Spellman	Denver Field Ornithologists	Conservation Committee
Jeff Stephenson	Society for the Preservation of Natural History Collections	Co-Chair Professional Development Committee
John Demboski	National Systematics Collection Alliance	Board of Directors
John Demboski	Denver Zoo	Animal Care & Use Committee
Joseph Sertich	Grand Staircase Escalante Partners	Board Member
Joseph Sertich	Texas Through Time Museum	Board Member
Joseph Sertich	Colorado Scientific Society	Council Member
Joseph Sertich	Dinosaur Ridge	Advisory Committee Member
Ka Chun Yu	SATCON2 Community Engagement Working Group	International Planetarium Society Committee
Ka Chun Yu	Big ACT Dome	Advisory Board
Ka Chun Yu	IMERSA	Advisory Council
Ka Chun Yu	IPS	Education Committee
Ka Chun Yu	National Space Science & Technology Institute	Board of Directors
Ka Chun Yu	OpenSpace	Advisory Board
Kathryn Reusch	American Association of Biological Anthropology	Program Committee
Megan Salas	American Institute for Conservation	Imaging Working Group Team Lead



STAFF MEMBER	ORGANIZATION	POSITION
Megan Salas	American Institute for Conservation	Materials Working Group
Melissa Bechhoefer	Association of Registrars and Collections Specialists	Board Member At-Large
Melissa Bechhoefer	Association of Registrars and Collections Specialists	Liaison to Conference Committee
Michele Koons	Society for American Archaeology	Program Committee Chair
Michele Koons	Society for American Archaeology	Awards Committee
Michele Koons	Colorado Council for Professional Archaeologists	Board Member
Michele Koons	Colorado Council for Professional Archaeologists	Program Chair
Nicole Neu-Yagle	Western Interior Paleontological Society	Science Committee
Paula Cushing	Colorado Mountain Club Foundation	Board Member
Paula Cushing	Symbiota Collections of Arthropod Network (SCAN)	Advisory Committee Member
Paula Cushing	International Society of Arachnology	Council Member
Paula Cushing	American Arachnological Society	Secretary
Ryan Jones	American Arachnological Society	Executive Committee
Steve Nash	Society for American Archaeology	Co-Chair Strategic Planning Committee
Steve Nash	Society for American Archaeology	Treasurer
Tyler Lyson	Society of Vertebrate Paleontology	Steven Cohen Award for Student Research Committee
Tyler Lyson	Marmarth Research Foundation	Director

### 8.13. APPENDIX M - AFFILIATE POSITIONS

STAFF MEMBER	UNIVERSITY/MUSEUM	POSITION
David Krause	Stony Brook University	Emeritus Distinguished Service Professor
David Krause	The Field Museum	Research Associate
David Krause	American Museum of Natural History	Research Associate
Erika Garcia	University of Colorado, Boulder	Teaching Assistant
Erin Baxter	University of Colorado, Boulder	Affiliate Faculty
Frank Krell	Colorado State University	Faculty Affiliate
Frank Krell	University of Colorado, Denver	Associate Professor Adjoint
Frank Krell	Butterfly Pavilion	Research Associate
James Hagadorn	University of Colorado, Boulder	Adjoint Curator
John Demboski	University of Colorado, Denver	Adjoint Faculty
John Demboski	Museum of Southwestern Biology	Adjunct Mammal Researcher
Kathryn Reusch	Metropolitan State University of Denver	Adjunct Faculty
Michele Koons	University of Colorado, Denver	Adjunct Faculty
Paula Cushing	University of Colorado, Denver	Adjoint Faculty
Paula Cushing	Colorado State University	Adjunct Faculty
Steve Nash	University of Colorado, Denver	Adjunct Faculty
Steve Nash	University of Arizona, Laboratory of Tree-Ring Research	Adjunct Faculty

## 8.14. APPENDIX N - PROFESSIONAL CONFERENCES

STAFF MEMBER	MONTH	LOCATION	DESCRIPTION
Ka Chun Yu	Jan	Virtual	American Astronomical Society Meeting
Michele Koons	Jan	Virtual	Institute for Andean Studies meeting
Gabriela Chavarria	Feb	Virtual	American Association for the Advancement of Science Annual Meeting
Melissa Bechhoefer	Feb	Virtual	DAM and Museums online conference
Gabriela Chavarria	Feb	Virtual	Defenders of Wildlife February Board Meeting
Erin Baxter	Mar	Virtual	Society for American Archaeology Conference
Gabriela Chavarria	Mar	Virtual	The Nature Conservancy Colorado Board Meeting
Michele Koons	Mar	Virtual	Colorado Council of Professional Archaeologists
Kathryn Reusch	Apr	Virtual	American Association of Physical Anthropology Annual Meeting
Dominique Alhambra	Apr	Virtual	Texas Association of Museums Annual Meeting
Natalie Toth & Salvador Bastien	Apr	Virtual	Association of Materials and Methods in Paleontology Annual Meeting
Steve Nash	Apr	Virtual	Society for American Archaeology Conference
Andrew Doll	Apr	Virtual	iDigBio: Sustaining Digitization and Data Mobilization
Michele Koons	Apr	Virtual	Society for American Archaeology Conference
Dominique Alhambra, Baylee Hughes	Apr	Virtual	Colorado-Wyoming Association of Museums Annual Meeting
Megan Salas	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Dominique Alhambra, Jeff Phegley, Baylee Hughes	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Andrew Doll	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Jeff Stephenson	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Nicole Neu-Yagle	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Melissa Bechhoefer	May	Virtual	American Institute for Conservation / Society for the Preservation of Natural History Collections Joint Annual Meeting
Gabriela Chavarria	May	Virtual	Defenders of Wildlife May Board Meeting
Andrew Doll	May	Virtual	IsoEcol 2021 - International Conference on the Applications of Stable Isotope Techniques to Ecological Studies
Ka Chun Yu	May	Virtual	Communicating Astronomy with the Public Meeting
Andrew Doll	Jun	Virtual	iDigBio Digital Data Conference - Fifth Annual Digital Data in Biodiversity Research Conference
Gabriela Chavarria	Jun	Virtual	The Nature Conservancy June Board Meeting
Gabriela Chavarria	Jun	Virtual	Building the Decarbonized Grid Virtual Summit

STAFF MEMBER	MONTH	LOCATION	DESCRIPTION
Gabriela Chavarria	Jun	Virtual	American Institute of Biological Sciences June Board Meeting
John Demboski	Jun	Virtual	American Society of Mammalogists Annual Meeting
Gabriela Chavarria	Jun	Virtual	National Parks Conservation Association Wildlife Council Workshop
Garth Spellman	Jun	Virtual	Virtual Evolution 2021
Paula Cushing	Jun	Virtual	American Arachnological Society Virtual Meeting
Frank Krell	Jul	Virtual	Royal Entomological Society London, Grand Challenges in Entomology Workshop
Ka Chun Yu	Aug	Virtual	International Planetarium Society Virtual Conference
Garth Spellman	Aug	Virtual	American Ornithological Society Annual Conference
James Hagadorn	Sep	Golden, CO	Rocky Mountain Geobiology Conference
Frank Krell	Sep	Virtual	Biodiversity Digitization: Celebrating a decade of progress
Andrew Doll	Sep	Virtual	Biodiversity Digitization: Celebrating a decade of progress
Gabriela Chavarria	Sep	Virtual	Defenders of Wildlife September Board Meeting
Michele Koons	Sep	Denver, CO	Rocky Mountain Pre-Columbian Association Meeting
Ka Chun Yu	Oct	Virtual	Dark & Quiet Skies for Science & Society
Michele Koons	Oct	Virtual	C2C Care Course: Building Collaborations Between Museums and Indigenous Communities
Frank Krell	Oct	Virtual	High Country Lepidopterists Annual Meeting
Ka Chun Yu	Oct	Virtual	Shaw IAU Workshop on Astronomy for Education
Gabriela Chavarria	Oct	Virtual	American Association for the Advancement of Science Science & Policy Conference
Kathryn Reusch	Oct	Virtual	Center for Experimental Ethnography's Digital Conference: Settler Colonialism, Slavery, and the Problem of Decolonizing Museums
Michele Koons	Oct	Virtual	Center for Experimental Ethnography's Digital Conference: Settler Colonialism, Slavery, and the Problem of Decolonizing Museums
Ka Chun Yu	Oct	Virtual	IEEE Vis 2021
Kathryn Reusch	Oct	Virtual	C2C Care Course: Building Collaborations Between Museums and Indigenous Communities
Gabriela Chavarria	Oct	Virtual	Entomological Society of America Annual Meeting
Dominique Alhambra	Nov	Boulder, CO	Plains Anthropological Society Conference
Dominique Alhambra	Nov	Virtual	Association of Registrars and Collections Specialists Biennial Meeting
Melissa Bechhoefer	Nov	Virtual	Association of Registrars and Collections Specialists Biennial Meeting
Michele Koons	Nov	Boulder, CO	Plains Anthropological Society Conference
Michele Koons	Nov	Virtual	Association on American Indian Affairs 7th Annual Repatriation Conference
Ka Chun Yu	Nov	Virtual	Astronomical Society of the Pacific 2021 Virtual Conference
Gabriela Chavarria	Dec	Virtual	The Nature Conservancy Virtual Summit
Gabriela Chavarria	Dec	Virtual	The Nature Conservancy December Board Meeting
Gabriela Chavarria	Dec	Virtual	American Institute of Biological Sciences December Board Meeting

