2016 Annual Report

Joseph A. Cook

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The University of New Mexico’s Museum of Southwestern Biology in 2016

The Museum of Southwestern Biology (MSB) enjoyed another banner year in 2016 by providing key infrastructure to the Department of Biology at the University of New Mexico and to a worldwide community of scientists, educators, public health workers, and natural resource managers that need samples and information on diverse aspects of biodiversity. Our collections and web-accessible databases, managed by a set of dedicated Collection Managers, constitute an informatics resource that contributes to understanding the complexity of planetary life and related ecosystem function on local, regional, and global scales. High research activity at MSB demonstrates the increasing use of collections (both samples and data) in environmental and biomedical research. Our collections now support a tremendous number of peer-reviewed publications (nearly 200 in 2016) and attract significant grant dollars (> $6.4M in force at UNM in 2016). The museum is an unparalleled informatics resource contributing to applied efforts in conservation as well as theoretical advancements in biology across time and across local, regional, and global scales. MSB faculty curators with active research and graduate programs and their staff build the collections and then exploit the wealth of specimens and data, as they create a permanent and shared resource for the greater scientific community.

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>5-Year Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collection growth (Specimens Cataloged)</td>
<td>25,446</td>
<td>34,772</td>
<td>103,947</td>
<td>129,245</td>
<td>66,334</td>
<td>71,949</td>
</tr>
<tr>
<td>2. Loans Out</td>
<td>99</td>
<td>145</td>
<td>241</td>
<td>176</td>
<td>208</td>
<td>174</td>
</tr>
<tr>
<td>3. Professional Visitors to the Collections</td>
<td>307</td>
<td>344</td>
<td>248</td>
<td>945</td>
<td>392</td>
<td>447</td>
</tr>
<tr>
<td>4. Collection Database Web Site Hits</td>
<td>396,362</td>
<td>**</td>
<td>233,079</td>
<td>585,913</td>
<td>454,998</td>
<td>417,588</td>
</tr>
<tr>
<td>6. Outside Pubs Citing MSB Specimens</td>
<td>76</td>
<td>167</td>
<td>147</td>
<td>189</td>
<td>90</td>
<td>134</td>
</tr>
<tr>
<td>7. Peer-Reviewed Publications by Staff</td>
<td>77</td>
<td>54</td>
<td>104</td>
<td>80</td>
<td>59</td>
<td>75</td>
</tr>
<tr>
<td>8. Graduate Students</td>
<td>42</td>
<td>42</td>
<td>41</td>
<td>27</td>
<td>56</td>
<td>42</td>
</tr>
<tr>
<td>9. Graduate Theses/Dissertations Completed</td>
<td>9</td>
<td>7</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>10. Undergraduate Students</td>
<td>76</td>
<td>66</td>
<td>63</td>
<td>57</td>
<td>73</td>
<td>67</td>
</tr>
<tr>
<td>11. Grants/Contracts in Force</td>
<td>76</td>
<td>61</td>
<td>61</td>
<td>82</td>
<td>51</td>
<td>66</td>
</tr>
<tr>
<td>12. Grants In Force Total Costs</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$2,662,014</td>
<td>$6,354,047</td>
<td>$4,508,030</td>
</tr>
</tbody>
</table>

* 1 UNM, 2 outside, NR – not reported

We focus on hands-on training of UNM students who gain experience in natural history specimen curation, field expeditions, informatics, and laboratory research. MSB faculty and staff are heavily involved in instructional efforts, including the new Museum Studies Program and through collaborative efforts with other departments and colleges on campus. MSB staff members (8 collection managers and 7 curators) teach
courses, provide specimens and offer many opportunities for high quality experiential or inquiry-based educational experiences. As one of the most active university-based natural history museums worldwide, UNM students are afforded world-class opportunities in biodiversity informatics, comparative biology, and cutting-edge genomics that extend their university experiences far beyond those available at other universities in the Southwest.

MSB has a long history of leading UNM in training students. Many of our students fill jobs with natural resource agencies, the private sector, or in academia in the state and elsewhere. We also lead in mentoring international students, especially those from Latin America, with many returning to leadership positions in their respective countries. MSB-affiliated undergraduate and graduate students have taken leadership positions in biology in the US. Many graduate students work in collections-related activities during their graduate tenure at UNM. Our unit regularly leads the Biology Department in the number of students receiving doctorate or master’s degrees.

MSB is a major contributor at UNM to public service and outreach efforts, especially activities related to evidence-based management of natural resources such as water and riparian environments in the Southwest. We are thoroughly engaged with municipal, county, state and federal agencies through funded projects ranging from South America to New Mexico to Alaska. Many of our outreach efforts are related to developing effective management plans for state and federal resource agencies. International organizations also rely on our specimens, data and expertise to help them design and implement public health initiatives. MSB has built a strong tradition in the public health arena in efforts related to identifying zoonotic pathogens (e.g., hantavirus) and understanding the ecology of zoonotic diseases and wildlife diseases in the western US, but also in a number of international settings including Peru, Mongolia and elsewhere.

Because of the vast spatial and temporal biodiversity data served, MSB is now a key player in national and international efforts in bioinformatics, both environmental and genomic. This activity is recorded in the number of hits (and downloads) from our databases, number of loans and number of publications based on these materials and data. MSB faculty and staff been heavily engaged with faculty in other departments and in other colleges---perhaps more so than other units on campus. We have established and long-term collaborative efforts with the School of Medicine and with the Arts and Ecology Program (College of Fine Arts), and Anthropology, Geography, History, and other disciplines. We have MOUs in place that are active and productive including one with New Mexico Museum of Natural History and Science. Our staff serves on national boards including the Board of Directors of American Society of Mammalogists, Flora of North America, Society of Ichthyologists and Herpetologists, Entomological Society of America, and the Natural Science Collections Alliance, the primary advocacy group of administrators and curators who oversee research-oriented museums of natural history in Washington, DC. MSB staff also serve on Steering Committees for several national initiatives, including VertNet, Aim-Up!, and the National Integrated Biocollections Alliance, a new NSF sponsored Research Coordinating Network (BCoN) focused on translating the vast digital resources of natural history museums into a catalyst for greater research productivity and educational transformation in the US.

Across the primary missions of UNM in research, teaching, and public service, MSB’s metrics attest to the fact that MSB is among the most productive and international units on campus. Follow us on FaceBook or at www.msb.unm.edu.
A few examples of the Breadth of MSB Activities in 2016 (more details in Division Reports).

<table>
<thead>
<tr>
<th>MONTH</th>
<th>AWARD OR EVENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2016</td>
<td>MSB Mammals and Birds received 149 museum cases (2 semi-trucks worth) donated this week to the MSB by the Denver Museum of Nature and Science. Thank you John Demboski (former Cook Lab doctoral student)! Nearly everyone got in on unloading all the equipment.</td>
</tr>
<tr>
<td>February</td>
<td>J Tomasz Giermakowski, Senior Collections Manager, Amphibians and Reptiles delivered a talk entitled “Of museums, specimens, and maps: How collections help conservation in a time of extinction” to a public audience at the NM Museum of Natural History and Science. There are many other examples of public talks by MSB personnel throughout the year including 5 lectures in the Bernalillo County Open Space Naturalist Series. Among these, the Division of Fishes presented Chihuahua Desert Pupfishes and Conservation.</td>
</tr>
</tbody>
</table>
April

MSB held an Open House for the Biology Department’s Annual Research Day. Bigger and better than ever this year, all divisions participated.

May

Lex Synder, Senior Collection Manager Fishes, received $100,000 from Region 6, Federal Emergency Management Administration (FEMA) for additional “earthquake” shelving ledges to stabilize jars during seismic events causing side-to-side movement of shelves.

Kelly Speer, former MSB undergraduate student has just completed her MS at University of Florida and will be beginning a doctoral program at the AMNH in New York this fall. She hails from Corrales NM and the local newspaper wrote about her accomplishments. http://www.corralescomment.com/.../3450-speer-wins-post-at-am...
Dr. Kelly Miller, Curator of Arthropods, has just completed a major monograph on the "Diving Beetles of the World" which will be published by Johns Hopkins Press in September 2016. Congratulations Kelly!

American Society of Mammalogists (ASM) 2016 annual meeting in Minneapolis. Bryan McLean was awarded the ASM Fellowship, the top ASM award for graduate students. Joseph Cook won the 2016 Joseph Grinnell Award for outstanding and sustained contributions to education in Mammalogy.

MSB Mammal crews are in eastern Mongolia on a six-week expedition to collect mammals and their associated parasites in collaboration with Batsaikhan Nayamsuren and his students at the National University of Mongolia. Another crew headed north to Canada to recover >1000 carnivore specimens from research freezers.

Tom Giermakowski attended the Summer Supercomputing Institute at the Texas Advanced Computing Center (TACC). The week-long series of workshops focused on using TACC resources to explore concepts ranging from data management to data visualization and data query and analyses on distributed systems. TACC resources provide an amazing array of options for different purposes and Tom's hopes to take advantage of TACC's connections to (hosting) the MSB database ARCTOS to further enhance use of MSB big data (e.g., through visualization).
In the Fall semester, the Division of Arthropods had 3 undergraduates, with funding from the US Geological Survey, help clear out a backlog of samples from Bandelier National Monument and the Valles Caldera National Preserve. The samples are for ecological monitoring of ground-dwelling arthropods to study the effects of climate change (Bandelier), or the effects of the 2011 Las Conchas fire (Valles Caldera).

Dr. Chris Witt stars in Nature program on hummingbirds!
http://www.pbs.org/…/nature/super-hummingbirds-about/14472/…

Howard Snell, MSB Curator of Herps, designed a new course, Wilderness Biology, where students develop expertise, confidence, and independence associated with wilderness travels and observations. Students just returned from a five-day, 50 river mile trip into the Rio Grande del Norte National Monument and Rio Grande Gorge. Day hikes at Punche & Costilla Creeks, Pinion Hills and Ute Mountain provided opportunities for viewing habitats and wildlife away from the river corridor.

Dr. Stephen Greiman (MSB Postdoctoral Associate) received the American Society of Parasitologists (ASP) 2016 Ashton Cuckler New Investigator Award, given to the most outstanding North American early career parasitologist of the year. The honor is competitive, and is based on the recipient’s research over the course of graduate studies. He is leaving MSB in January to start a tenure-track position at Georgia Southern University.
DIVISION HIGHLIGHTS

During 2016 the collection increased to 98,002 specimens. Students, staff, and collaborators of the division collected the majority of the 1,411 specimens that were added last year. In addition, we hosted several research visitors in the collection and responded to nearly 170 data requests in person. Our outreach activities, in addition to general tours of the collection to over 200 visitors, included a variety of presentations and consultations. We presented on the role of museums in conservation of amphibians and reptiles at New Mexico Museum of Natural History and Science as well as to the City of Albuquerque and Bernalillo County Open Space Division programs. In addition, staff and students gave presentations on ongoing research projects at regional and national meetings as well as gave invited lectures internally (at UNM).
TABLE OF COLLECTION USE

2016
1. Collection: growth & current size (New Specimens Cataloged/total specimens) 1,411 / 98,002
2. Loans Out 8
3. Professional Visitors to the Collections 5
4. Collection Database Web Site Hits 1,078
5. Outside Publications Citing MSB Specimens 10
6. Peer-Reviewed Publications by Staff 12
7. Graduate Students (using or working in collections) 5
8. Graduate Theses/Dissertations Completed (UNM/Other*) 3/0
9. Undergraduate Students (using or working in collections) 7/6

* List Other Institutions

COURSES USING THE COLLECTIONS

BIOL 204, Animal Form and Function, spring and fall semesters, 310 students
BIOL 386, General Vertebrate Zoology, spring and fall semesters, 83 students

COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

<table>
<thead>
<tr>
<th>INSTRUCTOR(S)</th>
<th>SEM</th>
<th>COURSE</th>
<th>TITLE</th>
<th>ENROLLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNELL, HOWARD</td>
<td>Spring</td>
<td>BIOL 402 U 022</td>
<td>T: Conservation Biology</td>
<td>15</td>
</tr>
<tr>
<td>SNELL, HOWARD; GIERMAKOWSKI, JACEK</td>
<td>Spring</td>
<td>BIOL 402 U 026</td>
<td>T: Herpetology Collection Research</td>
<td>9</td>
</tr>
<tr>
<td>SNELL, HOWARD</td>
<td>Spring</td>
<td>BIOL 499 U 027</td>
<td>Undergraduate Problems</td>
<td>2</td>
</tr>
<tr>
<td>SNELL, HOWARD</td>
<td>Fall</td>
<td>BIOL 379 U 001</td>
<td>Conservation Biology</td>
<td>41</td>
</tr>
<tr>
<td>SNELL, HOWARD</td>
<td>Fall</td>
<td>BIOL 402 U 011</td>
<td>T: Conservation Biology</td>
<td>12</td>
</tr>
<tr>
<td>SNELL, HOWARD</td>
<td>Fall</td>
<td>BIOL 409 U 001</td>
<td>T: Wilderness Biology</td>
<td>8</td>
</tr>
<tr>
<td>POE, STEVEN</td>
<td>Fall</td>
<td>BIOL 551 M 004</td>
<td>Research Problems</td>
<td>3</td>
</tr>
<tr>
<td>POE, STEVEN</td>
<td>Fall</td>
<td>BIOL 699 P 024</td>
<td>Dissertation</td>
<td>9</td>
</tr>
</tbody>
</table>
 COLLECTION MANAGEMENT

By the end of 2016, the collection has increased to 98,002 specimens. Students, staff, and collaborators of the division collected the majority of the 1,411 specimens that were added last year. The division’s website was viewed 1,873 times. The collection manager handled 169 data requests in person and hosted several research visitors in the collection. Our outreach activities, in addition to general tours of the collection to over 200 visitors, included a variety of presentations and consultations. We presented on amphibians and reptiles at New Mexico Museum of Natural History and Science as well as to the City of Albuquerque and Bernalillo County Open Space Division programs. In addition, we gave presentations on ongoing research projects at regional and national meetings as well as gave invited lectures internally (at UNM).

AWARDS, GRANTS, AND CONTRACTS (TO MSB CURATOR OR STAFF)

Poe, S: RAC grant received “Empirical test of the native-nonnative distinction, $10,000

Snell, HL; UNM Teaching Allocation Grant: “Wilderness Biology” $5,000

Snell, HL, Giermakowski, JT, and MJ Ryan: “2016 Surveys of the Arizona Toad throughout its range in New Mexico”, New Mexico Department of Game and Fish. $33,500


PUBLICATIONS (BY MSB CURATOR, CM OR OTHER PAID STAFF)=

Journal Articles (ONLY THOSE PUBLISHED IN 2016, NOT IN PRESS)


Books


Technical Reports


Ryan, MJ. Comments on the species status of the Gray Checkered Whiptail in New Mexico and implications for continued protection in New Mexico. Official Comments to New Mexico Department of Game and Fish.

**Publications Based on MSB Specimens/Data (OTHER THAN THOSE REPORTED ABOVE)**


**ACTIVITIES IN LEARNED SOCIETIES**
Invited Talks

**Ryan**
Spring 2016, Tropical Biology – Tropical Amphibian Ecology & Conservation, Lecture

**Giermakowski**
Fall 2016, Global Change Biology – Species Distribution Modeling and Climate Change, Lecture

Contributed Talks/Posters (*presenter)


**Ryan, MJ**. Population status and threats to the Boreal Chorus frog in New Mexico. Chiricahua Leopard Annual Meeting, Truth or Consequences, NM.

**Ryan, MJ**. Impacts of climate change on arid adapted lizards. University of Nevada, Reno Ecology and Evolution Group, Reno, NV.

Attendance at Professional Meetings

Giermakowski, JT. World Conference on Natural Resource Modelling, Flagstaff, AZ, June.
Giermakowski, JT. Joint Annual Meeting of the AZ and NM Chapters of The Wildlife Society, Flagstaff, AZ.
Ryan, MJ. Joint Annual Meeting of the AZ and NM Chapters of The Wildlife Society, Flagstaff, AZ.

Service as Editor or on Editorial Board of a Journal

S. Poe. Phyllomedusa (Associate Editor)

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity
J.T. Giermakowski


Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

H.L. Snell.
Member of IUCN SSC Iguana Specialist Group 2013-2016.

Member of New Mexico Department of Game and Fish Species Recovery Team for Boreal Toads and Gila Monsters. New Mexico Department of Game & Fish.

Elected Board Member, Tierra Grande Improvement Association (organization that administers 15,000 acres of protected areas in southern Manzano Mountains, Valencia County).

J.T. Giermakowski.
Webmaster of the Southwestern Partners in Amphibian and Reptile Conservation Steering Committee.

Member of Collections Committee for the American Society of Ichthyologists and Herpetologists.

Member of New Mexico Department of Game & Fish Species Recovery Board.

Appointed to University of New Mexico Institutional Animal Care and Use Committee. 2016-2018.

Journal Referee

Ryan
Canadian Journal of Fisheries and Aquatic Sciences
Evolutionary Ecology
Integrative Zoology
Herpetological Conservation and Biology (2x)
Mesoamerican Herpetology (2x)
United States Geological Survey Publications

10. SERVICE

<table>
<thead>
<tr>
<th>NAME</th>
<th>COMMITTEE/SERVICE</th>
<th>CHAIR (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNELL</td>
<td>Associate Chair</td>
<td></td>
</tr>
<tr>
<td>SNELL</td>
<td>Curator, Division of Herpetology, MSB</td>
<td></td>
</tr>
</tbody>
</table>
H.L. Snell, Curator  
W.H. Degenhardt, Curator Emeritus  
Poe, S., Associate Professor and Associate Curator  
J.T. Giermakowski, Collection Manager  
Loughran, C.L. Graduate Assistant (Spring and Fall)  

**Graduate students**

Gray, L.N., Ph.D. /Poe  
Latella, I.M., Ph.D./Poe  
Loughran, C.L., Ph.D/Wolf  

**Undergraduate Student Workers and Volunteers**

Castillo, Shelby, Student employee.  
Cruz, Paxton. Student employee.  
Isom, Kaylee. Student employee.  
McMenomy, Charlie. Student employee.  
White, Brittney. Student employee.

**MUSEUM ASSOCIATES**

**A. Curatorial Associates**

Pierce, L.J.S., New Mexico Dept. of Game & Fish  
Stuart, J.N., New Mexico Dept. of Game & Fish

**Research Associates**

Fitzgerald, L., Texas A&M University  
Fritts, T.H., retired
Division of Arthropods

TABLE OF COLLECTION USE

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1. Collection: growth &amp; current size (New Specimens Cataloged/total specimens)</td>
<td>7877</td>
</tr>
<tr>
<td></td>
<td>2. Loans Out</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3. Professional Visitors to the Collections</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4. Collection Database Web Site Hits</td>
<td>32,043</td>
</tr>
<tr>
<td></td>
<td>5. Outside Publications Citing MSB Specimens</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6. Peer-Reviewed Publications by Staff</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>7. Graduate Students (using or working in collections)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>8. Graduate Theses/Dissertations Completed (UNM/Other*)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>9. Undergraduate Students (using or working in collections)</td>
<td>3</td>
</tr>
</tbody>
</table>

* List Other Institutions

COURSES USING THE COLLECTIONS

NTSC 262 (College of Education), Life Sciences, one visit to museum (Jon & Sandy), 26 students

BIOL/419/519 Natural History Collections Curatorial Techniques (Sandy, Dave), 18 students

COURSES TAUGHT BY MSB PERSONNEL

Faculty/Collection Managers

CURATOR
BIOL 203
Animal Sexual Strategies
171

COLLECTION MANAGERS
BIOL 419/519
Natural History Collections Curatorial Techniques
18

COLLECTION MANAGEMENT

New collection: We received almost all of the crustaceans/mollusks from the NM Dept. of Game and Fish; the field notebooks and a few specimens will be transferred in early 2017. This collection fills most of the remaining space in the arthropod alcohol collection; once specimens are curated and moved to smaller containers, some space will be recovered.
**SCAN database:** TCN funding covered NAU undergraduate Caitlin Chapman’s work to complete specimen georeferencing; Mark Ward added many specimens to the Bandelier pinned collection and Sandy added all the pinned specimens to SCAN (2823 records); Rachael labeled and databased many of the spiders collected from Nicaragua; Sandy edited and uploaded 3660 specimen records from White Sands/Cuatro Cienegas to SCAN; MSBA records are now being sent to GBIF in addition to the iDigBio portal; TCN funding ended June 30.

**Other collection activity:** Darren Pollock and Lisa Reichert kindly identified 258 MSBA asilid specimens to genus or species level; GA Rachael Alfaro shifted the spider collection to match the current phylogeny of the order, as it will be in the new *Spiders of North America Identification Manual* (due Spring 2017); intern Jaylen Quintana inventoried and labeled the legacy Bandelier collection of Warren Pippin (1980s); during the Fall semester three undergraduate students worked with us to sort backlogged samples from Bandelier and the Valles Caldera.

**AWARDS, GRANTS, AND CONTRACTS (TO MSB CURATOR OR STAFF)**

Department of Agriculture (K.B. Miller, PI). Promoting undergraduate research in systematics: Insects as a template for training. ($60,000), 2016-2021.

NSF Systematic Biology and Biodiversity Inventories Grant #DEB–1353426 (K.B. Miller, PI). The Phylogeny of Diving Beetles and Extreme Diversification of Sexual Strategies ($520,000), 2014-2016. ($15,000 REU supplement).


2016 Alvin R. and Caroline G. Grove Summer Research Scholarship ($2250), Rachael Alfaro, to cover costs of travel for SEM imaging of spiders at California Academy of Sciences and to continue maintaining the Nicaraguan spider colony within the lab

2016 Spring GRAC Research Grant ($400), Rachael Alfaro, to cover costs associated with specimen preparation for SEM imaging of spiders at California Academy of Sciences

2016 Spring GRAC Travel Grant ($150), Rachael Alfaro, to cover travel to the 25th International Arachnology Congress

**PUBLICATIONS (BY MSB CURATOR, CM OR OTHER PAID STAFF)**
A. Journal Articles (ONLY THOSE PUBLISHED IN 2016, NOT IN PRESS)


Books

Dissertations/Theses Completed

ACTIVITIES IN LEARNED SOCIETIES

Contributed Talks/Posters (*presenter)
*Brantley, S.L. Spider responses to wildfire. Poster. Research meeting, Southwest Jemez Mountains Resilient Landscapes and Collaborative Forest Landscape Restoration Project (CFLRP), Santa Fe, NM. April
*Alfaro, R.E. Comparative spigot ontogeny and morphology across the Lycosoidea. Presentation. International Congress of Arachnology, Golden, CO. July

C. Attendance at Professional Meetings

**Brantley, S.L.** Southwest Jemez Mountains Resilient Landscapes and Collaborative Forest Landscape Restoration Project (CFLRP), Santa Fe, NM. April

**Brantley, S.L.** International Congress of Arachnology, Golden, CO. July

**Alfaro, R.E.** International Congress of Arachnology, Golden, CO. July

**Wright, K.W.** International Congress of Entomology, Orlando, FL. November

**Wright, K.W.** Entomological Collections Network Annual Meeting, Orlando, FL. November.

**Miller, K.B.** International Congress of Entomology Meeting, Orlando, FL. November.

OTHER PROFESSIONAL ACTIVITIES

**Presentation to General Audience in a Scholarly Capacity**

**PRESENTER**

**Brantley, S.L.** Arthropod identifications and information for NPS Centennial BioBlitzes at Bandelier National Monument (May) and Valles Caldera National Preserve (August)

**Brantley, S.L.** Insects of New Mexico. City of Albuquerque Open Space lecture series. June

**Brantley, S.L.** and **D.C. Lightfoot.** Article by Ollie Reed in the *Albuquerque Journal* about the long-term arthropod study at Bandelier National Monument. November

**Alfaro, R.E.** *Tengella perfuga*: an evolutionary conundrum? Spiders: Species rediscovery and evolutionary questions. Bernalillo County Open Space lecture series, August

**Alfaro, R.E.** Article by Cody Hooks in *The Taos News* about tarantulas and the male ‘migration’, October

Sandra Brantley giving Albuquerque Open Space talk, June, 2016.

**SERVICE**

Several museum tours, including El Dorado High School AP Biology students (33), loan of teaching specimens (bees) for K-12 group (borrowed by Yadeeh Sawyer); tour for a private school K-8 students (20); tour and educational visit with a young girl very interested in entomology and her family; participated in freshman recruitment through Tim Schroeder’s (UNM’s STEM Collaborative Center director) “Road Trips” on campus to highlight science programs.

**DONATIONS AND GIFTS RECEIVED**

258 MSB asilids identified by Darren Pollock and Lisa Reichert

130 beetles from Karen Wright (mostly bycatch from her bee traps)
CURRENT STAFF

Faculty/Staff
Kelly Miller, Curator, Associate Professor
Sandra Brantley, Senior collection manager, Research Assoc. Professor
David Lightfoot, Senior collection manager, Research Assoc. Professor

Graduate students
Rachael Alfaro, Ph.D. candidate
Grey Gustafson, Ph.D. candidate
Matthew Leister, Master’s student
Karen Wright, Ph.D. candidate

Undergraduate Student Workers and Volunteers
Lozen Benson
Caitlin Chapman (through TCN funding)
Joaquin Garcia
Katie Klonis
Kateri Lopez
Wesley Noe
Jaylen Quintana (UNM Los Alamos intern in the Accelerate Program)

MUSEUM ASSOCIATES

Research Associates
Robert Parmenter, Valles Caldera National Preserve
Ernest Valdez, NM Landscapes Field Station
Mark Ward, UNM/Valles Caldera National Preserve Research Scientist
DIVISION OF BIRDS

Highlights & Major events in 2016

- Major paper in *PNAS* on island evolution in birds.
- Major paper in *Nature Communications* about passerine diversification and biogeography.
- Major paper in *Nature Communications* about horizontal transfer of DNA between nematodes and birds.
- Major paper in *Science* about hemoglobin adaptation in birds.
- Major paper in *eLife* about evolution of avian carotenoid pigments.
- Arrival of four new graduate students (McCoullough, Brady, Williamson, Gadek) and one NSF Postdoctoral Fellow (Barrow)
- Graduation of two M.S. (Gaffney and Chavez) and one Ph.D. student (Beckman), all of whom moved on directly to competitive jobs in their field (USFWS, BLM, and University of Montana Philip Wright Museum, respectively).
- First major collecting efforts focused on sampling of New Mexico breeding bird communities in 21st century.
- New funded project on avian malaria of New Mexico, in cooperation with the Bureau of Land Management.
- Annual citations for publications based on the collection accelerates past 400 (up 33% in one year!).
- First *UNM Ornithology Retreat* to the Sevilleta, December 2016.

By the Numbers: MSB’s metrics of productivity for the Bird Division, 2016:

1. Collection Growth (Specimens Cataloged): 1,026 specimens added, bringing total to ~46,000.
2. Outgoing Loans 2016: Twenty-three.
3. Professional visits to collection: Four.
4. Collection Database Hits: 14,888 queries returning 1,341,142 records.
5. Outside Publications Citing MSB Specimens: 14 (but 24 total publications that were based on collection in 2016, when including those by MSB personnel; we think the latter number is the one that MSB should be tracking).
6. Peer-Reviewed Publications by Staff: Fourteen (includes curator, research associate, and student authors, using MSB byline); 10 of these utilized specimens and/or specimen data from the MSB Bird Collection.
7. Graduate Students using or working in the collection: Eight.
8. Graduate Theses/Dissertations Completed: Three UNM; one external; one undergraduate honors thesis.
9. Undergraduate Students using or working in the collection: Twelve.
**Figure 1.** Exponential citations growth continues through 2016 for the MSB Bird Division. Source: *Google Scholar.*

![Citations per year to articles that used MSB bird specimens](image)

**TEACHING IMPACT OF THE MSB BIRD DIVISION**

**PART 3: UNM courses using the collection (specimens, data, electronic archives and other resources provided by the MSB Bird Division).**

<table>
<thead>
<tr>
<th>2016 semester</th>
<th>Course No.</th>
<th>Title</th>
<th>Students</th>
<th>Credit hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>BIOL 300 U 001</td>
<td>Evolution</td>
<td>24</td>
<td>72</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 400 U 035</td>
<td>Senior Honors Thesis</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 402 U 001</td>
<td>T: Brown Bag Research Seminar</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 499 U 035</td>
<td>Undergraduate Problems</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 502 M 001</td>
<td>T: Brown Bag Research Seminar</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 502 M 045</td>
<td>T: Molecular Systematic Disc</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 551 M 035</td>
<td>Research Problems</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 599 M 035</td>
<td>Masters Thesis</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Spring</td>
<td>BIOL 699 P 035</td>
<td>Dissertation</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Fall</td>
<td>BIOL 402 U 001</td>
<td>T: Brown Bag Research Seminar</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Fall</td>
<td>BIOL 419 U 002</td>
<td>T: High Altitude Biology</td>
<td>36</td>
<td>108</td>
</tr>
<tr>
<td>Fall</td>
<td>BIOL 502 M 001</td>
<td>T: Brown Bag Research Seminar</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Fall</td>
<td>BIOL 502 M 026</td>
<td>T: Molecular Systematics Disc</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fall</td>
<td>BIOL 519 M 011</td>
<td>T: High Altitude Biology</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>
[Part 4. All courses listed taught in whole or in part by MSB Bird Division faculty curators and staff.]

Part 5. Collection Management.
In 2016, the Bird Division experienced unprecedented collections growth due to research activity in the Southwestern United States. We added 48 Arizona specimens, and 464 New Mexico specimens. This activity was mostly driven by three projects: BLM-sponsored project to survey Avian Malaria in New Mexico, and our ongoing division projects to understand migratory connectivity of New Mexico Yellow-rumped Warblers (led by the Schmitt family) and Hermit Thrushes (led by M. J. Baumann). The specimen preparation lab was more productive than ever before in 2016, with all graduate students, the curators, one post-doc, and several undergraduates participating. We were fortunate to have hired a dedicated, part-time post-bac preparator, Selina Bauernfeind, who prepared ~240 high-quality specimens in 2016. Additional strong contributions were made by students (especially Jenna McCoullough, Chauncey Gadek, Xena Mapel, Andrea Chavez, Ariel Gaffney, et al.) and Research Associates (M. J. Baumann, D. C. Schmitt, C. G. Schmitt).

RESEARCH IMPACTS OF THE MSB BIRD DIVISION

Part 6. AWARDS, GRANTS, AND CONTRACTS (Active grants and contracts to Curators or Staff for curation and/or specimen-based research)

2011-2017: Montane Biogeography Revealed by Quirks of the Evolutionary Process: Integrative Respiratory Phenotypes for Andean Birds; P.I.: C. C. Witt; co-P.I. Blair Wolf; co-P.I. Joann Mudge; National Science Foundation (Evolutionary Processes Cluster); $673,000; DEB-1146491.

2016-2021: BLM Cooperative Agreement: Avian Malaria of New Mexico. PI: C. C. Witt; $100,000.


**Figure 2.** Social media highlights from 2016, based on MSB Bird Division research.
Part. 7. PUBLICATIONS

A. Publications by personnel: (17 total; includes three theses and dissertations; only includes 2016 publications that have "Museum of Southwestern Biology" as part of the authors’ affiliations)

Carriker, Colin R; Mermier, Christine M; VanDusseldorp, Trisha A; Johnson, Kelly E; Beltz, Nicholas M; Vaughan, Roger A; McCormick, James J; Cole, Nathan H; Witt, Christopher C; Gibson, Ann L; Effect of Acute Dietary Nitrate Consumption on Oxygen Consumption During Submaximal Exercise in Hypobaric Hypoxia, International journal of sport nutrition and exercise metabolism, 26, 4, 315-322, 2016.

Ortiz-Ramirez, Marco F; Andersen, Michael J; Zaldavar-Riverin, Alejandro; Ornelas, Juan Francisco; Navarro-Sigienza, Adolfo G; Geographic isolation drives divergence of uncorrelated genetic and song variation in the Ruddy-capped Nightingale-Thrush (Catharus frantzii; Aves: Turdidae), Molecular phylogenetics and evolution, 94, 74-86, 2016, Elsevier.

Benham, Phred M; Witt, Christopher C; The dual role of Andean topography in primary divergence: functional and neutral variation among populations of the hummingbird, Metallura tyrianthina, BMC evolutionary biology, 16, 1, 22, 2016, BioMed Central.


Wright, Natalie A; Steadman, David W; Witt, Christopher C; Predictable evolution toward flightlessness in volant island birds, Proceedings of the National Academy of Sciences, 201522931, 2016, National Acad Sciences.

Suh, Alexander; Witt, Christopher C; Menger, Juliana; Sadanandan, Keren R; Podsriadlowski, Lars; Gerth, Michael; Weigert, Anne; McGuire, Jimmy A; Mudge, Joann; Edwards, Scott V; Ancient horizontal transfers of retrotransposons between birds and ancestors of human pathogenic nematodes, Nature communications, 7, 2016, Nature Publishing Group.

Clark, William S; Galen, Spencer C; Hull, Joshua M; Mayo, Megan A; Witt, Christopher C; Contrasting molecular and morphological evidence for the identification of an anomalous Buteo: a cautionary tale for hybrid diagnosis, PeerJ, 5, e2850, 2017, PeerJ Inc.

Carmi, Ore; Witt, Christopher C; Jaramillo, Alvaro; Dumbacher, John P; Phylogeography of the Vermilion Flycatcher species complex: Multiple speciation events, shifts in migratory behavior, and an apparent extinction of a Galapagos-endemic bird species, Molecular phylogenetics and evolution, 102, 152-173, 2016, Academic Press.

Toomey, Matthew B; Lind, Olle; Frederiksenn, Rikard; Curley Jr, Robert W; Riedl, Ken M; Wilby, David; Schwartz, Steven J; Witt, Christopher C; Harrison, Earl H; Roberts, Nicholas W; Complementary shifts in photoreceptor spectral tuning unlock the full adaptive potential of ultraviolet vision in birds, ELife, 5, e15675, 2016, eLife Sciences Publications Limited.

Natarajan, Chandrasekhar; Hoffmann, Federico G; Weber, Roy E; Fago, Angela; Witt, Christopher C; Storz, Jay F; Predictable convergence in hemoglobin function has unpredictable molecular underpinnings, Science, 354, 6310, 336-339, 2016, American Association for the Advancement of Science.

Moyle, Robert G; Oliveros, Carl H; Andersen, Michael J; Hosner, Peter A; Benz, Brett W; Manthey, Joseph D; Travers, Scott L; Brown, Rafe M; Faircloth, Brant C; Tectonic collision and uplift of Wallacea triggered the global songbird radiation, Nature Communications, 7, 2016, Nature Research.
Raymond A. Meyer, Deanne T. Meliopoulos, Grant M. Beauprez, Sartor O. Williams III; Breeding of the Short-eared Owl in New Mexico, Western Birds, 47, 2, 151-160, 2016, Western Field Ornithologists.

Clait E. Braun, Sartor O. Williams III; History of Sage-grouse (Centrocercus spp.) in New Mexico, Southwestern Naturalist, 60, 207-211, 2016, Southwestern Association of Naturalists.

Williams III, Sartor O.; Checklist of New Mexico Bird Species, New Mexico Ornithological Society, 2016.


**D. Publications Based on MSB Specimens/Data:** (24 total, includes 10 by division personnel, from list above; 14 by outside researchers; includes four theses and dissertations).

Abrahamson, Bethany; Evaluating the Utility of Natural History Collections in Research and for the Public, 2016.


Benham, Phred M; Witt, Christopher C; The dual role of Andean topography in primary divergence: functional and neutral variation among populations of the hummingbird, Metallura tyrianthina, BMC evolutionary biology, 16, 1, 22, 2016, BioMed Central


Carmi, Ore; Witt, Christopher C; Jaramillo, Alvaro; Dumbacher, John P; Phylogeography of the Vermilion Flycatcher species complex: Multiple speciation events, shifts in migratory behavior, and an apparent extinction of a Galapagos-endemic bird species, Molecular phylogenetics and evolution, 102, 152-173, 2016, Academic Press


Clark, William S; Galen, Spencer C; Hull, Joshua M; Mayo, Megan A; Witt, Christopher C; Contrasting molecular and morphological evidence for the identification of an anomalous Buteo: a cautionary tale for hybrid diagnosis, PeerJ Preprints, 5, e2850, 2016, PeerJ Inc.

Conrad, Cyler; Higham, Charles; Eda, Masaki; Marwick, Ben; Palaeoecology and Forager Subsistence Strategies during the Pleistocene-Holocene Transition: A Reinvestigation of the Zooarchaeological Assemblage from Spirit Cave, Mae Hong Son Province, Thailand, Asian Perspectives, 55, 1, 27-Feb, 2016, University of Hawai'i Press

Conrad, Cyler; Jones, Emily Lena; Newsome, Seth D; Schwartz, Douglas W; Bone isotopes, eggshell and turkey husbandry at Arroyo Hondo Pueblo, Journal of Archaeological Science: Reports, 10, 566-574, 2016, Elsevier

Ebbs, Erika T; Loker, Eric S; Davis, Norm E; Flores, Veronica; Veleizan, Ayleen; Brant, Sara V; Schistosomes with wings: how host phylogeny and ecology shape the global distribution of
Trichobilharzia querquedulae (Schistosomatidae), International journal for parasitology, 46, 10, 669-677, 2016, Elsevier

Etherington, Graham J; Mobley, Jason A; Molecular phylogeny, morphology and life-history comparisons within Circus cyaneus reveal the presence of two distinct evolutionary lineages, Avian Research, 7, 1, 17, 2016, BioMed Central


Grimstead, Deanna N; Reynolds, Amanda C; Hudson, Adam M; Akins, Nancy J; Betancourt, Julio L; Reduced population variance in strontium isotope ratios informs domesticated turkey use at Chaco Canyon, New Mexico, USA, Journal of Archaeological Method and Theory, 23, 1, 127-149, 2016, Springer US

Jones, Emily Lena; Conrad, Cyler; Newsome, Seth D; Kemp, Brian M; Kocer, Jacqueline Marie; Turkeys on the fringe: Variable husbandry in marginal areas of the prehistoric American Southwest, Journal of Archaeological Science: Reports, 10, 575-583, 2016, Elsevier

Kim, Stephanie Soun; The effects of sympatry on patterns of bill morphology between closely related species of birds, worldwide, 2016, Canadian theses

Macfarlane, Colin Bran Alexander; Natola, Libby; Brown, Mike W; Burg, Theresa M; Population genetic isolation and limited connectivity in the purple finch (Haemorhous purpureus), Ecology and Evolution, 6, 22, 8304-8317, 2016, Wiley Online Library

May, Roy H; Colecciones de aves de Costa Rica., Zeledonia, 20, 1, 2016.

Natarajan, Chandrasekhar; Hoffmann, Federico G; Weber, Roy E; Fago, Angela; Witt, Christopher C; Storz, Jay F; Predictable convergence in hemoglobin function has unpredictable molecular underpinnings, Science, 354, 6310, 336-339, 2016, American Association for the Advancement of Science

Persons, Nicholas W; Hosner, Peter A; Meiklejohn, Kelly A; Braun, Edward L; Kimball, Rebecca T; Sorting out relationships among the grouse and ptarmigan using intron, mitochondrial, and ultra-conserved element sequences, Molecular phylogenetics and evolution, 98, 123-132, 2016, Elsevier


Roulin, Alexandre; Evolutionary trade-off between naturally and sexually selected melanin based colour traits in worldwide barn owls and allies, Biological Journal of the Linnean Society, 119, 2, 455-476, 2016, Wiley Online Library

Suh, Alexander; Witt, Christopher C; Menger, Juliana; Sadanandan, Keren R; Podsiadlowski, Lars; Gerth, Michael; Weigert, Anne; McGuire, Jimmy A; Mudge, Joann; Edwards, Scott V; Ancient horizontal transfers of retrotransposons between birds and ancestors of human pathogenic nematodes, Nature communications, 7, 2016, Nature Publishing Group

Toomey, Matthew B; Lind, Olle; Frederiksen, Rikard; Curley Jr, Robert W; Riedl, Ken M; Wilby, David; Schwartz, Steven J; Witt, Christopher C; Harrison, Earl H; Roberts, Nicholas W; Complementary shifts in photoreceptor spectral tuning unlock the full adaptive potential of ultraviolet vision in birds, eLife, 5, e15675, 2016, eLife Sciences Publications Limited

Wright, Natalie A; Steadman, David W; Witt, Christopher C; Predictable evolution toward flightlessness in volant island birds, Proceedings of the National Academy of Sciences, 201522931, 2016, National Acad Sciences.
Part 9: OTHER PROFESSIONAL ACTIVITIES
A. Outreach (selected examples)
PBS Nature documentary, Super Hummingbirds, featuring MSB hummingbird research and viewed by over three-million people.

12. DONATIONS AND GIFTS RECEIVED
The following individuals donated to the Museum of Southwestern Biology Division of Birds in 2016:
Matthew J. Baumann
Andrea N. Chavez
David Marchiondo
Thomas P. Witt

13. CURRENT STAFF (See webpage: http://msb.unm.edu/divisions/birds/people/index.html)
A. Faculty/Staff
Christopher Witt, Curator
Michael Andersen, Associate Curator
Blair Wolf, Associate Curator
Andrew Johnson, Senior Collections Manager
Lisa N. Barrow, NSF Postdoctoral Fellow
Figure 3. Most personnel affiliated with the MSB Bird Division (a.k.a. UNM Ornithology) as of the end of 2016, as depicted on the 2017 UNM Ornithology Poster.
B. Graduate students affiliated with the MSB Division of Birds in 2016. These students are formally trained by our division in curatorial practices and standards of field data collection, specimen preservation, and institutional animal care guidelines.

Elizabeth Beckman, Ph.D, 2016
Andrea Chavez, M.S., 2016
Ariel Gaffney, M.S., 2016
Chauncey Gadek, M.S. in progress
Jessie Williamson, Ph.D. in progress
Serina Brady, M.S. in progress
Jenna McCullough, M.S. in progress

C. Undergraduate Student Workers and Volunteers. These students are formally trained by our division in curatorial practices and standards in the museum collection; a subset are also trained in field protocols, specimen preparation, and institutional animal care guidelines. This list includes undergraduates who are employed through Federal or State Work-Study programs, externally funded research grants and contracts, or education-training programs.

Selina Bauernfeind
Katrina Derieg
Jason Kitting
Anh Nguyen
Paula Barteau
Myranda Robinson
Adam Henry
Celina Aguilar
Xena Mapel

14. MUSEUM ASSOCIATES. These individuals are formally affiliated with the MSB Division of Birds and conduct research or curation on our behalf.

A. Research Associates
John Hubbard
Matthew J. Baumann
Donna Schmitt
Gregory Schmitt
Sartor O. Williams III
DIVISION OF GENOMIC RESOURCES

Joseph A. Cook, Curator
Mariel L. Campbell, Collection Manager

1. DIVISION HIGHLIGHTS.

The Division of Genomic Resources (DGR) of the Museum of Southwestern Biology (MSB) is a centralized repository for cryogenic material from all MSB divisions at the University of New Mexico. In 2016, we continued our collaborative efforts with the New Mexico Museum of Natural History, the U.S. Fish and Wildlife Service Mexican Wolf Recovery Program, U. S. Geological Survey, and National Park Service. We also continued our longstanding efforts in zoonotic pathogen discovery work with a number of US (e.g., Centers for Disease Control) and foreign institutions (e.g., Gorgas Institute in Panama City). The DGR frozen tissue collection has become a taxonomically broad repository with >500,000 tissue samples from over 200,000 specimens, including Mammals, Birds, Reptiles, Amphibians, and Fishes. The collection is now ranked as the largest cryogenic collection of wild mammal tissues worldwide and one of the top ten cryogenic collections of bird tissues in North America.

This year saw tremendous growth in numbers of tissues in the collection. We also submitted a grant to NSF and received funding ($500,000) for the upgrade to LN2 vapor storage. UNM provided another $500,000 for expansion and renovation of the facility adding about 400 sq ft to the DGR footprint on the third floor of CERIA. Demolition began in the late fall.

Collection Growth.
1. A large number of tissues (6166 specimens) were cataloged in the Division of Mammals (includes parasites as mammal parts to be later be converted to MSB Para)
2. Some 353 specimens with tissues were cataloged from the Division of Birds.
3. Some 77 specimens with tissues cataloged from the Division of Reptiles and Amphibians
4. Approximately 10,000 new specimens and 23,568 tissue vials archived in the DGR frozen tissue collection in the Arctos Object Tracking System.

Collection Management:
1. Legacy material inventoried, awaiting barcoding and cataloging or association with cataloged records:
   a. Robert Nofchissey: 486 legacy specimens and 972 legacy vials;
   b. Jerry Dragoo approx.1,000 vials
2. Legacy material in holding freezers inventoried and barcoded, awaiting cataloging or association with cataloged records:
   a. Panama: 4806 vials
   b. Troy Best: 1,458 vials
   c. MSB Herp: 1651 vials
   d. Yadeeh Sawyer: 1,134 vials
   e. Other misc: approx. 2,000 vials
   f. Total = 17,249 vials.
3. Barcoding of ~80 freezers for conversion to Arctos Object Tracking (CSBR grant):
   a. DGR2: 9,091 samples representing 4217 specimens barcoded and associated with catalog records
b. New Mexico Museum of Natural History and Science: 6200 specimens barcoded, awaiting upload to cataloged records

Collection Usage.
1. The DGR collection issued 62 loans from over 1900 specimens from the Mammal, Bird, Fish, Herp, and Parasite Divisions in 2016.
2. Publications in 2016 related to DGR loans are reported in the Divisions of Mammals, Birds, Fishes, and Amphibians and Reptiles annual reports.

Training in specimen based research and curation.

Training in specimen collection, preparation, curation, and data management remains one of the integral goals of all of the MSB divisions. Students gain experience in bioinformatics, natural history collection preparation and curation, and field and laboratory based research.

a. 8 UNM students were paid as DGR staff in 2016
   1) 4 graduate students
   2) 4 graduate
   3) 3 paid undergraduates (2 later became graduate students)
   4) 2 undergraduate independent study students
   5) 1 UNM post-baccalaureate volunteer

b. 10 Students were mentored by in DGR by the Collection Manager and Curator:
   1) 5 undergraduates
   2) 2 undergraduate students conducting independent study projects
   3) 3 high school student interns

Of these 18,
   1. 15 were females
   2. 8 were from under-represented groups
   3. 3 presented museum-related projects at regional scientific conferences
   4. 5 chose to continue subsequent museum and/or biology-related independent study/research

Publications citing MSB DGR specimens.

The MSB DGR tissue resource has become a foundation for considerable research worldwide. DGR attempts to track all publications utilizing our tissue specimens and incorporate the manuscripts into the ARCTOS database with linkages to specimen records, loans, and GenBank information. Tracking publications is now easier with the advent of electronic information sharing, but some publications using our specimens or their derivatives (e.g., sequences) are still unreported.

Theses/Dissertations. See Other Divisional Reports.

MSB Arctos database and collection accessibility.

B. Arctos database and collection accessibility. The Arctos database is a cutting-edge relational database that continues to provide an invaluable resource for biodiversity and environmental questions for researchers, educators, public health workers, and natural resource managers worldwide. Arctos is web-accessible and greatly enhances the visibility of the MSB. See MSB Mammal summary of Arctos usage.

C. Since the MSB DGR interface was discontinued in 2014, the DGR collection records are now accessed directly from the Arctos interface for the respective divisions. The tissue collections for the Divisions of Mammals and Birds are fully online; MSB Fish and MSB Herps are in the process of upload.
2. COLLECTION USE

<table>
<thead>
<tr>
<th>Collection Growth (samples archived)</th>
<th>Loans (# of specimens)</th>
<th>Visitors (DGR)</th>
<th>Publications Citing MSB DGR Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>~23,568 Mamm and Bird Vials</td>
<td>MSB Mamm 49 (1200)*</td>
<td>(DGR)</td>
<td>See other divisions</td>
</tr>
<tr>
<td>~10,000 specimens</td>
<td>MSB Bird 14 (699)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSB Herp 2 (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSB Para 1 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Loans: 66 (1692)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Mamm/DGR Mamm combined tissue loans (number of specimens)
** Birds/DGR Birds combined tissue loans (number of specimens)
*** Mammals/Birds/DGR/Fish/Herp/Para

Collection Usage:
MSB DGR issued 10,699 NK numbers in 2016 for collection of new specimens. The Division issued 62 loans of over 1900 specimens to researchers in 4 countries including Belgium, Brazil, Chile, and Norway, and multiple institutions across the United States.

3. COURSES USING THE COLLECTION

UNM Classes receiving loans of DGR material for educational purposes

<table>
<thead>
<tr>
<th>Course</th>
<th>Students</th>
<th>Loans</th>
<th>Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 599 – Masters Thesis, Spring</td>
<td>1 student</td>
<td>1 tissue loan</td>
<td>13 mammal specimens</td>
</tr>
<tr>
<td>BIOL 599 – Masters Thesis, Summer, Fall</td>
<td>5 students</td>
<td>4 tissue loans</td>
<td>79 mammal specimens</td>
</tr>
<tr>
<td>BIOL 699 – Dissertation, Spring</td>
<td>1 student</td>
<td>1 tissue loan</td>
<td>20 mammal specimens</td>
</tr>
<tr>
<td>BIOL 699 – Dissertation, Summer, Fall</td>
<td>7 students</td>
<td>10 tissue loans</td>
<td>64 bird specimens</td>
</tr>
</tbody>
</table>

Total: 15 student loans representing use of 898 specimens:

MS Donavan Jackson, 1 loan, 13 mammal specimens, Spring 2016
MS Schuyler Liphardt, 2 loans, 79 mammal specimens, 1 Summer, 1 Fall 2016
MS Jonathan Schmidt 1 loan, 16 bird specimens, Fall 2016
MS Andrea Chavez, Elizabeth. Beckman, Jenna McCollough, 1 loan, 64 bird specimens, Summer 2016

PHD Bryan Mclean, 1, 119 mammal specimens, Spring 2016
PHD Carlos Carrion 2 loans, 53 specimens, Summer 2016; 1 loan, 54 mammal specimens, Fall 2016
PHD Kayce Bell: 1 loan, 52 mammal specimens, fall 2016
PHD Jocie Colella, 2 loans, 20 mammal specimens, Fall 2016
PHD Jessica Weber 1 loan, 20 mammal specimens, Fall 2016
PhD Bryan Mclean, 1, 14 mammal specimens, Fall 2016
Postdoc/Undergrad Lisa Barrow, Rosario Marroquin Flores 1 loan, 316 bird specimens, Fall 2016
UNM courses or programs using the DGR collection through visits or staff presentations.
   UNM Art and Ecology
   MSST Museum Studies Class Group
   UNM Prep and IMSD programs

Visiting researchers: Institutions or Departments.

K-12 schools and educational group.
   See MSB Mammal/MSB Bird Divisional Reports.

COURSES TAUGHT BY DGR PERSONNEL

Faculty/Collection Managers Student Mentoring:

J. A. Cook (see Mammal Division Report)

Mariel L. Campbell:
Undergraduates

   Lizon Cenac, BCP Flea Independent Study; Project: Fleas of Beringian Shrews (Sorex spp.) presented at annual meeting of the Southwestern Association Parasitologists, Lake Texoma, OK, April 2016
   Laurel Cenac, BCP Flea Independent Study; Project: Fleas of Beringian Shrews (Sorex spp.); presented at annual meeting of the Southwestern Association Parasitologists, Lake Texoma, OK, April 2016
   Elisa Gagliano, Marten Endoparasite Study; Project: Patterns of Infection of American Marten (Martes americana) by the Nematode Parasite Soboliphyme baturini in Interior Alaska.; presented at annual meeting of the Southwestern Association Parasitologists, Lake Texoma, OK, April 2016
   Steven Guerin, Marten Endoparasite Study, Project: Patterns of Infection of American Marten (Martes americana) by the Nematode Parasite Soboliphyme baturini in Interior Alaska – A follow-up.
   Emma Fries, Marten Endoparasite Study, Project: Patterns of Infection of American Marten (Martes americana) by the Nematode Parasite Soboliphyme baturini in Interior Alaska – A follow-up.

High School

   Victoria Crosby (co-mentored with Dr. Stephen Greiman) (Amy Biehl High School) Project: A Morphological and Molecular Study of Cestodes of the Pygmy Shrew, Sorex hoyi. presented at annual meeting of the Southwestern Association Parasitologists, Lake Texoma, OK, April 2016
   Livia Coletta (Amy Biehl High School), CIIBA RAHSS intern in parasitology; Project: Curation of Beringian Coevolution Project parasites
   Samuel Nasci (CNM), CIIBA RAHSS intern in parasitology, Project: Curation of Beringian Coevolution Project parasites
Volunteers

Monica Naranjo, training in museum collections management, data entry, object tracking
Liota Weinbaum, training in bird and mammal helminth parasite necropsy techniques.

COLLECTION MANAGEMENT

MSB DGR added ~10,000 new specimens and installed 23,568 frozen tissue vials during 2016. All incoming tissue samples installed in 2016 were barcoded and scanned in the Arctos Object Tracking System. An additional 10,699 NK numbers were assigned for collection of new specimens. 62 consumable, nonreturnable loans of frozen tissue subsamples from >1900 specimens were processed.

Two -80C freezers failed in 2016; one (DGR2) was repaired. Tissues were transferred to backup before rising above -60C.

Funds in the amount of $499,976 were awarded in Spring 2016 by the National Science Foundation (Award#DEB1561342, PI Cook, Co-PI Campbell, Dunnun, Turner, Witt) for the purchase of 3 vapor phase nitrogen freezers and a liquid nitrogen cryogenerator. This three-year grant also provided staff to begin barcoding of legacy cryovials for the transfer from the DGR Locator system to Arctos Object Tracking. The equipment purchase RFP and initial purchasing began in Fall 2016, coordinated with a simultaneous UNM facilities upgrade for expansion and remodel. The combined equipment purchase and facilities upgrade totals >$1,000,000. Staff were hired and trained for the object tracking conversion in summer/fall 2016; approx. 20,000 samples representing approx. 10,000 specimens barcoded (DGR2 and NMMNHS).

Current projects generating specimens for DGR

Incorporation of other collections (Troy L. Best, Robert Nofchissey, Jerry Dragoo)
CIIBA – NSF (Cook, Hoberg, Galbreath); Canada, wolverines
High Latitude Contact Zones - Andrew Hope – Alaska (USGS, NPS, NSF-CIIBA)
Marten Endoparasite Project (Alaska ADFG) (Cook, Campbell)
Mexican wolf reintroduction – USFWS (Dunnun, Cook)
Mongolian Vertebrate Parasite Project – NSF (Scott Gardner-U Nebraska, Cook UNM, Town Peterson—Kansas U)
Panama Hantavirus –Cook, Dunnun, Blas Armien,
Bighorn Sheep Reintroduction Program – NMGF
Pecos Shrew Survey – Steven Greiman, Cook (NSF Postdoc and NSF-CIIBA)
Gila Carnivore Survey---Cook, Warren
Gila River Mammal Survey – Keith Geluso (U Nebraska)
Black bear/elk predation project – NMDGF
Mammalogy and Tropical Biology classes--Cook
Peruvian Bird Survey –Chris Witt (NSF)
El Malpais BLM Survey—Cook, Dunnun
Great Basin Sciurid Survey—Bryan McLean, Cook (USFWS).
The majority of staff time was spent:
1. Managing and curating the DGR collection.
2. Processing and shipping tissue loans for multiple museum divisions.
3. Supervising and training students and personnel in museum, field, and lab specimen curation and data management.
4. Equipment maintenance including: 17 ultra-cold freezers, multiple alarm systems, computers, and a bio-safety cabinet.
5. Equipment monitoring 24 hours a day, 7 days a week.
6. Maintaining the DGR Bio-safety Level II Laboratory.
7. USDA, UNM Bio-safety inspections and compliance.
8. Conversion of DGR locator to Arctos object tracking system
9. Preparation, cataloging, and installation of new specimens.
10. UNM remodel and expansion of DGR collections space; RFP submittal, equipment purchase, staff hiring and training. Grant written Fall 2015; awarded Spring 2016 (3-year, $499,976 NSF grant for vapor-phase nitrogen equipment purchase to be coordinated with simultaneous).

AWARDS, GRANTS, AND CONTRACTS
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

PUBLICATIONS
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

A. Books, Book Chapters, Edited Volumes
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

B. Journal Articles
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

C. Web-Based
All publications in the MSB series are available via free-download from our website.

D. Technical Reports
Annual Report, Division of Genomic Resources, Museum of Southwestern Biology

E. Theses/Dissertations Completed
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

F. Work In Progress (Only in press and already submitted)

G. Publications/Reports Based on MSB Specimens/Data by Outside Researchers
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

H. Theses/Dissertations
See MSB Mammal/MSB Bird/MSB Parasite/MSB Fish/MSB Herp divisional reports

ACTIVITIES IN LEARNED SOCIETIES
Attendance at Professional Meetings


Laurel, Cenac, Lizon Cenac, Ralph Eckerlin, Mariel L. Campbell, and Joseph A. Cook. *Fleas of Beringian Shrews (Sorex spp.).* Presented at the regional meeting of the Southwestern Association of Parasitologists, Lake Texoma, OK, April 14-16, 2016.

OTHER PROFESSIONAL ACTIVITIES

**Joseph A. Cook’s Efforts Reported in Mammal Division Report**

Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.


Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Campbell, Mariel L.
1. Arctos Database Working Group
2. EnviroBio Working Group, International Society for Biological and Environmental Repositories
3. Global Genome Biodiversity Initiative, MSB representative

SERVICE

A. **Symposia, Workshops, Conferences, etc. Sponsored, Organized, Held, etc.**

Arctos Wiki Environment (AWE) Workshop, Sevilleta Field Station, Bernardo, NM, February 18-20, 2016. Local Committee.

IsoBank Workshop, Sevilleta Field Station, Bernardo, NM, April 21-24, 2016. Local Committee.

Public Service

General
A significant portion of DGR staff time is spent providing information or assistance to the public either during visits to the collection, through phone calls, emails or through research tissue loans. This is an important and ongoing activity of all DGR personnel.

Divisional tours and presentations – provided educational tours and information for visitors and school group for MSB DGR, MSB Mamm, and MSB Para, August – December 2016.

CURRENT STAFF

Faculty/Staff

Joseph A. Cook, Curator (see Division of Mammals report for J.A. Cook, since 2003)
Mariel L. Campbell, Collection Manager (August 2014 to present)

Graduate students
Cook, J.A.
(Reported in Mammal Division report)

Grad Student Research Assistants DGR
1. Dianna Krejsa (Spring, Fall 2016)
2. Carlos Carrion (Summer, Fall 2016)
3. Lindsey Frederick (Fall 2016)
4. Kaylen Marie Jones (Fall 2016-partial)

Undergraduate Student Workers and Volunteers
1. Lindsey Frederick (Summer 2016)
2. Kaylen Marie Jones (Summer 2016)
3. Monica Naranjo (Summer, Fall 2016)
4. Dior Nishite (Fall 2016)
DIVISION OF FISHES

DIVISION HIGHLIGHTS
Currently, the MSB Division of Fishes has 100,162 cataloged lots of fishes (4,038,648 specimens). During the year, 1,375 lots of fishes (33,944 specimens) were cataloged and integrated into the main collections. To date, there are 91,226 digital files of field notes and 650 jpg files of habitat photographs and specimens (for color). There are 41,920 specimen locality records, georeferenced using decimal latitude and longitude. Guests hosted Dr. Keith B. Gido, Kansas State University, Manhattan KS.


TABLE OF COLLECTION USE

<table>
<thead>
<tr>
<th>Collection Growth</th>
<th>Loans Out</th>
<th>Professional Visitors</th>
<th>Collection Web Activity</th>
<th>Outside Publications Citing MSB</th>
<th>Publications by MSB Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>33,944 specimens</td>
<td>11</td>
<td>18</td>
<td>1,298</td>
<td>2</td>
<td>9</td>
</tr>
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<tr>
<td></td>
<td></td>
<td>Graduate Theses/Dissertations Completed</td>
<td>Graduate Students</td>
<td>Undergraduate Students</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>11</td>
<td></td>
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</tbody>
</table>

UNM COURSES USING THE COLLECTIONS

<table>
<thead>
<tr>
<th>TERM</th>
<th>COURSE</th>
<th>TITLE</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2016</td>
<td>BIOL386</td>
<td>General Vertebrate Zoology</td>
<td>20</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>BIOL 386</td>
<td>General Vertebrate Zoology</td>
<td>24</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>BIOL 204</td>
<td>Plant and Animal Form and Function</td>
<td>55</td>
</tr>
</tbody>
</table>
COLLECTION MANAGEMENT

The MSB records of fishes-100,162 total-were successfully reformatted in preparation for uploading to Arctos, a collaborative database of natural history collections available to researchers and the general public.  http://arctos.database.museum/  The MSB records of fishes are also available via FishNet2, a portal for museum fish collections data, about 50 partner institutions.  http://www.fishnet2.net

Over the past year, 25 requests for specimen data and information on curatorial technique, specimen preparation, supplies and materials were handled, requiring an average of 30 minutes per response and up to 60 minutes to find and collate supporting documentation.

Due to a recommendation made by the Region 6 Inspection Team for the Federal Emergency Management Administration (FEMA), additional AMCO shelving ledges were purchased and received July 2016.  These 18” ledges were installed on shelving uprights positioned between shelves to stabilize jars during seismic events causing side-to-side movement of shelves.

UNM undergraduate students continue to accomplish the “lion’s share” of curatorial work.  Five students were trained in curatorial techniques for fluid preserved collections of fishes, data management protocol for ichthyological and ecological information related to fishes, and developing digital files of field books.  On average, these students worked 15 hours a week in the spring semester and 30 hours a week during the summer semester.  They processed over 600 collections of larval fishes (cleaning field samples, restoring preservation fluid, labeling and organizing collections in preparation for cataloging).  For Spring Semester of 2016, two volunteer UNM undergraduates in Biology were mentored by the Collections Manager for a total of 20 hours per week. These students were exposed to fish systematics, taxonomy, data management, and museum technique. To learn these aspects of museum work, the students were assigned an accession of 2015 Wyoming fishes, corresponded with the Wyoming research team as they verified species and finally, cataloged the collections.

Collections were received from the following sources and projects:  Wyoming Dept. Game and Fish, Laramie WY, USGS Grand Canyon Monitoring Center, Flagstaff AZ, Southwest Native Aquatic
Resources and Research Center, Dexter NM, USFWS NM/TX Fish and Wildlife Conservation Office, Albuquerque NM, US Bureau of Reclamation (Salt Lake City and Albuquerque), US Bureau of Land Management (Taos and Las Cruces), BioPark Aquatic Conservation Facility, Albuquerque NM, American Southwest Ichthyological Researchers, and New Mexico Dept. Game and Fish.

Research projects generated by Turner Lab, UNM Biology supported by MSB collection management: Rio Grande Silvery Minnow (*Hybognathus amarus*) Genetic Monitoring, Nevada Bonytail Chub (*Gila elegans*) Genetic Monitoring, Gila Trout (*Oncorhynchus gilae*) Genetics, Gila River Native Fishes, and Canadian River Native Fishes.

**AWARDS, GRANTS, AND CONTRACTS:**


MRI: Acquisition of Instrumentation for Compound-Specific Stable Isotope Analysis at the University of New Mexico. National Science Foundation. S. Newsome PI, T.F. Turner co-PI with three others. 1 August 2014 to 31 July 2016. Total: $314,315


PUBLICATIONS

Journal Articles


**Technical Reports**


Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 186 pp. DOI:10.13140/RG.2.2.27029.93923


Publications/Reports Based on MSB Specimens/Data by Outside Researchers


ACTIVITIES IN LEARNED SOCIETIES

A. Invited Talks/Plenary
Cordova, S. Environmental DNA of New Mexican plethodontids. Chiricahua Desert Museum, Rodeo NM, 30 July 2016


Ross, S.T. ASIH, our biology family: looking back, looking forward, celebrating 100 years. 100 Year Symposium, American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA, 6-10 July 2016.


**B. Contributed Talks/Posters (Presenters’ name in bold)**


Attendance at Professional Meetings

A.L. Barkalow

W. H. Brandenburg
Colorado River Aquatic Biologists. Laughlin, NV. 6-8 January 2016.
Upper Colorado River Basin Researchers Meeting. Fort Lewis Collage, Durango, CO. 12-13 January 2016
ASIH-AFS Committee on Names of Fishes. Arizona Department of Game and Fish, Phoenix AZ. 4 April 2016.

D.T. Camak
Bioinformatics Bootcamp, Auburn University AL. 6-12 June 2016.

S.R. Clark
American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA, 6-10 July 2016.
San Juan River Basin Recovery Implementation Program, Biology Committee. San Juan Public Lands Center, Durango, CO. November 2016.

S. Cordova
American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA, 6-10 July, 2016.

R.K. Dudley

M.J. Osborne
Colorado River Aquatic Biologist Annual Meeting. Laughlin NV, 6 – 7 January 2016.

T.J. Pilger
Joint Annual Meeting of AZ & NM Chapters of the Wildlife and Fisheries Societies. Flagstaff AZ, 4-6 February 2016.
American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA, 6-10 July 2016.

D.L. Propst
Gila Natural History Symposium, Western New Mexico University, Silver City, NM. 25-26 February 2016.
American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA, 6-10 July, 2016.

M.A. Farrington

S.T. Ross
San Juan River Recovery Implementation Program, Environmental Flow workshop. Albuquerque, New Mexico, 5-6 April 2016.
American Society of Ichthyologists and Herpetologists, 96th annual meeting, New Orleans, Louisiana, 6-10 July, 2016.
A.M. Snyder
American Society of Ichthyologists and Herpetologists 96th Annual Meeting, New Orleans LA. 6-10 July, 2016

T.F. Turner
Colorado River Aquatic Biologist Annual Meeting. Laughlin NV. 6 – 7 January 2016
San Juan River Recovery Implementation Program, Biology Committee Meeting and annual public meeting. Durango CO. 10-11 May 2016.
San Juan River Recovery Implementation Program, Biology Committee Meeting, Durango, CO. 29-30 November, 2016.

Service as Editor or on Editorial Board of a Journal
S.T. Ross
Book Review Editor for the American Fisheries Society.
Co-Editor, Volume 3, North American Freshwater Fishes, Johns Hopkins University Press.

T.F Turner
Contributing Editor – Aquatic Biology 2008-present
Guest Editor – Oecologia 2015-present
Editorial Board, Ecology of Freshwater Fishes 2016-present

Service as Officer of Professional Society/Organization
S.T. Ross
Member, Long Range Planning and Policy Committee, American Society of Ichthyologists and Herpetologists, 2007-present.

A.M. Snyder
Institutional Animal Care and Use Committee, American Society of Ichthyologists and Herpetologists, 2015-present.
Ichthyological and Herpetological Collections Committee, American Society of Ichthyologists and Herpetologists, 1988-present.

T. F. Turner
Board of Governors, American Society of Ichthyologists and Herpetologists, 2013-2018
Chair, Stoye Award Committee, American Society of Ichthyologists and Herpetologists
Member, Genetics Section, American Fisheries Society
OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

A.L. Barkalow
Understanding aquatic food webs through compound specific carbon analysis and next generation DNA sequencing. University of New Mexico’s Center for Stable Isotopes Seminar. 24 October, 2016.

E.W. Carson

T.J. Pilger


A.M. Snyder

T. F. Turner
Challenges to balancing water use and biodiversity in New Mexico’s rivers. UNM Science on Tap, 4 February 2016.

Scholarly Service as a Member of a Local/State/Regional/Nat’l Committee, Panel

W. H. Brandenburg
Member, Desert Fishes Council Planning Committee for 2016 annual meeting

R.K. Dudley

M.A. Farrington
Appointed Member (Conservation Representative) for the Citizen Advisory Committee Habitat Stamp Improvement Program, New Mexico Department of Game and Fish. Member, Desert Fishes Council Planning Committee for 2016 annual meeting.

M.J. Osborne
Member, Rio Grande Silvery Minnow Propagation and Genetics Workgroup
Member, Rio Grande Silvery Minnow Adaptive Management Team
Member, Desert Fishes Council Planning Committee for 2016 annual meeting.

T.J. Pilger
Member, Desert Fishes Council Planning Committee for 2016 annual meeting
Member, Rio Grande Silvery Minnow Propagation and Genetics Workgroup
Member, Rio Grande Chub and Sucker Conservation Team
D.L. Propst
Leader, Gila Trout and Chihuahua Chub Recovery Team
Chair, Desert Fishes Council Planning Committee for 2016 annual meeting

S.T. Ross
Member, Peer Review Panel, San Juan River Basin Recovery Implementation Program (SJRRIP)2016
Member, Desert Fishes Council Planning Committee for 2016 annual meeting.

A.M. Snyder
Member, University of New Mexico Pre-Disaster Planning Committee

T.F. Turner
Member, Desert Fishes Council Planning Committee for 2016 annual meeting
Member, Gila Trout and Chihuahua Chub Recovery Team
Member, Rio Grande Silvery Minnow Propagation and Genetics Workgroup
Appointed UNM Representative to the Executive Committee, Middle Rio Grande Endangered Species Act Collaborative Program (MRGESACP).
Member, Independent Science Advisory Board, Northwest Power and Conservation Council
UNM Animal Research and Care Committee
UNM Chemical/Laboratory Safety Committee
UNM Museum Council, College of Arts & Sciences Representative
UNM Research Council
UNM Research Excellence Workgroup, Research Strategic Plan
PAIS Building Executive Committee
UNM Higher Learning Commission Accreditation Committee
MSB Planning Committee
MSB Publications Editorial board
MSB Executive Committee

**Journal Referee**
W. H. Brandenburg
PLOS One (1)

S.R. Clark
Copeia (1) Southeastern Naturalist (1)

M.J. Osborne
Molecular Ecology (3), Ecology and Evolution (1), Journal of Biogeography (1), Freshwater Biology (1), Aquatic Biology (1)

D.L. Propst
Reviews in Fish Biology and Fisheries (1), Environmental Monitoring and Assessment (1), Western North American Naturalist (1)

T.J. Pilger
Fishery Bulletin (1), Journal of Biogeography (1), Transactions of the American Fisheries Society (1)
T.F. Turner
Oecologia (1), Copeia (1), Ecology (1), Evolutionary Applications (1), Fish and Fisheries (1) Freshwater Biology (1), Freshwater Science (1) Aquatic Biology (2), Proceedings of the Royal Society B – Biological Sciences (1), Transactions of the American Fisheries Society (2)

SERVICE
A.L. Barkalow
Volunteer, University of New Mexico’s Center for Stable Isotopes open house, 24 Feb 2016.
 Volunteer, instructor (larval fish and museum specimens), student and young professionals

W. H. Brandenburg
MacArthur Elementary School, Albuquerque, NM, Elizabeth Sehlmeyer and Shelly Salazar
Fishes of New Mexico using specimens from MSB 18 March 2016.

T.J. Pilger
Invited editor for The Nature Conservancy’s Writing Workshop for the Science Impact Project
and NatureNet Science Fellows, Santa Fe NM, 4 – 7 April 2016
Organized student volunteer trip to Mora National Fish Hatchery for Gila Trout spawning. Mora,
NM 15-17 March 2016

A.M. Snyder
Panel Member, Maxwell Museum NEA pre-proposal for renovation of archives for cultural
collections, February 2016.
Mentor, UNM Biology Volunteer (2) Undergraduate Students in Museum Technique and Fishes

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.
2016 Recovery Champion Award. Presented by the US Fish and Wildlife Service at the
Southwest Regional Office (Region 2), Albuquerque, NM on 13 July 2016.

CURRENT STAFF
A. Faculty/Staff
Kendra Brunet Lecomte, Staff Curatorial Assistant
Scott R. Clark, Postdoctoral Research Fellow
Megan J. Osborne, Research Assistant Professor
Tyler J. Pilger, Postdoctoral Research Fellow
Steven P. Platania, Associate Curator of Fishes
David L. Propst, Curatorial Associate and UNM Adjunct Professor of Biology
Stephen T. Ross, Curator Emeritus and UNM Adjunct Professor of Biology
Alexandra M. Snyder, Collections Manager
Thomas F. Turner, Curator of Fishes, Professor of Biology, and Assoc. Dean for Research
B. Graduate students
Museum Research Assistants—Graduate Student TA
David Camak, Fall 2016

MSB Fishes Graduate Students, UNM Biology
Adam L. Barkalow, M.Sc. student
David Camak, Ph.D. student
Samantha Cordova, M.Sc. student

C. Undergraduate Student Employees and Volunteers, Lab and Museum
Kendra Brunet Lecomte, A&S Biology
Jenna Burgess, UNM Health Sciences
Hanna Carver, A&S Biology
Larissa E. Garcia, UNM School of Business
Holly L Hayes, A&S Psychology
Sarah Hogland, A&S Biology
Shiloh Langwell, A&S Art
Katie Taylor McCullough, A&S Biology
Alyssa Sanchez, A&S Biology
Sara Stienecker, A&S Biology
Yvonne Rivera, A&S Psychology

MUSEUM ASSOCIATES
A. Curatorial Associates
David L. Propst, Curatorial Associate and UNM Adjunct Professor of Biology

B. Research Associates
W. Howard Brandenburg, American Southwest Ichthyological Researchers, Albuquerque
James E. Brooks, US Fish and Wildlife Service, Albuquerque (Ret.)
Brooks M. Burr, Ph.D. Southern Illinois University, Carbondale
Robert K. Dudley, Ph.D. American Southwest Ichthyological Researchers, Albuquerque
Michael A. Farrington, M.S. American Southwest Ichthyological Researchers, Albuquerque
Eliza I. Gilbert, M.S. American Southwest Ichthyological Researchers, Albuquerque
Herbarium

DIVISION HIGHLIGHTS

The UNM Herbarium contained 133,735 specimens at the end of 2016. UNM has the largest collection of plant specimens in New Mexico, and is archived primarily for use in scientific research. Each specimen represents the field efforts of the collector and is mounted individually by student employees, databased, stored, and available for web-based, in-house, or outgoing-loan access by the public.

In our move to modernize the herbarium and make this resource available for wider use and enjoyment by the public we have imaged twenty-four thousand specimens that are available for high-resolution viewing and research. This recent emphasis by the staff and students at the herbarium complements the fully databased and web-accessible holdings of this division of the museum. These resources are available through multiple internet portals that receive thousands of views per month. Interpretive activities or collections-related outreach includes tours for the public, including K-12 and UNM students. The Herbarium works closely with the Native Plant Society of New Mexico (NPSNM) and the New Mexico Rare Plant Technical Council, as well as local schools and the Bosque Ecosystem Monitoring Project.
TABLE OF COLLECTION USE

2016

1. Collection: growth & current size (New Specimens Cataloged/total specimens): \(825 / 133,735\)
2. Loans Out: \(18\)
3. Professional Visitors to the Collections: \(296\)
4. Collection Database Web Site Hits \(244,000\)
5. Outside Publications Citing MSB Specimens \(\leq 2\)
6. Peer-Reviewed Publications by Staff - 1
7. Graduate Students (using or working in collections) - 1
8. Graduate Theses/Dissertations Completed (UNM/Other*) – 0, 0
9. Undergraduate Students (using or working in collections) - 1

* List Other Institutions

COURSES USING THE COLLECTIONS

BIOL 463L, Tim Lowrey, Fall 2016, 11 students.

COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

CURATOR

BIOL 463L, Tim Lowrey, Fall 2016, 11 students.

\begin{align*}
\text{BIOL 463L} & \quad \text{Flora of New Mexico} & 11 \\
\text{BIOL 599} & \quad \text{Masters Thesis} & 1 \\
\text{BIOL 699} & \quad \text{Dissertation} & 1 \\
\text{BIOL 406} & \quad \text{Museum Studies} & 16 \\
\end{align*}

BIOL 406, Phil Tonne, Spring 2016, 16 students. Museum Studies.

5. COLLECTION MANAGEMENT

This year we completed the imaging of thirteen plant families, including our largest, the sunflower family, or Asteraceae. We serve over twenty-four thousand specimen images through both the SEINet
(http://swbiodiversity.org) and iDigBio (https://www.idigbio.org/) portals. Our entire collection is digitized; all of the label information for over 130,000 specimens is available for use by the public and scientific research community.

We completed the remounting of a few thousand specimens from the early 1900s in 2016.

These specimens, part of the Brother Arsene Collection, were imaged in their original condition and then removed from their acidic paper. Once free they were mounted onto acid-free paper using modern techniques to preserve both the specimen and the historic label.

Our specimens traveled on loan to eighteen different institutions for taxonomic and systematic research this year. We received 296 visits to our division by the botanical community as well as group visits by schools and organizations. We average 2-3 information requests per week by e-mail and/or phone, and the SEINet and iDigBio portals receive thousands of visits to our collection.

While growth of the collection slowed this year, access to, and usability of, the collection grew tremendously. We have had the privilege of working with innovative bioinformatics programmers to maximize the availability of UNM’s collections and information to the national and international community. This year’s planning will lead to further growth and access to information.

We hosted the Southwest Carex Working Group once again in January. They are completing research on genera including Carex, Cyperus, and Juncus. Members include Max Licher, Jim McGrath, Bill Norris, and Glenn Rink. They are working on various treatments within this group for inclusion in the revision of the state’s flora, Flora Neomexicana, as well as other state and regional reports and publications. Our sedge family holdings have been reviewed, verified, and revised within this process.

**PUBLICATIONS**

**Journal Articles**


**Technical Reports**

Tonne, P. 2016. **BEMP Vegetation Report 2015**. A description of the findings of the vegetation crew within the long-term monitoring sites of the Bosque Ecosystem Monitoring Program. Submitted to the Bosque School, Albuquerque, NM.

**Publications Based on MSB Specimens/Data**  
(OTHER THAN THOSE REPORTED ABOVE)

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

**PRESENTER**


Lowrey, T. Asteraceae; key characteristics and identification. Three Day workshop for the Native Plant Society of New Mexico. Sevilleta Field Station. September 2016. 25 participants.

Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Lowrey, T.:
- Graduate Policy Committee
- Ph.D. Committee of F.J. Triepke, Chair
- M.S. Committee of M. Gattreaux
- Ph.D. Committee of Karen Wright
- Provost's Committee on Tenure and Promotion
- Presidential Search Committee
- Provost's Committee on Academic Success
- Assoc. Deans of Research Advisory Committee
- NM Rare Plant Technical Council
- Council of Graduate Deans

Tonne, P. NM Rare Plant Technical Council

**Journal Referee**

Lowery, T. 5 manuscripts/proposals reviewed.
Tonne, P. 2 manuscripts/proposals reviewed.

**SERVICE**

Research Associate, Missouri Botanical Garden, St. Louis, MO. 1985-present.

**CURRENT STAFF**

A. Faculty/Staff

Tim Lowrey, Professor, Curator and Associate Dean
Phil Tonne, Senior Collection Manager
B. Graduate students

Jack Triepke, PhD candidate, PhD submitted.  
Matt Gautreaux, Masters student.  
Samantha Stutz, Herbarium Graduate Assistant.  

C. Undergraduate Student Workers and Volunteers

Kyle Robinson  
Trent Llewellyn  

MUSEUM ASSOCIATES

Research Associates

Daniela Roth, State Forestry Division Botanist, EMNRD.  
Robert Sivinski, retired State Forestry Division Botanist; botanical consultant at present.
DIVISION HIGHLIGHTS

Collection Growth. The DOM added 10,246 new specimens to its catalogue during 2016 and now contains 292,452 cataloged specimens. The collection is the 2nd largest collection in the Western Hemisphere and in the top 3 worldwide. New accessions (130) of mammalian material amounted to >6,000 specimens.

The continued exceptional growth is the result of several facets of our operation:

a. Specimen growth through fieldwork
   1) Directed specimen-based studies within Joseph Cook’s research program.
   2) Highly successful fieldwork in a wide variety of projects spanning the Western Hemisphere, eastern Asia, and collaborations with state and federal resource agencies in the western US and Canada. Work primarily sponsored by the National Science Foundation, National Institutes of Health, USDA Forest Service and US Fish and Wildlife Service.
   3) New initiatives focused on building the collection in key geographic regions and for critical taxa.
   4) Specimen growth through donation
   5) A well-developed network of researchers and agencies worldwide are now heavily invested in the DOM, by continuing to deposit their material here and later track and retrieve information via the Arctos database.
   6) Donations of personal collections from individual researchers.
   7) Transfer of collections from other institutions (i.e. NMMNHS, USGS).

Continued growth and use, in addition to recognition by several agencies that DOM is a primary repository for research material, points to the strength and good standing of this infrastructure in the greater scientific community.

Training in specimen based research and curation. Training remains one of the integral goals of the DOM. Students gain experience in bioinformatics, natural history collection preparation and curation, and field and laboratory based research. Students were involved in all activities of the division during 2016.
Each year, MSB Mammals hosts several high school interns from local schools.

a. 27 UNM students worked in the division in 2016
   i. 2 graduate student
   ii. 10 paid undergraduates
   iii. 15 volunteer undergraduates
   iv. Of these 27:
       1. 22 were females, 5 males
       2. 11 were from under-represented groups

b. 21 Albuquerque Public Schools high school interns/volunteers

Publications utilizing MSB DOM specimens or data. The DOM collection continues to be utilized heavily in a wide range of disciplines and is the basis for a large number of peer-reviewed publications and agency reports. Tracking all publications that utilize our specimens is difficult, as not all authors are careful to acknowledge use of DOM specimens. Thus, the number of publications based on our material should be viewed as an underestimate.

![Citations per year graph]

Publications citing MSB mammal specimens have increased dramatically in the last decade and establish MSB as critical research infrastructure globally.
During 2016 DOM specimens were cited or specimen data was utilized in at least 66 studies published in 46 journals and 3 books:

1. Acta Chiropterologica
2. American Museum Novitates
3. Archives of Zoological Museum of Moscow State University
4. Asian Perspectives
5. Biological Conservation
6. Biological Journal of the Linnean Society
7. BioScience
8. BMC immunology
11. Canadian Journal of Zoology
12. Check List
13. Cladistics
14. Current Zoology
15. Ecology and Evolution
16. Evolution
17. Geoarchaeology
18. Infection, Genetics and Evolution
19. Journal of Mammalian Evolution
20. Journal of Mammalogy
22. Mammal Research
23. Mammalia
24. Mammalian Biology-Zeitschrift für Säugetierkunde
25. Mastozoología neotropical
26. Molecular biology and evolution
27. Molecular ecology resources
28. Molecular Ecology
29. Molecular phylogenetics and evolution
30. Museum of Texas Tech, Special Publications
31. Occasional Papers, Museum of Texas Tech University
32. Paleobiology
33. Parasitology Research
34. PLoS Negl Trop Dis
35. Proceedings of the Royal Society B
36. Scientific reports
37. Southeastern Naturalist
38. Systematic parasitology
40. Tropical Medicine and Health
41. USFS Science Findings
42. Vector-Borne and Zoonotic Diseases
43. Virology journal
Bat diversity is well represented in the MSB Mammal Division.

Arctos database and collection accessibility. The Arctos database is a cutting-edge relational database that continues to provide an invaluable resource for researchers, educators, public health workers, and natural resource managers worldwide. Arctos is web-accessible and greatly enhances the visibility of the MSB.

d. Web visits to Arctos tracked via Google analytics = 118,356 visits

<table>
<thead>
<tr>
<th>Collection</th>
<th>Queries</th>
<th>Specimen Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGR Mammals</td>
<td>2275</td>
<td>23,107</td>
</tr>
<tr>
<td>MSB Mamm Obs</td>
<td>234</td>
<td>559</td>
</tr>
<tr>
<td>DOM</td>
<td>52,949</td>
<td>24,807,336</td>
</tr>
</tbody>
</table>

e. 6,408 (27.7%) visitors referred to our site were from GenBank.
f. Global Impact--visitors came from 202 countries.
g. Queries containing records from DOM, DGR Mammals, or DOM observations:
Barcoding of USGS collection – Barcoding of USGS tissue samples is about 1/3 completed.

Collection Donations

h. Ernest Thompson Seton mammal collection Transfer of > 400 mammal voucher specimens previously held at the Philmont Scout Ranch was completed. This important collection is composed of specimens dating from the late 1800-1920’s and documents the southwestern US, as well as Canada and England.

i. Ryan Stephens collection – 1000 small mammals documenting contemporary diversity in New Hampshire from federally funded monitoring projects on USDA Forest Service lands. All specimens are excellently prepared by Stephens and have associated tissues.

j. Canadian carnivores - Suzanne Carriere and Thomas Jung – 1300 wolverine and 300 marten skulls and tissues from NWT and Yukon.

k. Troy Best Collection – approximately 300 specimens from Oklahoma and New Mexico mostly from the 1980s were donated from Dr. Best’s personal collection. To date, Dr. Best has deposited >3000 mammal specimens.

Throughout the year, we host numerous tours to school classes of all ages.

TABLE OF COLLECTION USE

<table>
<thead>
<tr>
<th>2016</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collection: growth &amp; current size (New Specimens Cataloged/total specimens)</td>
<td>10,246/292,452</td>
</tr>
<tr>
<td>2. Loans Out</td>
<td>71 loans of 3,414 specimens</td>
</tr>
<tr>
<td>3. Professional Visitors to the Collections</td>
<td>66</td>
</tr>
<tr>
<td>4. Collection Database Web Site Hits</td>
<td>118,356</td>
</tr>
<tr>
<td>6. Outside Publications Citing MSB Specimens</td>
<td>56</td>
</tr>
</tbody>
</table>
7. Peer-Reviewed Publications by Staff 10
8. Graduate Students (using or working in collections) 31
9. Graduate Theses/Dissertations Completed (UNM/Other*) 4
10. Undergraduate Students (using or working in collections) 25

* List Other Institutions

COURSES USING THE COLLECTIONS

UNM Classes receiving loans of material for educational purposes (13 classes serving 951 students)

- BIOL 204L - Plant and Animal Form and Function. Spring (180 students)
- BIOL 204L - Plant and Animal Form and Function. Fall (180 students)
- BIOL 203L – Ecology and Evolution. Spring (240 students)
- BIOL 203L – Ecology and Evolution. Fall (240 students)
- Biol 499/599 – Trop Biol- Ecuador (20 students)
- BIOL 386L – General Vertebrate Zoology. Fall (30 students)
- BIOL 386L – General Vertebrate Zoology. Spring (40 students)
- BIOL 389L – Mammalogy Fall (22 students)
- BIOL Ecology of the Past (Smith) Spring
- BIOL 599 – Masters Thesis. Spring (2 students, 2 loans)
- BIOL 599 – Masters Thesis. Fall (2 students, 2 loans)
- BIOL 699 – Dissertation. Spring (1 students, 1 loans)
- BIOL 699 – Dissertation. Fall (4 students, 8 loans)

UNM courses or programs using collection through visits or staff presentations (269 students, 18 instructors from 11 classes/programs).

- ART seminar (Andrea Poli) Fall (3 students, 1 instructor)
- ART Studio 141 (Intro art/ecol), 2 sections, Spring (34 students, 2 instructors)
- Land Arts of American West (13 students, 1 instructor)
- ART /ART HIST – Drawing I. 2 sec, Spring/Sum (38 students, 2 instructors)
- ANTRO Zooarchaeology (13 students, 1 instructor)
- BIOL 499/599 (Tropical Biology) (16 students, 2 instructors)
- BIOL 486L General Vertebrate Zoology (52 student, 2 instructors)
- BIOL 489L Mammalogy (22 students, 1 instructor)
- MSST 476/576 Mus Studies (Larson) Spring/Fall (22 students, 2 instructor)
- MSST 476/576 Mus Studies (Traxler) Fall (18 students, 1 instructor)
- NTSC 262L – Life Science Spring/Fall (47 students, 2 instructor)
- UNM Biology graduate student orientation (25 students, 1 instructor)

COURSES TAUGHT BY MSB PERSONNEL

64
A. Faculty/Collection Managers

CURATOR - Cook, J. A.

<table>
<thead>
<tr>
<th>BIOL course number</th>
<th>Title</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 400 U 007</td>
<td>Senior Honors Thesis</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 461L U 001</td>
<td>Intro To Tropical Biology</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 499 U 007</td>
<td>Undergraduate Problems</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 502 M 006</td>
<td>T: Phylogenomics</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 502 M 054</td>
<td>T: Adv Tropical Field Biology</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 551 M 007</td>
<td>Research Problems</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 599 M 007</td>
<td>Masters Thesis</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 699 P 007</td>
<td>Dissertation</td>
<td>Spring</td>
</tr>
<tr>
<td>BIOL 400 U 007</td>
<td>Senior Honors Thesis</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 489L U 001</td>
<td>Mammalogy</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 499 U 007</td>
<td>Undergraduate Problems</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 502 M 054</td>
<td>T: Evolutionary Genomics</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 551 M 007</td>
<td>Research Problems</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 599 M 007</td>
<td>Masters Thesis</td>
<td>Fall</td>
</tr>
<tr>
<td>BIOL 699 P 007</td>
<td>Dissertation</td>
<td>Fall</td>
</tr>
</tbody>
</table>

Teaching Assistantships

Bell, KC
Biol 461L/561L Tropical Biology Fall 14
Liphardt, S
BIOL 489L Mammalogy Fall 22

COLLECTION MANAGEMENT

Visitors (539 total)
K-12 schools and educational groups: 287 students, 24 teachers from 11 schools.

Jefferson Middle school (88 students, 5 teachers)
Montessori on the Rio Grande (10 students, 3 teachers)
Alchesay High School, Whiteriver, AZ (11 students, 1 teachers)
Salam Academy (18 students, 2 teachers)
Amy Biehl High School (60 students)
Cuba High School (40 students, 4 teachers)
Monte Vista Elementary (22 students, 2 teachers)
El Dorado High School (38 students, 2 teachers)
Early College Academy (1 teacher)
Albuquerque Academy (1 teacher)
RET (3 teachers)

Visiting researchers: 63 from 14 institutions or departments

- UNM Dept of Anthropology (12)
- UNM Dept of Biology (22)
- UNM Dept of Art (2)
- University of Nebraska-Kearney (4)
- University of Nebraska-Omaha (1)
- USGS (2)
- Prescott College (2)
- Oklahoma State University, Health Sciences (1)
- University of Montana (2)
- CIBNOR, La Paz, Mexico (2)
- USDA (2)
- New Mexico Museum of Natural History/Science (1)
- New Mexico State University (2)
- University of Sydney, Australia (1)
- Other (7)

Other visitors: 189

- UNM IMSD Program (2)
- UNM Maxwell museum (2)
- UNM Libraries (1)
- UNM KUNM (1)
- UNM STEM tour (30)
- UNM Research Day Open House (100)
- Capital University of Economics, Beijing, China (1)
- USGS (5)
- Philmont Scout Ranch museum (2)
- Bernalillo Co. Master Naturalists Program (25)
- Albuquerque Biopark docents (17)
- Universidad Nacional Autonoma de Mexico (1)
- Universidad Nacional Autonoma de Yucutan (1)
- Instituto Tecnico Superior Tantoyuca (1)
- Instituto Tecnico Superior de Pira Rica (1)
- Other (14)

Graduate students working in or using collections through loans (31)

Chloe Courtney UNM Art
Lara Goldmann UNM Art
Cyler Conrad UNM Anthropology
Asia Alsgaard  UNM Anthropology
Clayton Meredith  UNM Anthropology

James Degnan (Prof, Math and Stats) and Huan Jiang, PhD candidate

Eden Franz  UNM Anthropology
Jana Valesca Meyer  UNM Anthropology
Jamie Fowler Diaz  UNM Anthropology
Schuyler Liphardt  UNM Biology
Bryan McLean  UNM Biology
Kayce Bell  UNM Biology
Jocie Colella  UNM Biology
Catalina Tome  UNM Biology
Melissa Pardi  UNM Biology
Brittany Coe  UNM Biology
Richard Ramirez  UNM Biology
Marie Westover  UNM Biology
Carlos Carrion  UNM Biology
Jessica Weber  UNM Biology
Donavan Jackson  UNM Biology
Amanda Jones  UNM Biology
Diana Kredja  UNM Biology
Dejeanne Doublett  NMSU
Grace Igwe  NMSU
Hannah Kim Frank  Stanford University
Emily Weidner  University of Montana
Nathanael Herrera  University of Montana
Natasha Vitek  Florida Museum Nat Hist
Mirjam van Dalum  UiT Norges arktiske universitet Norway
Natali Hurtado Miranda  Universidad de la Republica, Uruguay
Carola Canon  Universidad de Concepción, Chile
Carlos Carrion, PhD Candidate working on the Systematics of Myotid Bats of Ecuador

**LOANS**

71 loans of 3,414 specimens (1,547 skin, skel or skin clips, 1,018 frozen tissues and 849 mammal parasites) to 28 institutions.

**AWARDS, GRANTS, AND CONTRACTS (TO MSB CURATOR OR STAFF)**

1. Cook, JA - Initiated the James S. Findley Student Endowment Fund

2. Cook, JA, JL Dunnum, ML Campbell - CSBR:Natural History: Upgrade and transfer of the Museum of Southwestern Biology’s Division of Genomic Resources frozen tissue collection to nitrogen vapor storage. (NSF1561342) 5/1/16-4/30/2019


5. Cook, JA, KC Bell - USDA ARS—Genomes of Helminths, USDA ARS


Journal Articles


**Technical Reports**

Annual Report, Division of Mammals, Museum of Southwestern Biology
Annual Director’s Report, Museum of Southwestern Biology

**Publications Based on MSB Specimens/Data (OTHER THAN THOSE REPORTED ABOVE)**


**Theses/Dissertations**


ACTIVITIES IN LEARNED SOCIETIES

A. Invited Talks

Cook, JA


Contributed Talks/Posters (*presenter)

Patterns of Infection of American Marten (*Martes americana*) by the Nematode Parasite *Soboliphyme baturini* in Interior Alaska. Poster presentation at the Southwestern Association of Parasitologists, Lake Texoma, OK, April.


Attendance at Professional Meetings

American Society of Mammalogists 96th Annual Meeting (June 2016).
Cook, JA
Dunnum, JL
Kredjsa, DM
Liphardt, S
McLean, B
Weber, J

Evolution Meetings (June 2016)
Colella, JP
McLean, B
Weber, J

Xth International Conference on HFRS and HPS and Hantaviruses.
Ft Collins, CO (31May-3 June 2016).
Liphardt, S. & JA. Cook

American Quaternary Association 24th Biennial Meeting (June 2016).
McLean, B
SACNAS, Long Beach, California (October 2017).
Weidner, AM

Service as Editor or on Editorial Board of a Journal

Cook, JA
International Advisory Board, Revista Brasileira de Zoologia, 2008-present

Service as Officer of Professional Society/Organization

Cook, JA
Chair, Steering Committee, AIM-UP! Research Coordinating Network, 2010-2016
Board of Directors, American Society of Mammalogists, 2007-2017
Steering Committee, ARCTOS on-line museum database, 2009-present, Chair 2016
President, National Systematics Collection Alliance, 2016-present
Steering Committee, National Integrated Biocollections Alliance (NIBA), 2014-2019
NEON Reboot, Front Royal, 28-29 March 2016

Bell, KC
American Society of Mammalogists Board of Directors 2016 - present
Committee Chair, Membership Committee, American Society of Mammalogists 2016 - present

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

PRESENTER

Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Cook, JA
UNM Faculty Sponsor, Student Chapter of the New Mexico Wilderness Alliance (founded and advised new student conservation group) 2005-2016
UNM A&S Chairs and Directors Council 2011-2017
UNM Museum Council
UNM Museum Studies Program-- Executive Board
MS Advisor--Museum Studies--Kaylen Jones
MS Advisor--Museum Studies-Lindsey Frederich
UNM Wilderness Alliance, Faculty Sponsor
Telluride Mountain Film Festival, 29-30 Jan
Panelist, STEM Gateway Colloquium April
Dunnum, JL
American Society of Mammalogists Systematic Collections committee, 2010-present
American Society of Mammalogists Latin American Awards committee, 2015-present
Co-Chair, Arctos Database Working Group (20 institutions), 2009-present
NEON Scientific Research Collections Technical Working Group, 2013-present
MSB Space Committee

Bell, KC
Reviewer, Society of Systematic Biologists Graduate Student Research Award, 2016
UNM Biology Graduate Student Selection Committee Member, 2016
Program Committee, American Society of Mammalogists, 2013-present

McLean, B
American Society of Mammalogists Systematic Collections committee, 2013-present

Journal Referee
Bell, KC
Reviewer, Biological Journal of the Linnean Society (1 ms).

Cook, JA
NSF Panels (PFBR) & Ad hoc (Dimensions, Biodiversity) 19 proposals reviewed
Ecosphere (1 ms).
Scientific Reports (2 ms).
Frontiers of Ecology and Evolution (1 ms).
Mastozoologia Neotropical (1 ms).

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Cook, J. A
Joseph Grinnell Award, American Society of Mammalogists

Bell, KC
Smithsonian Institution Scholarly Studies Award, the Impact of Host Hybridization on Parasitism in Western North American Chipmunks. Co-PI: Anna Phillips $20,847
Global Genome Initiative Rolling Awards $6,415

Colella, J
Joseph Gaudin Fellowship in Mammalogy, University of New Mexico. $1750
Caroline G Grove Summer Research Scholarship, UNM Biology Departmental Grant. $1250
American Society of Mammalogists Travel Award. $400
Donald Caughran Memorial Scholarship. UNM Biology Departmental Grant. $250

Krejsa, D
University of New Mexico Biology Department Scholarships
Joseph Gaudin Award — $500
Grove Award — $1,661
UNM, Biol Grad Student Association, GRAC Travel Award $150

Liphardt, S
Donald Caughran Memorial Scholarship. $500.
Graduate Research Allocation Committee research grant. $400.

McLean, B
ASM Fellowship, American Society of Mammalogists - $7500
Research Grant, UNM Graduate Research Allocations Committee - $400
Travel Grant, UNM Graduate Research Allocations Committee - $150

Weber, J.
Society for the Study of Evolution Travel Grant
Alvin R. and Caroline G. Grove Summer Research Scholarship
Lynn Hertel Memorial Scholarship

DONATIONS AND GIFTS RECEIVED
Virginia Rausch $5000
James Findley endowment ($17,500)
Troy Best Collection 300 specimens
Seton (Philmont Scout Ranch) Collection 400 specimens

CURRENT STAFF

Faculty/Staff
J.A. Cook, Curator
J.L. Dunnum, Collection Manager
M.A. Bogan, Emeritus Curator
J.S. Findley, Emeritus Curator
Stephen O. MacDonald, Curator II (retired)
Adrienne Raniszewski, Curatorial Assistant

Graduate students
Bell, Kayce. Completed Ph.D.. Systematics and phylogeography of chipmunk lice.

McLean, Bryan. 5th year Ph.D. student. Systematics and phylogeography of ground squirrels.

Rearick, Jolene. Completed M.S. Phylogeography and molecular evolution of freeze tolerance in Lithobates sylvaticus.

Jessica Weber. 6th year Ph.D student. Hypoxia tolerance and adaptive responses in Caviomorph rodents.

Colella, Jocie. 4th year Ph.D student. Patterns of phylogeography, hybridization and diversity of mustelids (Mustela ermine and Martes spp.) across northwestern North America.
**Liphardt, Schuyler.** 2nd year M.S. student. Hantavirus evolution.

**Jones, Amanda.** Completed M.S. Mammals of the Gila River ecosystem.

**Jackson, Donavan.** Completed M.S. Phylogeography of the meadow vole *Microtus pennsylvanicus*.

**Krejsa, Diana.** 3rd year Master’s student. Phylogeography and population genetics of North American wolverine (*Gulo gulo luscus*).

**Carrion, Carlos.** 2nd year Ph.D. student. Systematics of Neotropical *Myotis*.

**Undergraduate Student Workers and Volunteers**

**Volunteers**

Bernalillo County Master Naturalist interns
Jesse Borges
Lisa Hada

High/Middle schoolers
Amy Biehl Students (5 visits, ~12 students each time)
Caroline Pierotti (Albuquerque High)
Mark Granere (Amy Biehl)
Patrick Clark (Albuquerque Academy)
Ricky Falcon (Amy Biehl)
Serina Altamirano (Amy Biehl)
Sierra Romero (The Montessori Middle School)
Somiya Dunnum (Albuquerque High)

UNM undergrads
Chanley Clayton
Hailey Patterson
Jessica Center
Kaylen Jones
Kiara Takacs
Liza Nguyen
Loryn Phillips
Luna Bandera
Mikayla Fahey
Milena Carvalho
Monica Naranjo
Ryan Gillett
Shannen Lopez
Taylor VanDenBerg
Tiffany Kenworthy

other
Aaron Cde Baca (former UNM student)
Chrissy Viola (New Mexico Work program)
Jan Henfling (former Master Naturalist)
Nanda Ramos (Eckerd College)
Susan Stark (former UNMH employee)
Lance Robinson (Mandy’s Farm)

1911 total volunteer hours (1300 hour increase over last year)!!!

Paid High school Interns (RAHSS)
Delaney Hill (Amy Biehl)
Alex Olivas (recent HS graduate)

Paid Undergrads
Ola Liota Weinbaum (work-study)
Tiffany Kenworthy
Alex Olivas (work-study)
Jairo Ulloa (work-study)
Victoria Viola
Stephanie Mladinich
Shannon O’Brien
Richard Apodaca
Lena Bolling
Ellie Johnson

Grad Students
Kayce Bell
Schuyler Liphardt

MUSEUM ASSOCIATES

Curatorial Associates
Jerry W. Dragoo, UNM Department of Biology
William Gannon, UNM Graduate Studies
David J. Schmidly, UNM Department of Biology

Research Associates
J. Scott Altenbach, UNM Department of Biology (retired), NM
Sydney Anderson, American Museum of Natural History (retired), NY
Robert J. Baker, The Museum, Texas Tech University, Lubbock, TX
Troy L. Best, Department of Biology, Auburn University (retired), AL
James H. Brown, UNM Department of Biology emeritus
Fernando Cervantes, UNAM, Mexico City, Mexico
Paul J. Cryan, Ft. Collins, CO
Natalie Dawson, University of Montana, Missoula, MT
John Demboski, Denver Museum of Science and Nature, Denver, CO
Guillermo D’Elia, Universidad de Valdivia, Chile
Eugene Fleharty, Ft. Hayes University (retired), KS
Melissa Fleming, Poulsbo, WA
Jennifer K. Frey, Las Cruces, NM
Kurt Galbeath, Northern Michigan University, Marquette, MI
Scott L. Gardner, Dept. Nematology, Curator, University Nebraska, NE
Keith Geluso, Lincoln, NE
Ken Geluso, Albuquerque, NM
David J. Hafner, New Mexico Museum Nat. History (retired)
Art Harris, University of Texas (retired), El Paso, Texas
Heikki Henttonen, Finnish Forest Research Institute, Finland
Edward J. Heske, Illinois Biological Survey, IL
Eric Hoberg, Beltsville, MD
Andrew Hope, Kansas State University, Manhattan, KS
Clyde Jones, The Museum Texas Tech University (retired), Lubbock, TX
Tom Jung, Whitehorse, Yukon
Sue Kutz, University of Calgary, Alberta
Enrique Lessa, Universidad de la Republica, Montevideo, Uruguay
Stephen MacDonald, Gila, NM
Jason Malaney, University of Nevada, Reno, NV
Michael Mares, Oklahoma University, Norman, OK
Pablo Marquet, Universidad Catolica, Santiago, Chile
Rodrigo Medillín, UNAM, Mexico City, Mexico
Tony R. Mollhagen, Lubbock, TX
Gary Morgan, New Mexico Museum Natural History, NM
Thomas J. O’Shea, Ft. Collins, CO
Eduardo Palma, Universidad Catolica, Santiago, Chile
Robert Parmenter, Valles Caldera, Jemez, NM
James L. Patton, Museum of Vertebrate Zoology (retired), Berkeley, California
Reggie Rausch, Burke Museum, University of Washington, Seattle, WA
Brett R. Riddle, University of Nevada, Las Vegas, NV
Jorge Salazar Bravo, Texas Tech University, Lubbock, TX
C. Greg Schmitt, Farmington, NM
Fred Szalay, Los Ranchos de la Rio Grande, NM
Sandy Talbot, Molecular Ecology Lab- USGS Anchorage, AK
Fernando Torres Perez, Vina del Mar, Chile
Ernie Valdez, USGS-UNM, Tijeras, NM
Alasdair Veitch, Department of Renewable Resources, Norman Wells, NWT, Canada
Jack Whitman, Ketchum, ID
Don E. Wilson, Smithsonian (retired), Washington, DC
Nyamsuren Batsaikhan, National University of Mongolia, Ulaan Baatar
Parasitology Division

1. DIVISION HIGHLIGHTS

The Division of Parasites is likely the third largest collection of parasites in the Western Hemisphere. Most of our samples are from North America and eastern Africa, though we have samples of parasites from all around the world. This last year, we initiated a large project to organize and catalogue the larval trematodes of gastropods as well as cataloging those gastropods whether or not they were infected with parasites. Most of these samples are from 3 decades of field collections by Curator Loker and a decade of field collections from Collection Manager Brant. We made great progress on the North American collections and are about 75% complete. Our STEM summer program has been a wonderful source of parasite and host material, as well as an integrative way to train students in both parasite biology and museum techniques. We have completed thus far only 2 summers, but plan to continue each summer.

2. TABLE OF COLLECTION USE

<table>
<thead>
<tr>
<th>New Specimens Cataloged</th>
<th>total specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1005</td>
<td>476</td>
</tr>
</tbody>
</table>

**Collection: growth & current size (New Specimens Cataloged/total specimens)**

Currently we have 25,471 catalogued parasite records in Parasites and 21,657 catalogued host records

**New additions for 2016:**
- 355 Trematoda
- 297 Nematoda
- 171 Cestoda
- 5 Acanthocephala
- 12 Anoplura
- 7 acari
- 151 Siphonaptera

**1005** new catalogued parasites

**476** new catalogued Hosts

**Loans Out 12**

**Professional Visitors to the Collections**
- Research Visitors: 2
- Visiting Researchers (not here for work in the collection): 3
- Outreach Visitors/tours: 9
Collection Database Web Site Hits 4335

Outside Publications Citing MSB Specimens 6

Peer-Reviewed Publications by Staff 4

Graduate Students (using or working in collections) 2

Undergraduate Students (using or working in collections) 1

* List Other Institutions

3. COURSES USING THE COLLECTIONS

BIOL 406, Hanelt and MSB Collections Managers, Natural History Collections and Curatorial Techniques, Spring, 16 students

BIOL 239, Hanelt, Microbiology for Health Science Majors, Spring, 200 students

STEM summer course Brant, Hanelt, undergrad Emily Sarvis, “A day in the life of a parasite: Field Parasitology and Museums, 6 students, 4 females of whom were here via international programs in South America

4. COURSES TAUGHT BY MSB PERSONNEL

Loker, E.S.
-In spring 2016 I co-taught Biology 490 Biology of Infectious Organisms with Bruce Hofkin. We had an enrollment of 81 students.
-In the fall I taught Biology 419/519 Biology of Disease Vectors and I had 63 students.
-In addition I coordinated Bio 402/502 Parasites and Hosts as a parasitology journal club/lab meeting, and the other usual teaching activities (dissertations, Problems, etc.) for my 4 graduate students.

Brant, S.V.
-BIOL 406, Natural History Collections and Curatorial Techniques, Spring, 16 students (Brant)
-STEM summer course (Brant, Ben Hanelt, undergraduate Emily Sarvis)

Faculty/Collection Managers

CURATOR

<table>
<thead>
<tr>
<th>BIOL course number</th>
<th>Title</th>
<th>Number of Students</th>
</tr>
</thead>
</table>
COLLECTION MANAGEMENT

SUMMARY OF ACTIVITY IN COLLECTIONS.

- Currently we have 25,471 catalogued parasite records in Parasites and 21,657 catalogued host records. Many of the host records were gastropod hosts from the trematode work of Loker and Brant. The other gastropods and their parasites have come from the STEM summer course we started two years ago. We teach the students how (including permitting) to collected hosts and parasites, then how to examine them in the lab, identify them, and process them for vouchering at MSB. They do all their own labeling and record input so that they will be associated through time with those specimens. It has been very successful, particularly in terms of samples added to the collection and experience for the STEM undergrads.

- The large Paramphistomidae collection by PhD student Martina Laidemitt was catalogued and linked with the resulting publication. Now this is the largest most diverse collection of African amphistome parasites.

- Hold regular meetings with Dr. Brant to discuss Parasite Division matters.

- Procured KWS export permit for release of specimens of snails and trematodes associated with our project on schistosomiasis research in Kenya. Now the KWS export permit has been finally approved, several years backlog of samples can now be brought back from Kenya and once these are catalogued, will include the worlds most accessible diverse collection of African trematodes (this also includes the collection from South Africa from Brant and Ebbs), mostly from snail host Biomphalaria, but several other families of snails too.

- Preparation of outreach material.

- Facilitated acquisition of needed microscope equipment.

- We engage in several small tours of people, usually just 1-3, generally interested in parasites. We also have been involved in several phone ‘interviews’ with high school students working on projects – most of these recommendations have come through our American Society of Parasitologists. It is a good sign too that MSB is slowly being recognized, at least nationally. But we continue as always to improve our visibility. In all, with phone, email and in-person contact time, we spend about 5-6 work days a year.

AWARDS, GRANTS, AND CONTRACTS (TO MSB CURATOR OR STAFF)

Loker, E.S. (PI) NIH grant entitled “Snail-related studies of transmission and control of schistosomiasis in Kenya”, Total Award: 5 years, direct costs $1,250,000; Duration: 1 July 2012 – 30 June, 2017.

Loker, E.S. (PI) Gates SCORE grant entitled “SCORE Hot Spot Studies.” Duration: 1 Jan 2016-present; ~$50,000.
Loker, E.S. (PI) COBRE: Center for Evolutionary and Theoretical Immunology. NIH, National Center for Research Resources, P30 GM110907; Total Award: 5 years, total award $5.4M total; Duration: 1 June 2014 – 1 July June 2019.

Brant S.V. (PI) NSF DEB-1021427 REVSYS: Phylogenetic and Revisionary Systematics of a Diverse Clade of Avian Schistosomes. 09/01/2010 – 08/31/2016 $60,000 (annual direct cost).

PUBLICATIONS (BY MSB CURATOR, CM OR OTHER PAID STAFF)

Journal Articles


Publications Based on MSB Specimens/Data (OTHER THAN THOSE REPORTED ABOVE)


**ACTIVITIES IN LEARNED SOCIETIES**

**Invited Talks**

**Loker, E. S.** “Schistosomiasis: Historical and Ecological perspectives on an Unconquered Neglected Tropical Disease” 6-10 March 2016, RCMI Infectious and Global Disease Symposium, San Juan Puerto Rico

**Loker E. S., Brant S. V.** “Swimmer’s Itch and Human Schistosomiasis: A search for the same solutions” Michigan Swimmer’s Itch Conference, 20 June-23 June, Roscommon, Michigan.

**Loker, E. S.** “Human schistosomiasis: a tenacious neglected tropical disease thriving in Sub-Saharan Africa, 2016 Gerald D. Schmidt Memorial Lecture at the Rocky Mountain Conference of Parasitologists, 9 September 2016, Cedar Point Field Station, Nebraska

**Loker, E. S.** “Human schistosomiasis: a tenacious neglected tropical disease thriving in Sub-Saharan Africa,” Presentation to the Epidemiology class at HSC, 6 September 2016,

**B. Contributed Talks/Posters** (*presenter, ^student, bolded names MSB)

Lu, L.^*^, Zhang, S.M., Mutuku, M.W., Mkoji, G.M., **Loker, E.S.** Relative compatibility of *Schistosoma mansoni* with *Biomphalaria sudanica* and *B. pfeifferi* from Kenya as assessed by PCR amplification of the *S. mansoni* ND5 gene in conjunction with traditional methods. NISBRE meeting, Washington D.C. Marriott Hotel, 26-29 June 2016.

Lu, L.^*^, Zhang, S.M., Mutuku, M.W., Mkoji, G.M., **Loker, E.S.** Relative compatibility of *Schistosoma mansoni* with *Biomphalaria sudanica* and *B. pfeifferi* from Kenya as assessed by PCR amplification of the *S. mansoni* ND5 gene in conjunction with traditional methods. American Society of Parasitologists meeting, Westin Hotel, Edmonton, Canada, 11-14 July 2016

Buddenborg, S.K.^*^, Zhang, S, Mkoji, G.M., **Loker, E.S.** RNA-SEQ responses of field- derived specimens of the African snail *Biomphalaria pfeifferi* to infection with the human parasite, *Schistosoma*
mansoni. American Society of Parasitologists meeting, Westin Hotel, Edmonton, Canada, 11-14 July 2016


Brant, S.*, Loker*, E.S., Tkach, V., Casalins, L.^ and Flores, V. Phylogenetic placement of a schistosome from an unusual marine snail host from Argentina and a secondary switch from freshwater to marine snails. American Society of Parasitologists meeting, Westin Hotel, Edmonton, Canada, 11-14 July 2016

Sarvis, E.W.*^, Ebbs,E.T., Loker*, E.S., Tkach, V.V., Davis, N., Jouet, D., Brant, S.V. Cosmopolitan species or cryptic species complexes: is the arterial waterfowl schistosome, Dendritobilharzia pulverulenta a widespread species? American Society of Parasitologists meeting, Westin Hotel, Edmonton, Canada, 11-14 July 2016

Buddenborg, S.K.*^, Bu, L., Zhang, S.M., Mkoji, G.M. and Loker, E.S. Dual RNA-Seq responses of field-derived specimens of the African snail Biomphalaria pfeifferi to infection with the human parasite Schistosoma mansoni provide insight into host-parasite relationships and reproductive implications of parasitism. ASTMH 65th Annual Meeting. Atlanta Marriott Marquis and Hilton Atlanta, Atlanta, Georgia USA. November 13-17, 2016


Laurel Cenac^, Lizon Cenac*^, Ralph Eckerlin, Mariel L. Campbell, and Joseph A. Cook. Fleas of Beringian Shrews (Sorex spp.) Poster Presented at the Annual Meeting of the Southwestern Association of Parasitologists, Lake Texoma OK April 2016.

**Attendance at Professional Meetings**

**Loker, E. S.**
-Host, NIH COBRE CETI EAC Meeting, 3-5 June, Tamiya Resort, Bernalillo
-NISBRE IDeA Meeting, Wardman Park Marriott, Washington, D.C., 26 June-29 June,
-American Society of Parasitologists meeting, Westin Hotel, Edmonton, Canada, 11-14 July 2016
-American Society for Tropical Medicine and Hygiene, 65th Annual Meeting. Atlanta Marriott Marquis and Hilton Atlanta, Atlanta, Georgia USA. November 13-17, 2016

**Brant, S. V.**
-Southwestern Association of Parasitologists, Lake Texoma, Oklahoma, 14-16 April 2016.

**Martina Laidemitt (graduate student)**
-SIRIS Meeting, Washington D.C., 2016

**Emily Sarvis (undergraduate)**
-Southwestern Association of Parasitologists, Lake Texoma, Oklahoma, 14-16 April 2016.

**Service as Editor or on Editorial Board of a Journal**
**Loker, E.S.** - Journal of Helminthology
**Brant S. V.** - Graphics Editor for Journal of Parasitology

**Service as Officer of Professional Society/Organization**

**Brant, S. V.**
-Council Member at Large, American Society of Parasitologists
-Chair, Membership Committee, American Society of Parasitologists

**OTHER PROFESSIONAL ACTIVITIES**

**Presentation to General Audience in a Scholarly Capacity**

**Loker, E. S.*, Brant S. V.** “Swimmer’s Itch and Human Schistosomiasis: A search for the same solutions” Michigan Swimmer’s Itch Conference, 20 June-23 June, Roscommon, Michigan.
Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Loker, E.S.
- Main Campus RAC Committee
- NSF CAREER Award Review
- Belgian Science Foundation proposal review

Brant, S.V.
Voting member, IACUC, Animal Care and Use Committee
Vice Chair, IACUC, Animal Care and Use Committee
Voting Member, Laboratory and Chemical Safety Committee, SRS

Journal Referee

About 15 different journals between Loker E.S. and Brant S.V.

SERVICE

Loker - I serve as a Curator of the Parasite Collection which is a role I am growing into and spending more time with, I continue to serve as the Director of CETI which is a major ongoing service activity (facilities to oversee, grant money to disperse, seminar program to oversee, External Advisory meetings to organize), I am a member of the main campus RAC committee which twice annually meets to review RAC proposals, I have been an informal consultant for matters of research administration, I serve on the Biology Department Faculty Review Committee, and I serve as a member of the Gates-funded SCORE program on schistosomiasis research.

Sara Brant
- Jefferson Middle School, Albuquerque, 60 students, Suzanne Dunnun
- Participated in Dept. of Biology Research Day open house at the MSB, March.
- UNM Recruitment Undergraduate and Graduate Student Tour, Christopher Witt
- UNM Museum Studies Tour, Loa Traxler
- UNM Honors College Seminar People and Animals UHON302-016
- Salam Academy Middle School students, Albuquerque
- Lybrook Middle School tour (grades 5-8) organized by SEPA, Ashlee Begaye UNM
- Eldorado High School tour (grades 11-12), Lesha Harenburg
- Markesha Oliver, UNM biochemistry major, came for interview of UNM resources project for her English class
- Cross of Hope Elementary School, Joy Thornhill
- Phone interview with Lily Ramsey, high school student Francis Howell North High School, Missouri, several times to encourage her interest in Parasitology
- Guest lecture for Dept Bio Mammalogy course, “Zoonotic Diseases”
CURRENT STAFF

Faculty/Staff
Dr. Eric S. Loker
Dr. Sara V. Brant

Graduate students
Ms. Erika T. Ebbs
Ms. Martina Laidemitt

Undergraduate Student Workers and Volunteers
Ms. Emily Sarvis

MUSEUM ASSOCIATES

Curatorial Associates
NONE

Research Associates
NONE