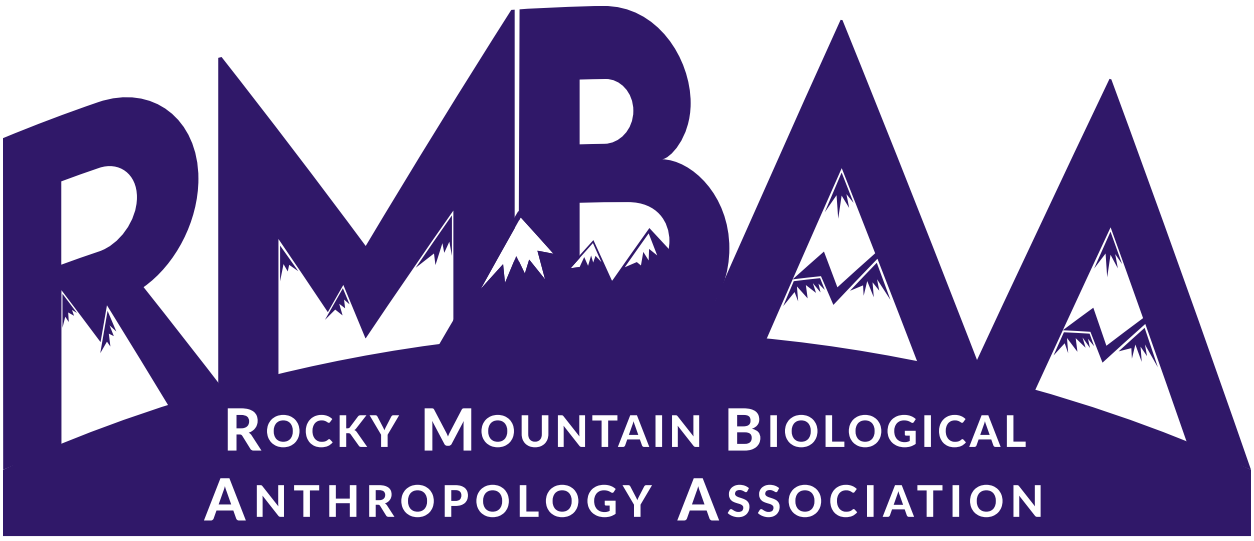
Program & Abstracts

September 30, 2023
Estes Park, CO



Program and abstracts of the 2nd Annual Meeting of the Rocky Mountain Biological Anthropology Association September 30, 2023

To be held at the
Assembly Hall, YMCA of the Rockies
Estes Park, CO 80517

RMBAA Executive Committee

President
Todd R. Yokley

Vice President
Paul E. Morse

Secretary-Treasurer
Michala K. Stock

Communications Coordinator
Jill E. Scott

Membership and Student Affairs Coordinator
Marian Hamilton

Welcome

Message from the RMBAA President

Welcome to the second annual meeting of the **Rocky Mountain Biological Anthropology Association!** First, I'd like thank everyone who participated last year: the keynote speakers, presenters, panelists, and other attendees. You all helped make our inaugural meeting a huge success, and you helped make this second annual meeting possible. This year we have another excellent slate of events in store for you, including many more student presentations. We have two fabulous keynote speakers plus a professional development seminar with a panel of experts to answer student questions about applying to and succeeding in graduate school. We are also proud to announce our first RMBAA student awards for the top graduate and undergraduate abstracts. Thanks again for your continued support of RMBAA, and we hope to continue holding these meetings for many years to come.

Todd R. Yokley
President and Founder
Rocky Mountain Biological Anthropology Association

Code of Conduct

The Rocky Mountain Biological Anthropology Association requires that all participants at the annual meeting adhere to the American Association of Biological Anthropologists Code of Conduct: We are committed to providing safe spaces that are free of threats, harassment, or assault, to all our members regardless of age, ethnicity, race, gender identity or expression, sexual orientation, disabilities, religion, marital status, or any other reason unrelated to professional performance. It is unethical in any professional setting to use the inequalities of power that characterize many professional relationships to obtain personal, sexual, economic, or professional advantages. It is also unethical to engage in any type of harassment, including sexual, sexual identity, or racial/ethnic harassment. Due to their centrality in professional training and networking in our discipline, conferences (such as this meeting) are clearly an extension of the workplace environment. As such, all college, university, or institutional rules regarding appropriate behavior apply in these contexts. We will not tolerate harassment of conference participants in any form or retaliation for reporting of misconduct. *Additional information can be found on the AABA website:* https://bioanth.org/about/position-statements/aapa-code-conduct/

Social Distancing

There is no mandate to use masks, but high-quality surgical masks will be available during the conference at the registration desk free of charge. Poster presenters have the right to request that people interacting with them either wear a mask or maintain a distance of six feet. Thank you for supporting a healthy environment for all participants as well as our coworkers, friends, and loved ones with whom we interact after the conference ends.

Keynote Speakers

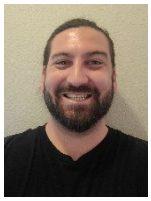
Dr. Britney Kyle is a biological anthropologist who seeks to understand human variation and evolution based on the study of populations from the last 10,000 years. In particular, she is interested in human adaptation in settings undergoing rapid change, often under social, cultural, and environmental disruption. Her recent research has focused on the eastern Mediterranean basin, investigating the impact of Greek colonization of the Balkans from the 8th-6th centuries BC, by study of archaeological human remains from a series of sites in Albania, Italy, and Greece. Her recent work can be found in a variety of journals including the *Proceedings of the National Academy of Sciences* (PNAS), the *American Journal of Physical* (now *Biological*) *Anthropology*, *PLOS One*, and the *International Journal of Osteoarchaeology*, among others.

Dr. Fernando Villanea is a population geneticist interested in understanding the genetic legacy of Neanderthals and other archaic human species. His work is focused on learning about the natural history of archaic species as observed through genetic data. These include ancient genomes sequenced from individuals long dead, as well as the small fragments of archaic DNA inherited in people living today. His favorite theoretical frame is the coalescent, his favorite method is computer simulation, and his favorite analysis tool is machine learning. Dr. Villanea currently serves as Assistant Professor of Anthropology at University of Colorado Boulder.

Student Award Recipients

Ryan E. Belmont, Regis University: "Mantled Howler Monkeys Modify Activity and Spatial Cohesion in Response to Seasonality."

Reilly L. Miller, Regis University: "Mantled Howler Monkeys (*Alouatta palliata*) Alter Activity and Spatial Cohesion in a Forest Fragment."



Professional Development Workshop Panelists

Robin James is a first-year Ph.D. student studying bioarcheology at CU Boulder who is primarily interested in paleoepidemiological research, but loves anything to do with understanding the past through the human skeleton.

Dr. Steven Leigh is a professor of Anthropology at the University of Colorado Boulder and Past President of the AABA. His research focuses on growth and development and microbiomes in human and primate evolution.

Dr. Caley Orr is a paleoanthropologist who teaches human gross anatomy at CU Medical Campus with a research focus on hominin postcranial morphology and evolution.

Program

Program of the 2nd Annual Meeting of the Rocky Mountain Biological Anthropology Association September 30, 2023

All events will be held in the Assembly Hall, YMCA of the Rockies, Estes Park, CO
All times are in the Mountain Time Zone

SCHEDULE OF EVENTS

8:30 AM **On-Site Registration Opens**

9:00 AM **Welcome and Opening Remarks,** Todd Yokley, RMBAA President

9:15 AM **Keynote Speaker 1:** Britney Kyle, Ph.D., *"The Bioarchaeology of Mediterranean Colonies Project: What Happens When Cultures Collide?"*

10:15 AM **Coffee Break**

10:30 AM **Poster Session 1: Bioarcheology, Living Human Biology, and Forensic Anthropology**
Author summaries will begin at 10:30 and proceed in the order listed on the Scientific Program

12:00 PM **Lunch Break**

1:00 PM **Professional Development Workshop:** Applying to and Succeeding in Graduate School

2:00 PM **Coffee Break**

2:15 PM **Poster Session 2: Paleoanthropology and Primatology**
Author summaries will begin at 2:15 and proceed in the order listed on the Scientific Program

3:45 PM **Keynote Speaker 2:** Fernando Villanea, Ph.D., *"Archaic Introgression in Modern Humans: What It Can Tell Us about Archaic Humans and about Ourselves."*

4:45 PM **Closing Remarks,** Todd Yokley, RMBAA President

5:00 PM **RMBAA Business Meeting**

Scientific Program

All events will be held in the Assembly Hall, YMCA of the Rockies, Estes Park, CO

Poster Session 1: Bioarcheology, Living Human Biology, and Forensic Anthropology

1 **"You Too Can Be a Scientist!" Demystifying Science and Cultivating Our Students' Inner Scientists in Intro to Bio Anth Courses.** C. REYNOLDS. Pg 20–21

2 **Utilization of Open Access, 3D-Printed Osteology Models in Skeletal Anatomy and Skeletal Pathology Education.** L. BOWLING, J. ERNEWEIN, Z. THROCKMORTON. Pg 8–9

3 **Faunal Analysis and the Stratigraphic Contiguity of the Black Mousterian Archaeological Level (> 45,000 BP) at Arma Veirana, Italy.** J. HODGKINS, C.M. ORR, S. MANASSEE. Pg 11–12

4 **High and Dry: Paleoecology and Bison Pathology at a Middle Ceramic Period Processing Site in Douglas County, Colorado.** J.J. BATISTA. Pg 7–8

5 **Can't Catch a Break: Trauma Recidivism in Colorado State Hospital.** M. RHEA, L. HOSEK. Pg 21

6 **Hazardous Conditions: Fracture Patterns and Occupational Risks in the 19th-Century Colorado State Hospital.** R. COPPOCK, L. GATES, L. HOSEK, A. MAGENNIS. Pg 9

7 **Building a Case for Repatriation: Analysis of a Peruvian Mummy Bundle.** R. MENCHACA, L. HOSEK. Pg 16–17

8 **Introducing an "Indigenous-Life-History" Approach: Supporting Informed and Informative Bioarcheology.** M.E. HARDIE. Pg 10–11

9 **Gender and Health: Paleoepidemiology of an Institutionalized Population in Nineteenth Century Colorado.** R. JAMES. Pg 13

10 **The Misuse of Antibiotics: Impact on the Human Microbiome and Its Effects on Black Populations in the United States.** H.W. OBUNA. Pg 18–19

11 **Ritualization of Cleanliness: The Maasai Perspective.** H.M. THORNTON. Pg 23–24

12 **Ritual Enhances Mindful Eating.** G.H. MIKESH. Pg 17

13 **A Lifetime of Accommodation: Musculoskeletal Features and Neurovascular Anatomy of Bilateral Typical Cleft Hand Morphology.** T.E. HOBBS, J. GILMORE, C.M. ORR, C. LOHMAN. Pg 11

14 **Testing the Respiratory-Energetics Hypothesis and Sex-Based Differences in the Facial Skeleton of Modern Human Subadults.** M.K. STOCK, B TREDE. Pg 23

15 **Research with Altitude: Colorado Mesa University's Human Decomposition Research Centers.** C.I. BAIGENT, D.E. KINTZ, M.A. CONNOR. Pg 7

16 **The Forensic Investigation Research Station Donated Human Skeletal Collection: Creation, Research, and Educational Value.** A.J. SMITH. Pg 22–23

Program

Poster Session 2: Paleoanthropology and Primatology

17 **Comparative Analysis of Maxilloturbinate Anatomy of Eocene Tillodont *Esthonyx*.** W.T. McCORMACK, R,L. ANEMONE, T.R. YOKLEY. Pg 15–16

18 **Variability in Thoracic and Pelvic Proportions: An Evolutionary Perspective.** Z.G. SHAW. Pg 22

19 **From *Australopithecus* to *Homo*: What the Outliers (*Homo floresiensis*, *Homo naledi*, and *Homo luzonensis*) Tell Us about the "Transition That Wasn't."** C.M. ORR, M.W. TOCHERI. Pg 19

20 **Using Drone Survey to Map Hominin Activity Patterns at Olduvai Gorge.** A. PELISSERO, T. NEGASH, M. PANTE. Pg 19–20

21 **Landscape Connectivity and Hominin Movement in Late Pleistocene Central Asia.** K.M. HORTON, M.M. GLANTZ. Pg 12

22 **Mapping Paleo-Glacial Environments and Human Presence in the Rocky Mountains during the Late Pleistocene.** T. NEGASH, A.M. CLEMENT, J.W. HAGADORN, H. PETERMANN, D. GOLDHAMER. Pg 18

23 **Chewing Intensity of a Modern Spotted Hyena Modified Assemblage.** KYLE J. PONTIERI. Pg 20

24 **The Importance of Dentition: Using Dental Microwear to Reconstruct Primate Life Histories.** P. FAULCONER, M. HAMILTON. Pg 20–21

25 **Size, Scaling, and Sexual Size Dimorphism in Wild South African Thick-Tailed Bushbabies (*Otolemur crassicaudatus*).** S.R. LEIGH, M.L. SAUTHER, F.P. CUOZZO, A.S.W. TORDIFFE. Pg 14–15

26 **Monkey Movement Patterns and Microstructure of Second Metacarpals.** W.S. MCGRAW, P.K. CUNNEYWORTH, A. DONALDSON, N. DUNHAM, E. BEAMISH, P.D. SHEVCHENKO, S.R. STOCK. Pg 16

27 **Mantled Howler Monkeys (*Alouatta palliata*) Prefer Branches with a Smaller Diameter than Their Torso than Larger Branches for Locomoting and Resting in La Selva, Costa Rica.** D.R. IRUEGAS, A.L. SCHREIER. Pg 12–13

28 **Travel or Treat?: Analysis of Spider and Howler Monkey Prehensile Tail Use.** L. LEHMAN. Pg 14

29 **Behavior in Female Mantled Howler Monkeys (*Alouatta palliata*) With and Without Dependent Offspring.** M.S. ROE, A.L. SCHREIER. Pg 21–22

30 **The Effect of Human Presence on Mantled Howler Monkey (*Alouatta palliata*) Activity at La Selva Biological Station in Costa Rica.** A.G. MARTIN, A.L. SCHREIER. Pg 15

31 **Mantled Howler Monkeys Modify Activity and Spatial Cohesion in Response to Seasonality.** R.E. BELMONT, F.V.E. KASER, R.L. MILLER, M. ENNIS, L.M. BOLT, A.L. SCHREIER. Pg 8

32 **Mantled Howler Monkeys (*Alouatta palliata*) Alter Activity and Spatial Cohesion in a Forest Fragment.** R.L. MILLER, F.V.E. KASER, R.E. BELMONT, M. ENNIS, L.M. BOLT, A.L. SCHREIER. Pg 17–18

Research with Altitude: Colorado Mesa University's Human Decomposition Research Centers

CHRISTIANE I. BAIGENT[1], DAVID E. KINTZ[2], and MELISSA A. CONNOR[1]

[1]Colorado Mesa University; [2]Park County Coroner's Office

Human decomposition is best studied using humans. However, only approximately nine facilities study decomposition with full-body human remains in the world. Two are in Colorado. The Forensic Investigation Research Station (FIRS), in Whitewater, Colorado at approximately 4900 ft AMSL was the facility at the highest altitude in the world until the establishment of FIRS' The Back 40 (TB-40) in Park County at approximately 9500 ft AMSL.

TB-40 is co-administered with Colorado Mesa University and the Park County Coroner's Office (PCCO). The academic-practitioner partnership allows PCCO to conduct much of the day-to-day operations, while bodies are donated through CMU's human body donation program and are returned to the skeletal collection at CMU.

The taphonomic trajectory of decomposition in the desert and at altitude differ significantly from the models posed in most texts, which are based on research in the Eastern Woodlands. In the desert (at the FIRS) far longer periods of moist decomposition and mummification are seen. In fact, one set of remains was placed a decade ago and still includes soft tissue. The final decomposer is a suite of black fungi. There is, however, significant variation in the long-term postmortem interval and the causes are still under investigation. Other current research includes post-mortem isotope change, postmortem microbiome change, and odor analysis.

At TB40, longer periods of moist decomposition and mummification is also the norm. Scavengers are significantly more aggressive at TB40. Scavenging patterns noted are informing search strategies for human remains (e.g., skeletal elements were in packrat nests in trees). Coyote pups were noted to have different scavenging patterns than adults.

This research is significant in informing the practice of postmortem interval estimation and search strategies in these environments.

Funding: NIJ GRF 2018-R2-CX-0014 C Baigent, PI supported the TB40 study. NIJ R&D in Forensic Science Grant Award 2015-DN-BX-K015, Connor & Hansen PIs, supported initial FIRS work.

High and Dry: Paleoecology and Bison Pathology at a Middle Ceramic Period Processing Site in Douglas County, Colorado

JUSTIN J. BATISTA

University of Colorado Denver

Within the Platte River Basin of Colorado, the Middle Ceramic Period (800-410 BP) is thought to be a time of drought and human population decline. Douglas County site 5DA2866 is a short-term bison processing camp situated on the bank of Willow Creek. In addition to Dismal River Gray Ware pottery recovered at the site, AMS radiocarbon dating of the faunal remains firmly places the site within the Middle Ceramic Period with a date range of 655-555 2-sigma calibrated BP.

Faunal remains belonging primarily to a single individual exhibit an abundance of cut marks and percussion marks. Tooth fragments assigned to that individual exhibit morphology indicative of Dental Enamel

Abstracts

Hypoplasia: a condition that indicates physiological stress on the animal. Additionally, juvenile artiodactyl long bone shafts were recovered from 5DA2866; these may parsimoniously suggest a parent-offspring relationship between specimens at the site, but DNA testing is necessary to affirm this potential relationship (analysis pending).

Despite the environmental scarcity of the Middle Ceramic Period in Douglas County, site 5DA2866 provides a local, high-resolution dataset that suggests subsistence resilience of both humans and bison.

Funding: UC Denver.

Mantled Howler Monkeys Modify Activity and Spatial Cohesion in Response to Seasonality

RYAN E. BELMONT[1], FRANCESCA V.E. KASER[1], REILLY L. MILLER[1], MICHAEL ENNIS[1], LAURA M. BOLT[2], and AMY L. SCHREIER[1]

[1]Regis University; [2]University of Toronto Mississauga

Climate change shifts seasonality, increasing the length of dry seasons across various habitat types which decreases precipitation, consequently impacting wildlife who rely on stable seasonal patterns. Howler monkeys in tropical rainforests rely on consistent seasonality for food. We investigated mantled howler monkeys' response to seasonality at La Selva Research Station, Costa Rica by comparing their activity and spatial cohesion patterns across seasons. We predicted that howler monkeys would rest more, feed less, and locomote less during the wet season compared to the dry season, due to increased nutritional resources. We also predicted they would be more spatially cohesive during the wet season as greater food availability precludes the need to spread apart to obtain resources. We collected data on howler monkey activity and spatial cohesion at La Selva using instantaneous focal sampling during the dry season (November 2018-February 2019: 225 hours of behavioral data) and the wet season (May-June 2022 and 2023: 376 hours). As expected, monkeys spent significantly more time feeding in the dry season (14.1%) than the wet season (7.9%), although they spent more time locomoting in the wet season (6.3%) than the dry season (4.8%). As predicted, the mean distance between nearest neighbors was higher in the dry season (2.8m) than the wet season (2.5m). These results suggest that lower nutritional yields of the dry season require increased feeding to meet energy requirements while high yields of the wet season allow energy expenditure on locomotion to search for preferred foods. The wet season's resource abundance allows howler monkeys to be more spatially cohesive due to the decrease in competition for resources. Since many primate species rely on stable seasonality, these results suggest that primates across the tropics will likely need to modify their activity and spatial cohesion patterns as climate change continues to increase the length of dry seasons.

Utilization of Open Access, 3D-Printed Osteology Models in Skeletal Anatomy and Skeletal Pathology Education

LAUREL BOWLING, JAMIE ERNEWEIN, and ZACH THROCKMORTON

Colorado University School of Medicine at Colorado State University

Skeletal anatomy and skeletal pathology content is taught in a broad range of curricula, from introductory-level under-graduate general anthropology labs, to advanced graduate primate comparative

anatomy classes, to professional clinical musculoskeletal courses. While there is no replacement for training students with real human skeletal material, this entails numerous potential drawbacks such as costs to purchase, store, and replace, ethical concerns about sourcing, and non-availability of less common anatomical variants and pathological conditions. While high-quality models of human skeletal material are available for purchase from specialty retailers, these also entail costs and are generally limited to typical anatomy. We present here how we utilize open access, 3D-printed osteology models to train first-year medical students at the Colorado University-School of Medicine's Colorado State University Branch Campus in both classroom and laboratory settings. Specific examples of these models include specimens of a variety of bone cancers such as osteosarcoma, bone infections such as osteomyelitis, skeletal trauma cases, and stages of the skeletal embryology and bone healing processes. Given the accessibility and specificity of 3D-printed osteology models and that most Rocky Mountain region colleges already have a 3D printing lab on campus (which can potentially reduce technical burden on biological anthropology instructors), we hope this work advances student interest and engagement in osteology and facilitates regional colleagues' exploration of 3D printed resources.

Funding: This work was funded by the Colorado University School of Medicine at Colorado State University.

Hazardous Conditions: Fracture Patterns and Occupational Risks in the 19th-Century Colorado State Hospital

RACHEL COPPOCK[1], LAUREN GATES[2], LAUREN HOSEK[1], and ANN MAGENNIS[3]

[1]University of Colorado, Boulder; [2]University of Dundee; [3]Colorado State University

Bioarcheological evidence for trauma in 19th century institutions in the United States provides a valuable complement to the often incomplete archival records for these facilities. This poster presents a preliminary investigation into osteological evidence for traumatic injury in the skeletal remains associated with the Colorado State Hospital (CSH), a state asylum in Pueblo, CO in operation in the late 19th century. Burial on the property dates from 1879-1899 and over 150 individuals from this period were exhumed during construction events in the early 1990s. The skeletal collection is currently housed at Colorado State University. A sample of 42 individuals from CSH was assessed for presence and type of trauma. Each fracture was documented by location, type, degree of healing, and descriptive measurements. Of the 42 individuals assessed, 27 (64%) exhibited at least one fracture. Over half of these individuals with trauma exhibited more than one fracture. The most common fracture site was the ribs, with 16 individuals (59% of those with fractures) displaying one or more rib fractures, often at different stages of healing. However, cranial fractures were also present along with numerous leg fractures to the femur and/or tibia. Differentiating between accidental or occupational injuries and trauma caused by interpersonal violence is important for understanding the hazards encountered by people in a particular historical context. Most of the trauma in the CSH sample fits patterns of occupational injuries, likely reflecting the hazards of mining, farming, and even institutionalization that many of these patients likely faced.

Abstracts

The Importance of Dentition: Using Dental Microwear to Reconstruct Primate Life Histories

PAMELA FAULCONER and MARIAN HAMILTON

University of Northern Colorado

This project examines how the analysis of dentition can be used to reconstruct an individual's life. Dentition and dental examination can be used to reconstruct aspects of an individual's life history. This study uses dentition and cranial anatomy to reconstruct the diets, species identifications, and origin status (wild vs captive) of unknown primate crania housed in the UNC Biology Department Museum. It is undetermined when UNC acquired them and little research has been done on these specimens in the past. Through dental microwear analysis with light microscopy and scanning electron microscopy, isotopic analysis of the enamel, species analysis and identification, and X-ray fluorescence, I build a preliminary reconstruction of the life events of the adult individuals in this collection. Results indicate that this collection represents at least (3) species of catarrhine monkeys, probably guenons and vervets, who ate primarily frugivorous diets. The microwear and isotopic data do not match what is expected based on the species designation. So we conclude that this is likely a captive population donated to the museum. Further tests should include the dating of the bones and genetic testing to achieve more precise data about the age and species of the primates in this collection. This will aid in corroborating the data from preliminary testing.

Introducing an "Indigenous-Life-History" Approach: Supporting Informed and Informative Bioarcheology

MEGAN E. HARDIE

University of Colorado Boulder

Bioarcheologists have worked towards decolonizing their discipline, employing activist frameworks to prevent continued harms on marginalized communities. Feminist, queer, and Indigenous theories are three such paradigms that contribute to decolonized research models. In projects directed by FQI methodology, bioarcheologists have considered stress, identity, relation, embodiment, and the impact of colonization within Indigenous history. Drawing together these various theories and contributions into a hybridized multidisciplinary model, the author proposes the new framework of Indigenous-life-history. This approach to bioarcheology acknowledges the failures and violences of anthropology as a colonialist discipline while studying topics of concern directed by research questions and restrictions provided by descendant collaborators. Indigenous-life-history prioritizes bioarcheology be performed first as a deeply informed and involved science which practices respect towards Ancestors and their relations, whether this be through data-producing research or projects of repatriation. Synthesized activist motivations, intersectional FQI and STS frameworks, integrated bioarcheological models, and collaboration with descendant communities are premises to Indigenous-life-history and the work it accomplishes. By reorienting research to consider repatriation and restitution of Indigenous life and land as the "discussion and conclusion" of scientific pursuits, this model can develop innovative project designs, engagements, communication, and collaborative relationships that do

not perpetuate frameworks established within practices of colonization. Through Indigenous-life-history, it is hoped bioarcheology can narrate informed, informative histories and create new activist legacies. Bioarcheologists won't just be stewards for Ancestors, seeking data to uncover their histories—we will be granted the privilege to work alongside descendants who speak these stories themselves.

A Lifetime of Accommodation: Musculoskeletal Features and Neurovascular Anatomy of Bilateral Typical Cleft Hand Morphology

TARA E. HOBBS[1], JOSEPH GILMORE[1], CALEY M. ORR[1,2,3], and CHELSEA LOHMAN[1,2]

[1]Modern Human Anatomy Program, University of Colorado Anschutz Medical Campus; [2]Department of Cell and Developmental Biology, University of Colorado Anschutz Medical Campus; [3]Department of Anthropology, University of Colorado Denver

Typical cleft hand malformation is characterized by a large V-shaped fissure extending into the palm in the absence of one or more central digits. This congenital disorder is discussed in the literature with a primary focus on morphological classifications (of which variable systems are defined) and correcting aesthetic implications of the malformation. Markedly fewer describe potential corrective surgeries to rectify mechanical ramifications of the condition; rarer yet are reports including comprehensive dissections of the antebrachium, brachium and axillary regions. The dual purposes of this study are to provide a comprehensive, descriptive account of the muscle attachments, blood supply, and innervation of nonuniform, bilateral typical cleft hands and to gain a better understanding of what morphological accommodations have been established. A layered dissection methodology was used to visualize the following: anterior and posterior compartments of the brachium; superficial, intermediate, and deep compartments of the antebrachium; and the contents of the superficial, thenar, adductor, hypothenar, and interosseous compartments of the hand. An Artec Space Spider Scanner was used to generate 3D models of each layer and observations of tendon attachment points and neurovascular distribution were recorded. Computed tomography images of each upper limb will be taken to visualize osteological morphology. This project contributes to the scientific understanding of how musculoskeletal features and neurovasculature have codeveloped under dramatic structural modifications of typical cleft hand morphology and how biomechanics were altered throughout a lifetime with this condition.

Faunal Analysis and the Stratigraphic Contiguity of the Black Mousterian Archaeological Level (> 45,000 BP) at Arma Veirana, Italy

JAMIE HODGKINS[1], CALEY M. ORR[2], and SARAH MANASSEE[1]

[1]University of Colorado Denver; [2]University of Colorado Anschutz Medical Campus

Palaeoecological reconstruction and taphonomy are critical for understanding and contextualizing archaeology sites. Arma Veirana is a cave site in northwestern Italy in the region of Liguria that preserves rich Mousterian archaeological deposits that extend beyond the range of radiocarbon dates and later strata that date to the Pleistocene/Holocene boundary. As of the most recent excavation season (2018), sediments thought to belong to the lowest stratigraphic aggregate at the site [the Black

Mousterian (BM)] was excavated in squares on either end of an east-west main trench. These squares are not currently contiguous in the excavation; thus, whether or not the sediments in the eastern exposure (provisionally labeled BM0) and western exposure (provisionally labeled BM3) represent the same archaeological horizon remains uncertain.

This study seeks to determine if BM0 and BM3 represent one horizon that was deposited together or alternatively, time-separated, and distinct packets of sediment originating from under different depositional circumstances.

This study proceeded by comparing the faunal taphonomic data—bone element, taxa, shaft and epiphysis data, nutritive/non-nutritive breakage, and skeletal element refits from BM0 and BM3 and assesses their similarities and differences via statistical analysis Our null hypothesis is that there is no difference between BM0 and BM3 cannot be rejected based on the zooarchaeological data; thus, supporting the stratigraphic model that they are similar enough to be consolidated as one Black Mousterian level.

Landscape Connectivity and Hominin Movement in Late Pleistocene Central Asia

KATHARINE M. HORTON and MICHELLE M. GLANTZ

Colorado State University

The foothills of the Inner Asian Mountain Corridor (IAMC) in Central Asia provide key niches for hominins during periods of climatic change and deterioration during the late Pleistocene. This high-elevation range starts in the SW corners of Uzbekistan and Tajikistan and terminates in the Altai Mountains in Russia. The IAMC provides both refuge during climatic downturns as well as potential pathways that connect the western and eastern landscapes that juxtapose the Tien Shan and Altai Mountains. Genetic and archeological evidence suggests that Neandertals, Denisovans, and modern humans shared these landscapes as well as mates. Our exploratory study investigates the potential patterns of hominin movement in this broad and heterogenous region. Possible travel pathways may be inferred by analyzing the landscape's potential connectivity using factors that reflect the cost of movement. The connectivity among well-known archaeology sites in Central Asia and the surrounding regions, including Teshik Tash, Obi-Rakhmat, and Denisova Caves, were examined here. Least-cost path and corridor analyses were conducted in R with several landscape variables such as, slope, elevation, and elevation variation, in order to create a resistance map that simulates hominin movement costs. Understanding the patterns of connectivity in this region allows us to better reflect on how 'obstacles' to hominin movement are characterized. When obstacles, like high mountains and deserts, are reframed as permeable and productive landscapes, valid descriptions of the limits of hominin adaptation, niche preference, and potential areas of population overlap and mate exchange are possible.

Mantled Howler Monkeys (*Alouatta palliata*) Prefer Branches with a Smaller Diameter than Their Torso than Larger Branches for Locomoting and Resting in La Selva, Costa Rica

DIEGO R. IRUEGAS and AMY L. SCHREIER

Regis University

Arboreal primates can use many different locomotion types such as quadrupedal

walking, climbing, bridging, leaping, and swinging. Primates may choose to use less energy-demanding locomotion types when they need to conserve energy. Additionally, larger primates typically use larger support for mass bearing to maintain an equal center of gravity compared to smaller primates. We examined the type of locomotion large-bodied mantled howler monkeys prefer (quadrupedal walking, climbing, or bridging) as well as the size of the branches that the monkeys prefer to locomote and rest on. We predicted that howler monkeys will spend a greater proportion of scans quadrupedal walking over climbing and/or bridging, that they would spend a greater proportion of scans walking on smaller branches compared to larger branches, and that they would rest on larger branches compared to smaller branches. We conducted instantaneous focal sampling on locomotion behavior at La Selva Biological Station, Costa Rica (23 May-31 May 2023). Branch size was determined by the diameter of the branch compared to the torso of the subject. The mean proportion of quadrupedal walking was significantly greater than the mean proportion of climbing and bridging. The mean proportion of smaller branches used was significantly greater than the mean proportion of medium and larger branches used for resting and locomotion. Our results suggest that howler monkeys prefer to walk than climb and bridge, likely to conserve energy. They also prefer smaller branches to larger and medium size branches likely because they have more leaves and thus lower predation risk. Further research at La Selva should examine locomotion in the small-bodied white-faced capuchin to compare locomotion across species of different body sizes.

Gender and Health: Paleoepidemiology of an Institutionalized Population in Nineteenth Century Colorado

ROBIN JAMES

University of Colorado Boulder

Nineteenth century men and women were understood by both medical professionals and laymen to be differentially vulnerable to madness. Burials from the Colorado Insane Asylum cemetery provide osteological evidence of the lived experience of perceived madness in Colorado from 1879 to 1899. Comparison to other contemporary skeletal collections suggests that the lives of these individuals were similar to other socioeconomically disadvantaged Americans. Problems of overcrowding and insufficient sanitation contributed to observed disease patterns throughout the urban-industrial United States. However, some population differences were observed. Exploring the perceived causes of insanity listed in the asylum admissions record in combination with the wider social contexts demonstrates that madness in nineteenth century Colorado was understood to be deeply integrated with laboring bodies and physical health. Vulnerabilities were differentially embodied through gender-typical labor and the health consequences of gendered behavioral norms. Skeletal analysis reveals a high incidence rate of traumatic injury among the male population sample, which resulted from both interpersonal conflict and industrial accidents. Skeletal indications of poor health, such as linear enamel hypoplasia and osteoperiostitis, as well as an unusual mortality pattern revealed in the admissions record, suggests that the women of this population sample faced exceptional challenges to their health.

Abstracts

Travel or Treat?: Analysis of Spider and Howler Monkey Prehensile Tail Use

LYDIA LEHMAN

Colorado State University

Many primates possess adaptively unique traits through shared evolution such as the mantled howler monkey (*Alouatta palliata*) and black-handed spider monkey (*Ateles geoffroyi*) of Costa Rica with the prehensile abilities of their tails. Observational data of the two primate species behavior was collected at the property of Camaquiri Conservation Initiative over the course of a 7-day week to examine the activity differences between the primates in terms of prehensile tail use preference. Data was collected using interval focal methodologies that involved intermittent recording of 2 minute intervals across 20 minutes of observation time per subject. Information was collected over a total of 14.4 hours of active observation time. Howler monkeys spent a combined 23.91% of movement engaging in weight bearing tail postures and 34.88% of feeding engaged in weight bearing postures of the tail, likewise spider monkeys spent 53.6% of weight bearing tail posture in movement and 28.78% for feeding. Amount of instances where feeding or movement occurred differed between the species, however howler monkeys and spider monkeys displayed similar percentages of observed feeding behaviors in prehensile tail suspensory postures. The howler monkey data supported the assertions put forth by McGraw and Daegling (2012) and Lawler and Stamps (2002) however the spider monkey data did not align with these examples of literature, instead supporting the Youlatos (2002) article on spider monkey tail use behavior. These outcomes demonstrate the importance of not assuming taxonomic family-wide adaptive feature uses to be similar at a species level.

Size, Scaling, and Sexual Size Dimorphism in Wild South African Thick-Tailed Bushbabies (*Otolemur crassicaudatus*)

STEVEN R. LEIGH[1], MICHELLE L. SAUTHER[1], FRANK P. CUOZZO[2,3], and ADRIAN S.W. TORDIFFE[4]

[1]University of Colorado Boulder; [2]Mammal Research Institute, University of Pretoria; [3]Lajuma Research Centre, South Africa; [4]Department of Paraclinical Sciences, Faculty of Veterinary Science, University of Pretoria

Sexual size dimorphism is a fundamentally important feature of primate biology, varying substantially across the Order. Here, we explore the developmental bases of sexual size dimorphism in a strepsirrhine primate, the thick-tailed bushbaby (*Otolemur crassicaudatus*). We aim to understand the developmental bases of adult sexual size dimorphism by focusing on allometric analyses of an extensive set of somatometrics from a large sample of wild-caught juvenile and adult animals. Among adults, males (averaging 1242.89g) are 1.21 times larger than females (averaging 1027.55g), possibly representing the highest known level of sexual size dimorphism among extant strepsirrhine primates. Ontogenetic allometric analyses show that body size dimorphism and skeletal size dimorphism are decoupled in this species, with much lower levels of dimorphism in the skeleton than in body mass. The developmental bases of dimorphism in the torso and limbs are closely tied to body mass increases, leading to comparatively high levels of adult dimorphism in forelimb dimensions. A male skeletal system that differs only minimally from that of females supports both large body male size driven partly by tissues measured by circumferences. Sexual selection, probably attributable to modest

levels of intermale competition, may account for sexual size dimorphism in this species. The conservatism of the skeletal system, combined with high body mass size dimorphism, may be most compatible with generalized quadrupedalism and developmental reductions in leaping in the species. Decoupling of body mass and skeletal dimorphism has important implications for understanding primate sexual size dimorphism and in the interpretation of the fossil record.

Funding: This work was supported by the National Science Foundation (grant number 1638833) and the University of Colorado, Boulder (USA).

The Effect of Human Presence on Mantled Howler Monkey (*Alouatta palliata*) Activity at La Selva Biological Station in Costa Rica

ABIGAIL G. MARTIN and AMY L. SCHREIER

Regis University

Anthropogenic disturbances have consistently plagued wildlife, with more expected as deforestation and agricultural practices continue to expand in the tropics. In an environment like La Selva Biological Station in Costa Rica, human contact with mantled howler monkeys is inevitable, and because of how expansive the forest is, the same group of monkeys can see varying amounts of people in different locations throughout the rainforest. Therefore, we predicted that there would be no difference in behavior in the mantled howler monkeys based on whether there were large groups of human observers versus small ones since human presence is so common, focusing specifically on resting, feeding, and locomoting. We conducted 30-minute instantaneous focal sampling with two-minute intervals to record behavior (May-June 2023), and all-occurrences sampling to note the number of humans within a 50-meter radius, with 10 or fewer being a small group and more than 10 being a large group. We found that the average proportion of intervals did not significantly vary in the presence of large versus small groups of humans when the monkeys were resting (large: 0.713, small: 0.690), feeding (large: 0.163, small: 0.120), or locomoting (large:0.040, small: 0.093). These results demonstrate that the hypothesis was supported, implying that mantled howler monkeys do not change their behavior depending on if people are present. If this is caused by habituation, then anthropogenic disturbances could be negatively impacting howler monkeys by decreasing their natural behavior as human and non-human primates increasingly occupy shared environments.

Comparative Analysis of Maxilloturbinate Anatomy of Eocene Tillodont *Esthonyx*

WILLIAM T. McCORMACK[1], ROBERT L. ANEMONE[2], and TODD R. YOKLEY[1]

[1]Metropolitan State University of Denver; [2]University of North Carolina Greensboro

The phylogenetic position of the Paleogene clade, Tillodontia, relative to other mammals is unknown. To further investigate the potential phylogenetic relationships of Tillodontia, we compared the maxillo-turbinate anatomy of a remarkably complete cranium of the tillodont *Esthonyx* from the Tim's Confession site in the Great Divide Basin, Wyoming to extant specimens from two potential sister taxa, Artiodactyla and Carnivora. Variation in turbinate morphology in the mammalian fossil record morphology is relatively unknown due to lack of preservation. However, the complete nature of the nasal region of this *Esthonyx* specimen provides another avenue for comparative

analysis and potential phylogenetic information. The comparative sample of maxilloturbinate anatomy was compiled from micro-CT scans of artiodactyls and carnivores from morphosource.org. Variation in turbinate anatomy is typically categorized using differences in branching pattern: single scroll, double scroll, complex branching, etc. As such, we analyzed maxilloturbinate shape at coronal cross sections through the anterior-posterior midpoint of the maxilloturbinate to determine morphological pattern for both *Esthonyx* and our comparative sample. Although there is variation within both orders, maxilloturbinates of carnivores typically exhibit a convoluted branching structure, whereas those of artiodactyls exhibit a double scroll shape. The maxilloturbinate of *Esthonyx* exhibits a distinct double scroll shape. This could suggest that *Esthonyx* and other tillodonts are closely related to artiodactyls, but at present the phylogenetic utility of maxilloturbinate anatomy is unknown. We can conclusively say that *Esthonyx* resembles artiodactyl nasal morphology, but whether or not this indicates a close phylogenetic relationship is currently unclear.

Monkey Movement Patterns and Microstructure of Second Metacarpals

W. SCOTT MCGRAW[1], PAMELA K. CUNNEYWORTH[2], ANDREA DONALDSON[2], NOAH DUNHAM[3], ESME BEAMISH[4], PAVEL D. SHEVCHENKO[5], and STUART R. STOCK[6]

[1]Department of Anthropology, The Ohio State University; [2]Colobus Conservation, Diani, Kenya; [3]Cleveland Metroparks Zoo; [4]University of Cape Town; [5]Advanced Photon Source, Argonne National Laboratory; [6]Department of Cell & Developmental Biology, Northwestern University

Bones remodel to remove accumulated microdamage, and the newly formed bone organizes to resist the deformations to which it is subjected. Primates are excellent subjects for examining bone's response to different loading regimes because primates display great locomotor diversity. Metacarpal bones are of particular interest because different locomotor (suspensory vs palmigrade/digitigrade) and habitat (arboreal vs terrestrial) preferences are known to impose different loading patterns on hand and wrist bones. One expects lifestyle-related differences in monkey second metacarpal (mc2) bones, and this poster explains how mc2 bone structure in several species of Old World monkeys has been quantified with high resolution synchrotron microComputed Tomography (microCT). Specifically, the distal epiphyses' trabecular micro-architecture and the diaphyses' cortical thickness and porosity are quantified using open-source tools.

Building a Case for Repatriation: Analysis of a Peruvian Mummy Bundle

RAQUEL MENCHACA and LAUREN HOSEK

University of Colorado, Boulder

This poster presents the results of investigations of a small quantity of mummified human remains and accompanying items, likely of Peruvian origin, currently curated by the Department of Anthropology at University of Colorado, Boulder. These materials were collected in the late 1960s by a private American individual working in the Rimac Valley of Peru. This project considers the fundamental challenges of repatriation of human remains and cultural objects held outside the countries of origin while also contributing a detailed bioarcheological analysis of the remains themselves. The objective of the analysis was to establish baseline information building a case for the repatriation of these

remains to their country of origin. In doing so, we also examine the ethical complexities of colonialism and the circulation of human remains while upholding respectful practices maintaining the dignity of the deceased in the laboratory. A complete biological profile was established including age, sex, pathology, and taphonomy, alongside an analysis of the associated textiles. A small section of rope was sampled for radiocarbon dating to narrow down the temporal origin. These analyses begin to provide an identity to an individual who has otherwise been stripped of context. Possible future analyses, including necrobiome and dental calculus, may also contribute to the case for repatriation to the Peruvian consulate.

Funding: Department of Anthropology and Honors Program at University of Colorado, Boulder.

Ritual Enhances Mindful Eating

GALE H. MIKESH

University of Northern Colorado

Mindful eating is intentionally bringing attention to the experience of consuming edible food without judgment. Rituals are standardized, repeated, and often symbolic behaviors. Together, rituals used with Buddhist-based mindful eating enhance the consumption experience, facilitating intention, gratitude, and attunement to one's body. This interaction reveals how vital rituals used in conjunction with mindfulness during eating are. The literature review, ethnographic interview, and component analysis demonstrated rituals utilized with mindful eating significantly impact human connection, culture, and senses. Further research must be done with larger sample sizes on how mindful eating varies by culture and dietary choice.

Mantled Howler Monkeys (*Alouatta palliata*) Alter Activity and Spatial Cohesion in a Forest Fragment

REILLY L. MILLER[1], FRANCESCA V.E. KASER[1], RYAN E. BELMONT[1], MICHAEL ENNIS[1], LAURA M. BOLT[2], and AMY L. SCHREIER[1]

[1]Regis University; [2]University of Toronto Mississauga

Habitat loss due to deforestation is a primary threat to global biodiversity. Clearing tropical rainforests for agriculture leads to forest fragmentation. Forest fragments contain fewer large trees and provide lower food availability for primates compared to continuous forests. Mantled howler monkeys inhabit the increasingly fragmented rainforests of Central and South America. Howler monkeys may need to alter their activity and spatial cohesion to mitigate competition and preserve energy in fragments where there is lower quality food. We compared howler monkey activity and spatial cohesion across a small forest fragment (La Suerte Biological Research Station, LSBRS) and a large, continuous forest (La Selva Research Station) in northeastern Costa Rica. We predicted that monkeys at LSBRS would rest more, feed more, travel less, and be less spatially cohesive compared to La Selva to contend with fewer resources and higher competition in the small fragment. Using instantaneous scan sampling at two-minute intervals during 30-minute focal samples, we recorded activity and counted the number of individuals within 5 meters of the focal animal (LSBRS: 874.5 hours of behavioral data; La Selva: 603 hours). Generalized linear mixed-effect models showed the odds of observing each activity were significantly different across sites. As predicted, monkeys at LSBRS fed more than those at La Selva (LSBRS: 12.5% of activity budget; La Selva: 10.4%), but contrary to our predictions, they rested less (LSBRS: 65.1%;

La Selva: 73.3%) and traveled more (LSBRS: 11.2%; La Selva: 6.2%). The mean number of individuals within 5m was significantly lower at LSBRS (0.54) compared to La Selva (1.17). The ability to modify their activity and spatial cohesion in response to fragmented forests provides insight into how primates can contend with fewer resources and higher competition in changing ecosystems world-wide.

Funding: This project was funded by Regis University's Research and Scholarship Council and Faculty Development Committee.

Mapping Paleo-Glacial Environments and Human Presence in the Rocky Mountains during the Late Pleistocene

TEWABE NEGASH[1,2], ANNAKA M. CLEMENT[2], JAMES W. HAGADORN[2], HOLGER PETERMANN[2], and DAN GOLDHAMER[1]

[1]Colorado State University; [2]Denver Museum of Nature & Science

It is unclear when or how humans first arrived in the Americas during the late Pleistocene. A handful of controversial archaeological and paleoanthropological sites have been proposed as evidence of human presence in America before the Last Glacial Maximum (LGM, 20 ka). However, paleogenetic data suggests that humans only occupied the Americas south of the ice sheets after the LGM, and the general consensus is that humans crossed the Beringia land bridge around 18-15 ka.

To explore these different ideas, we created paleoenvironmental maps for time periods before and during widespread human occupation of North America, employing records of cosmogenic nuclide and ^{14}C data to reconstruct maximum ice extent during the LGM along with lithologic evidence from the literature to represent paleo-landscape evolution. We also visualized the spatial distribution of archaeological sites through time to depict where and when humans inhabited the area. The Rocky Mountain glacial extent was significantly larger during the LGM than after and no evidence of human presence has been recognized in the Rocky Mountains before the Bølling–Allerød warm period. However, it is unlikely that the Rocky Mountain paleo glaciers were a barrier to human occupation because the glacier-proximal landscapes were likely suitable for habitation because they attracted both predators and prey making this a potentially resource-rich environment for prehistoric humans. This research was carried as part of the Paleomapping project of the Denver Museum of Nature and Science.

Funding: There is a travel fund available through Colorado State University's Department of Anthropology and Geography, which I will apply for.

The Misuse of Antibiotics: Impact on the Human Microbiome and Its Effects on Black Populations in the United States

HELEN W. OBUNA

Colorado State University Fort Collins

The overuse and overprescription of antibiotics have become a growing concern worldwide due to their detrimental effects on the human microbiome. This literature review aims to explore the relationship between antibiotic overuse and the human microbiome, with a specific focus on its impact on Black populations in the United States. The review provides an overview of the human microbiome, the mechanisms of antibiotic action, and the potential consequences of antibiotic overuse. It also

examines the socio-economic factors contributing to the overuse of antibiotics in Black communities and discusses the implications for health disparities. The findings of this literature review underscore the importance of targeted interventions and education to address antibiotic overuse and protect the human microbiome, particularly in minoritized communities.

Funding: Colorado State University McNair Scholars Program.

From *Australopithecus* to *Homo*: What the Outliers (*Homo floresiensis*, *Homo naledi*, and *Homo luzonensis*) Tell Us about the "Transition That Wasn't."

CALEY M. ORR[1] and MATTHEW W. TOCHERI[2]

[1]Department of Cell and Developmental Biology, University of Colorado School of Medicine; [2]Department of Anthropology, Lakehead University

Cladistically, there is no limit to how many species may belong in a genus and generic bounds are typically defined by the perceived "adaptive coherence" of species that compose a monophyletic grouping. As noted by Kimbel and Villmoare (2016; Philos. Trans. R. Soc. Lond., B Biol. Sci. 371:20150248), *Homo* represents a diversity of lineages exhibiting varying mosaics of features such that all derived characters might not appear, even among taxa well-nested within the genus. Conversely, some features appear in australopiths, suggesting a deeper phylogenetic origin for many of these supposed adaptive signatures. Consequently, the "transition" from *Australopithecus* to *Homo* may not have been as dramatic an adaptational affair as traditionally reconstructed. Not considered were three species (*H. floresiensis*, *H. naledi*, and *H. luzonensis*) that persisted into relatively recent times yet preserve morphological characters that appear primitive in many aspects. Here we evaluate craniodental versus postcranial characters of these three species to assess the adaptive coherence of *Homo* when they are included. Our analysis suggests that although craniodental synapomorphies unite these taxa with other specimens that have traditionally nested within *Homo*, the mosaic nature of some features, especially in the postcrania, reflect the piecemeal evolution of supposed adaptive signatures of the genus. This phylogenetic perspective renders dubious the exercise of identifying the adaptive bounds of *Homo* and the addition of these three taxa reinforces the conclusions of Kimbel and Villmoare (2016) that the transition from australopiths to "*Homo*" did not co-occur with an adaptively coherent suite of characteristics.

Using Drone Survey to Map Hominin Activity Patterns at Olduvai Gorge

ALEX PELISSERO, TEWABE NEGASH, and MICHAEL PANTE

Colorado State University

Almost 100 years since it was first excavated, Olduvai Gorge, Tanzania has continued to provide a wealth of paleontological, archaeological and geological information crucial to understanding the evolution of our lineage. The geographically and temporally extensive deposits sample almost two million years of human evolution, allowing for large-scale questions to be investigated regarding hominin behavioral ecology, land-use, and response to environmental changes. New research methods have been able to expand our current knowledge and allow for new approaches to existing datasets. Our team recently conducted an extensive unmanned aerial vehicle ("drone") photogrammetry survey of Olduvai. The goal of this survey is

the creation of high-resolution imagery of the site to be used for mapping the geology and analyzing the distribution of hominin activities in the area through time. We present preliminary results demonstrating how drone-based imagery and geographic information systems (GIS) can be used to analyze and compare the availability of fossiliferous exposures, excavation locations, and the pattern of hominin activities.

Funding: Africa Center, CSU; Department of Anthropology and Geography, CSU; Stone Age Institute.

Chewing Intensity of a Modern Spotted Hyena Modified Assemblage

KYLE J. PONTIERI

University of Colorado at Denver

Documenting chewing damage in fossil assemblages can aid in identifying carnivores responsible for the accumulation and modification of those assemblages. A first step in such documentation is studying chewing damage inflicted by extant carnivores, with an aim towards identifying taxon-specific chewing damage patterns. Much of this research has focused on chewing damage by spotted hyenas, which have specific adaptations for bone crushing to access marrow within the bones of their prey. This project contributes to that body of work by applying a method introduced by Pobiner, Dumouchel, and Parkinson (2020) to a spotted hyena created assemblage. This study examines over 700 modern bones modified by spotted hyena created by Salvatore D. Capaldo in the 1990's. Intensity of chewing damage is quantified using a 5-stage scale. A chewing damage intensity score was assigned for skeletal elements and portions (0 = no damage, 1 = tooth marks only, 2 = minimal chewing damage, 3 = moderate chewing damage, and 4 = severe chewing damage, fragmentation, or destruction). It was predicted that both skeletal element and spotted hyena specific adaptations would condition the intensity of chewing damage inflicted by spotted hyenas. This can be seen with the high average damage for nearly all long bones with their averages being: femur (3.69), humerus (3.65), tibia (3.68), radio-ulna (3.4), and metacarpal (3.7). Comparatively, ribs (2.94) and scapulae (3.16) are less intensely chewed.

"You Too Can Be a Scientist!" Demystifying Science and Cultivating Our Students' Inner Scientists in Intro to Bio Anth Courses

CERISA REYNOLDS

Aims Community College

For a variety of reasons, students often enter science classes with trepidation, apathy, or even animosity. Perhaps it is because common images of scientists don't look like them. It is possible the scientific method has been presented in uninviting or even exclusionary ways, or that a former teacher made them feel as though they couldn't succeed. Maybe their family or larger culture group lacks enthusiasm for science or even carries anti-scientific beliefs. Regardless of what lies behind the emotions, they negatively impact the classroom environment and keep our students from learning as deeply or as passionately as they otherwise could. Additionally, these sentiments work as barriers against our students developing a love for science, or even entering scientific fields. So what can we, as instructors, do to change any of this? How do we show our students that they belong in our classes and in our discipline? How do we show them that they are already scientists and just need to

build their skills? How do we show them that science is about imagination and passion and creativity as much as it is about structure and process and rigor? In this poster, I will describe some of the simple but effective steps I have taken in recent years to show my Intro to Bio Anth students that they are scientists, that science is something they can do, and that the scientific world is theirs for the taking. Space will also be made for attendees to share additional ideas on welcoming students into the exciting world of science generally, and biological anthropology more specifically.

Can't Catch a Break: Trauma Recidivism in Colorado State Hospital

MAILE RHEA and LAUREN HOSEK

University of Colorado, Boulder

Trauma analysis allows us to better understand an individual's health and life history. By combining skeletal analysis with respectful use of historical records, we are able to produce an in-depth analysis through a biocultural approach. The Colorado State Hospital (CSH), was an asylum located in Pueblo, CO, operating since the mid-19th century. Skeletal remains of individuals from the early decades of operation (1879-1899) were first exhumed during construction in the 1990s. The CSH skeletal collection is currently housed at Colorado State University. By undertaking an analysis of individuals with trauma in this collection, we can identify different traumatic injuries and stages of healing. Trauma recidivism, the occurrence of multiple injuries over time, can indicate levels of care, occupational hazards, and other aspects of individual lives that better helps us to understand the risks and realities of 19th century institutionalization. We present a case of injury recidivism in an adult male from the CSH collection with extensive rib fractures at different stages of healing as well as healed fractures to the right hip and femur. This person's injuries are placed in the context of broader trauma patterns in a sample of the CSH collection as well as anonymized admission records, and other archival evidence. Low funds, understaffing, use of mechanical restraint and drugs to control residents, and other adverse conditions were made clear in records. As we learn more and more about this population, it is important that we continue to respect their remains and next steps beyond finishing research should include communication with the descendant communities and potential reburial.

Behavior in Female Mantled Howler Monkeys (*Alouatta palliata*) With and Without Dependent Offspring

MARY S. ROE and AMY L. SCHREIER

Regis University

Mantled howler monkeys are social, bisexually dispersing monkeys. Infants/juveniles require up to three years of dependency on their mother. Infant care is energetically demanding and essential to the infant's survival. At La Selva Biological Research Station, a large, protected forest in Costa Rica, we examined how activity patterns and nearest neighbors varied between adult female mantled howler monkeys with dependents versus without. We also reported how the mother's activity changed when her dependent was and was not physically attached to her. In May-June 2023, we observed female howler monkeys with/without infants using instantaneous focal sampling (30-minute samples, 2-minute scans). We predicted that adult females with dependents would spend a greater proportion of scans with other adult females than adult males or non-dependent juveniles, that

adult females with dependents would spend a greater proportion of scans resting and feeding compared to locomoting, and that infants/juveniles would physically attach to their mother more when she is locomoting and/or feeding and less when resting. Findings demonstrate that mothers with dependents spent the most time with other females. Females with dependents spent a significantly greater proportion of scans resting than feeding or locomoting, but not significantly more than females without dependents. Females also spent significantly more scans feeding with the dependent off than feeding with the dependent on. These findings suggest that females with infants need to spend the majority of their time resting and tend to feed when they are apart from their dependent. Further research at La Selva should examine the importance of relationships between females with dependents and other adult females.

Variability in Thoracic and Pelvic Proportions: An Evolutionary Perspective

ZOE G. SHAW

Colorado State University

It is traditionally accepted that modern human body proportions can be traced back to *Homo erectus*. KNM-WT 15000 provides evidence for this anatomical shift and defines the derived morphological pattern shared with anatomically modern *Homo sapiens* (AMHS). Contrary to the traditional view, many researchers now agree that *H. erectus* exhibits a wider thorax, likely present in all members of the genus *Homo* up until the appearance of AMHS. This study aimed to determine whether dimensions of the thorax and pelvis covary predictably in modern humans to understand better how selection has operated on these structures. Employing three-dimensional models derived from computed tomography (CT) scans of living individuals showed that these structures are likely not integrated and do not predictably covary. These results imply that selection has independently operated on the thorax and pelvis to produce modern human body proportions. Future research should delve into a more comprehensive exploration of the potential benefits of both narrow and wide pelvic and thoracic dimensions in modern and ancestral hominins.

The Forensic Investigation Research Station Donated Human Skeletal Collection: Creation, Research, and Educational Value

ALEXANDER J. SMITH

Forensic Investigation Research Station, Colorado Mesa University

Identified human skeletal collections are extremely valuable in forensic anthropology. Creation and validation of skeletal identification methods relies on the use of individuals with known biomedical information for accuracy and precision. Pathological and traumatic changes with known origins help increase understanding of these conditions and how to identify them. Over the past ten years the Forensic Investigation Research Station (FIRS) in Whitewater, Colorado has built a skeletal collection from human remains donated to the facility. Individuals in the collection were donated soon after death and allowed to decompose naturally in a cool semi-arid steppe climate for a period ranging from three months to over seven years. At the conclusion of soft tissue decomposition studies, the remaining tissue is removed manually and through warm water maceration. Current methods include use of an incubator, dish soap, meat tenderizer, and ammonia. At present the collection houses 80 modern human skeletons, though more

continue to be added as they are macerated. All individuals currently in the collection died between 2011 and 2020 and were between 33 and 103 at time of death. Cause of death includes but is not limited to cancer (various), cardiovascular disease, gunshot wound, drug intoxication, liver disease, and trauma from a fall. Most individuals are male (49 of 80) and identified as white (71 of 80). Previous research utilizing the collection is wide ranging and includes testing biological profile methods, isotopic analysis, subaerial weathering, search methods, and scavenging. While some of this work has been done by professionals, many projects utilizing the collection are led by undergraduate students under the supervision of FIRS staff. Through this collection students can learn the process and value of original research and professionals and students alike can address a variety of valuable research questions in biological anthropology and associated forensic fields.

Testing the Respiratory-Energetics Hypothesis and Sex-Based Differences in the Facial Skeleton of Modern Human Subadults

MICHALA K. STOCK and B TREDE

Metropolitan State University of Denver

Accurate estimation of sex assigned at birth is a key facet of the biological profile in forensic anthropological and bioarcheological contexts. However, this assessment remains difficult when conducting skeletal analyses of subadult individuals, as previous studies have focused on cranial features that may not appear or do not display sex-based differences until after puberty. Here, we examine the applicability of the respiratory-energetics hypothesis in sex discrimination among modern, U.S. individuals prior to adolescence. Postmortem computed tomography (CT) scans of 32 decedents (13 assigned female sex-at-birth, 19 assigned male subadult individuals) ranging from 2-12 years at time-of-death, and free from pathology and trauma to the face, were accessed from the New Mexico Decedent Image Database (NMDID). Using the 3-D processing software Amira, the CT scans were segmented to isolate the cranium and mandible of each individual, and 11 measurements of the nasal passage and oro-/nasopharynx were collected from the generated surfaces. Interobserver error was assessed for all measurements in a subsample of 10 individuals. Linear discriminant analysis (LDA) was performed to test the measurements' ability to differentiate between assigned female and male individuals. Absolute error (mean=0.55mm), percentage error (range: 0-0.13%) and intra-class correlation coefficients (range: 0.77-0.98) are reported, indicating good agreement between the observers. LDA demonstrated that nasal aperture width, nasopharynx height, and palate length were weighted most heavily in the analysis. When employing leave-one-out cross-validation, the LDA classified 38% of the female individuals and 74% of male individuals accurately. These results warrant further examination with an expanded data set, particularly given the range of ages sampled, the pooled-ancestry sample present within the NMDID, as well as the sex-bias in the original test sample.

Ritualization of Cleanliness: The Maasai Perspective

HANNAH M. THORNTON

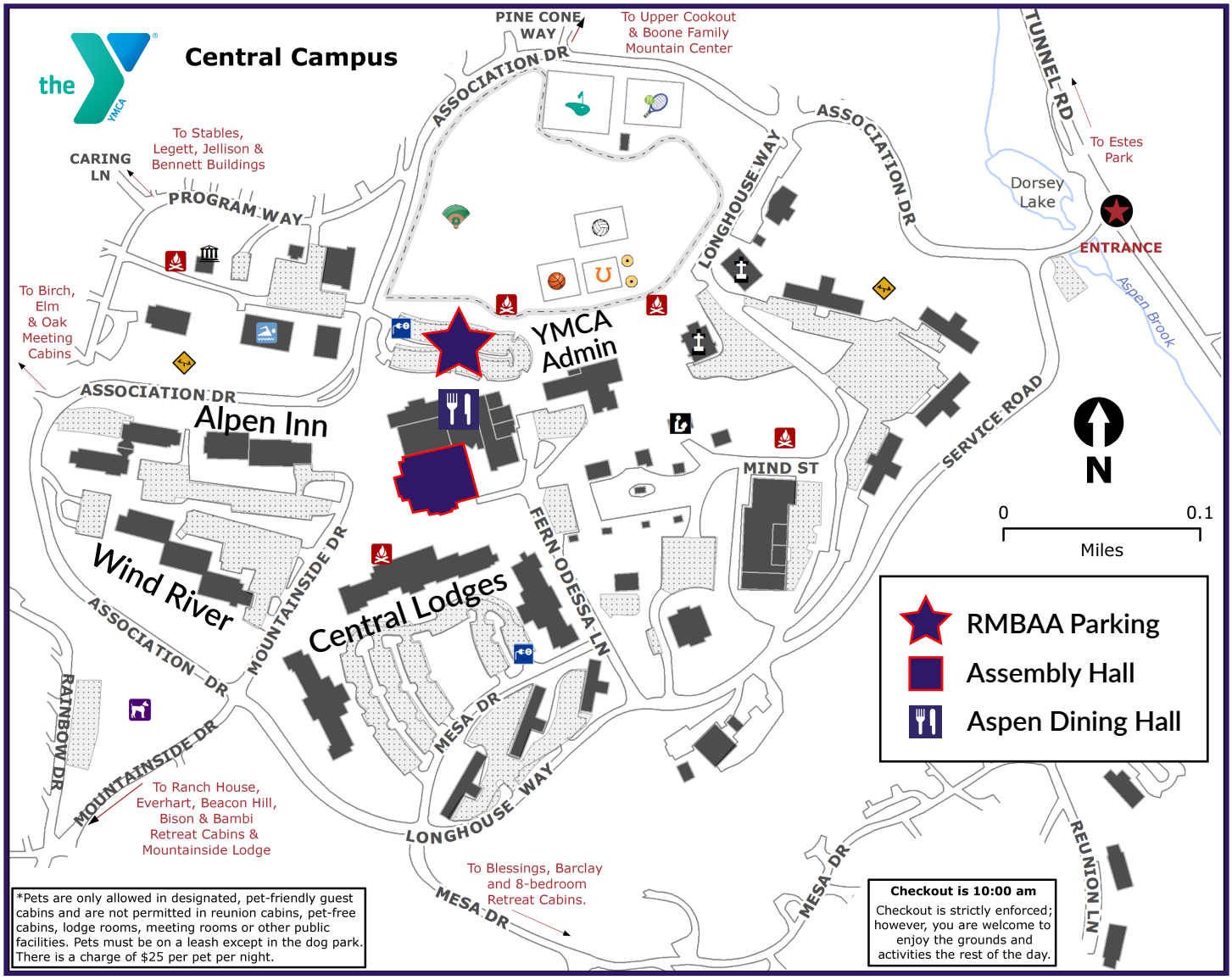
University of Northern Colorado

Throughout time, practices of hygiene have become highly ritualized. The motivation of hygienic rituals is based on the feeling of disgust. Ritualizing hygiene practices is a practice that we see across our cultures, this

is likely due to the shared common human response of disgust to unsanitary and unclean conditions. This response of disgust is adaptive because basic hygiene changes for resources in the environment. While the underlying selective mechanism has been at work on the disgust response broadly, we manifested in different cultural practices that serve the same biological purpose. The importance for the ritualization came from the sensation of cleanliness. The ritualization of hygienic cleanliness includes brushing teeth, makeup removal, and brushing hair. In the case study, research is conducted on the Maasai ritualized hygiene based on surrounding resources through primary ethnographic observation and a supporting literature review. The surrounding area is prominently desert with scattered plants. Maasai tribes have adapted to the use of the surrounding plants for different hygienic tools. The means by which different cultures act on this shared human impulse for hygiene, driven by our common disgust response, is intimately tied to their ecology. This is illustrated by the Massai's use of local plants and materials as toothbrushes, lotions, toothpaste and other hygiene products. In this study, I will use ethnographic and participant observations coupled with a literature review to argue, Maasai tribes do not have the same hygienic tools as other cultures, they adapted to the surrounding resources for protection of biological diseases.

Funding: The Maasai Tribes.

Venue & Location



Map provided courtesy of YMCA of the Rockies

Directions

The entrance to the YMCA of the Rockies is 2 mi south of Hwy 36 near the entrance to Rocky Mtn National Park, on the west side of Tunnel Rd/State Hwy 66 (red star on map).

Turn on to Association Dr, and continue past Longhouse Way and an activity area on the left that includes tennis, mini golf, and a baseball diamond to the parking lot on the left.

The Assembly Hall is on the south side of the building complex, past the Aspen Dining Hall, at 40.3395015° N, 105.5734734° W (purple square on map).

The Aspen Dining Hall has a wide variety of cafeteria food options for those uninterested in traveling for lunch, while coffee and snacks and available from the nearby Rustic Cafe.

Questions or Concerns?

Call Todd Yokley (303) 615-1339 or visit the **YMCA Admin office** (see map).


RMBAA
Rocky Mountain Biological
Anthropology Association