Northeastern Evolutionary Primatologists

VIII Meeting of the Northeastern Evolutionary Primatologists

November 4-5, 2022

Locations: University at Buffalo, North Campus

- Keynote presentation and podiums: Knox Lecture Hall 109
- Friday night reception: Brickhouse Tavern and Tap:
  For those not driving, there will be a shuttle to Brickhouse leaving from Knox Lecture Hall after the keynote.There is parking at the restaurant for those driving, and it is a 5 min drive/25 min walk back to the hotel. We encourage carpooling, Lyft, or Uber to get back to the hotel after the reception.
- Poster presentations and lunch: Student Union Multipurpose Room

Masking and Covid Testing:

While the UB policy leaves mask wearing up to the individual, for this meeting we require masks indoors anytime you are not actively eating or at the podium. We also encourage you to complete an at home test prior to attending the event. This policy will help protect attendees that may be more vulnerable than you are to Covid-19.

Poster Presentation Guidelines:

To hang your poster, please look for the board with the number associated with your presentation (see below). We recommend you hang your poster during breakfast or during one of our breaks and no later than Lunch on Saturday. Pins and Clips will be available on your board.

Podium Presentation Guidelines:

Podium talks will be 12 minutes long, followed by a 3-minute Q&A session. Please bring your slides on a flash drive or USB in PPT format, as Keynote software is not available on the presentation computer. We will collect your slides upon check-in on November 4, so please bring your flash/USB to check-in (Knox 109).

Networking Lunch

Lunch and seating will be available Saturday afternoon in the SU multipurpose room. Each registrant is assigned a table, in advance, represented by a color (sticker on your name tag). Please sit at your assigned table *prior* to selecting your meal; each table will be called in turn by conference organizers to avoid overcrowding.

General Meeting

We will have a NEEP General Meeting on Saturday after the last podium presentation and before the poster session. All attendees are encouraged to attend!

Conference Organization

Andrea Baden, Marina Cords, Eva Garrett, Jessica Gunson, Lauren Price, and Christopher Schmitt. Local organizer: Stephanie A. Poindexter. We also thank all the many volunteers helping during the conference.

Meeting Program

Friday, Nov 4th

5:00 -5:30 pm: Registration (Knox Lecture Hall Rotunda, upstairs entrance to Knox 109)
5:30-6:30 pm: Keynote Talk (Knox Lecture Hall 109)
Dr. Kate McGrath: What can teeth and bones tell us about stress? 3D studies of our fossil ancestors and primate relatives

6:30 – 9:30 pm Reception at Brickhouse Tap and Tavern (4120 Maple Rd, Amherst, NY 14226)
Appetizers and cash bar.

Saturday, Nov 5th

8:30-9:30 am: Breakfast
Knox rotunda (upstairs outside of Knox 109)

9:40-9:45: Welcome announcements

Session 1: Behavior

9:45: Correlates of Chimpanzee Termite Fishing Variation in Mbam & Djerem National Park, Cameroon
Andres-Bray, T.C. (1)(2); Nichols, I. (3); Abwe, E.E. (4)(5); Gonder, M.K. (1)(2).
(1) Department of Biology, Drexel University; (2) Cameroon Biodiversity Protection Program; (3) Virginia Tech; (4) Ebo Forest Research Project, Cameroon; (5) San Diego Zoo Global

10: Fitness costs and benefits of social integration in wild female geladas
Feder, J.A. (1); Beehner, J.C. (2); Bergman, T.J. (2); Snyder-Mackler, N. (3); and Lu, A. (1).
(1) Stony Brook University; (2) University of Michigan; (3) Arizona State University

10:15: Social conflict and injury rates in blue monkeys: do they tell the same story?
Arguelles, N. M. (1); Cords, M. (1).
(1) Columbia University

10:30 Parent-offspring social behavior in captive white-faced saki monkeys
Askren, Emma C (1).
(1) Bryn Mawr College

Break 10:45-11:00

Session 2: Genetics and Morphology

11:00: Field-optimized selection sequencing of MHC-containing chromosome 17 of the vervet (*Chlorocebus aethiops*) using Oxford Nanopore technology
DeCamp, R.M. (1); Hauff, L.R. (1); Chaney, M. (2); Tosi, A.J. (2); Bergey, C.M. (1).
(1) Rutgers University; (2) Kent State University

11:15 Genetic architecture of immune cell DNA Methylation in free-ranging rhesus macaques
Costa, C.E (1); Watowich, M.M (2); Goldman, E.A. (3); Sterner, K. (3); Negron-Del Valle, J. E. (4), Phillips, D. (4); Montague, M.J. (5); Platt, M. (5); Brent, L.J.N. (6); Higham, J. P. (1); Snyder-Mackler, N. (4); Lea, A.J. (7).
(1) New York University; (2) University of Washington; (3) University of Oregon; (4) Arizona State University; (5) University of Pennsylvania; (6) University of Exeter; (7) Vanderbilt University.

11:30 Rethinking the relationship between fruit availability, gregariousness, and orangutan flanging
Kralick, A. E. (1); Knott, D. C.(2); O'Connell, C.(1).
(1) Department of Anthropology, University of Pennsylvania; (2) Department of Biology, Boston University

11:45 -1:00 pm LUNCH

Session 3: Signals and communication

1:00: Tongue-flicking: An idiosyncratic displacement behavior in a free-ranging and urban-dwelling population of Balinese long-tailed macaques
Chertoff, S. (1); Wandia, I.N. (2); Leca, J-B. (1,3).
(1) University of Lethbridge, (2) Udayana University, (3) School of Natural and Engineering Sciences, National Institute of Advanced Studies

1:15: Using gaze tracking to provide insight into conspecific visual recognition in the nocturnal aye-aye (*Daubentonia madagascariensis*)
Laurita, A.J. (1); Poindexter, S.A. (1).
(1)University at Buffalo

1:35-2:30pm: General Meeting
2:30-4:30 pm Posters (SU Multipurpose room)
5:00 Student Awards

Poster Presentations

Bold names denote presenters

1. The biomechanics of footwear differences during walking on uneven terrain
   Apolito, Z.M. (1); Holowka, N.B. (1).
   (1) University at Buffalo

2. Vocal repertoire of the black-and-white ruffed lemur (*Varecia variegata*)
   Batist, C.H. (1); Razafindraibe, M.N. (2); Randriamanantena, F. (3); Baden, A.L. (1,2)
   (1) City University of New York Graduate Center; (2) University of Antananarivo; (3) Centre ValBio Research Station; (4) Hunter College

3. Morphological variation in strepsirrhine nails: implications for primate origins
   Card, G.K. (1); Maiolino, S.A. (1)
   (1) Stony Brook University.

4. Slow loris venom: revisited
   DesJardin, W.(1); Poindexter, S.A. (1).
   (1) University at Buffalo

5. Evidence Of Selection In The Fabp4 Gene Region Suggests Thermoregulatory Adaptation To Cold Temperatures In Savanna Monkeys
   Gagnon, C.M. (1), Svardal, H. (2), Jasinska, A.J. (3,4), Freimer, N.B. (3), Grobler, P.J. (5), Turner, T.R. (5,6), Schmitt, C.A. (1).
   (1) Boston University; (2) University of Antwerp; (3) University of California; (4) Polish Academy of Sciences; (5) University of the Free State; (6) University of Wisconsin

6. Can Insular Dwarfism be applied to Restricted Territories/Home Ranges within Larger Spaces? A Case to Explain Shortened Hominin Stature.
   Henderson, W.B.(1), Garrett, E.C.(1), Schmitt, C.A.(1), and Leiss, A.(2).
   (1) Sensory Morphology and Anthropological Genomics Lab, Department of Anthropology, Boston University, (2)Department of Anthropology, Boston University.

7. Captioning does not affect social media viewers' perceptions of photographs depicting human-primate interaction
   Huang, M.H. (1); Robinson, N.J. (2, 3); Yoo, B. (4); Cronin, K.A. (5); Freund, C.A. (6); DiGiorgio, A.L. (7).

(1) Princeton University; (2) Boston University; (3) Gunung Palung Orangutan Conservation Program; (4) Princeton University; (5) Lincoln Park Zoo; (6) Wake Forest University; (7) Princeton University

8. Foraging Behavior of Black-and-gold howler monkeys (*Alouatta caraya*) in the Gran Chaco in Northern Argentina: A Preliminary Assessment of Possible Feeding Competition with Azara's night monkeys (*Aotus azarae azarae*)
   Joslin, E. D. (1); Fernandez-Duque, E. (1); Corley, M. (1); García de la Chica, A. (2).
   (1) Yale University; (2) Owl Monkey Project.

9. A Geometric Morphometric Analysis of the Primate Clavicle
   Klier, K.P. (1); Simons, E.A. (2); Von Cramon-Taubadel, N. (1).
   (1) University at Buffalo; (2) Oregon Health and Science University

10. A Usable Feast? Red-ruffed lemur (*Varecia rubra*) food resources and utilitarian plants in northeastern Madagascar
    Kling, K. J. (1,2,); Eppley, T. E. (3,4); Markham, A. C. (5); Wright, P. C. (2,5,6); Razafindrapaoly, B. N. (7); Delox, R. (7); Rasolofoniaina, B. J. R. (7); Randriamanetsy, J. M. (7); Elison, P. (7); McAntonin, A. (8), Gibson, D. (3); Rasamisoa, D. C. (3); Razafrindramanana, J. (9); Vasey, N. (4); Borgerson, C. (7,10).
    (1) Interdepartmental Doctoral Program in Anthropological Sciences, Stony Brook University; (2) Institute for the Conservation of Tropical Environments, Stony Brook University; (3) Conservation Science & Wildlife Health, San Diego Zoo Wildlife Alliance; (4) Department of Anthropology, Portland State University; (5) Department of Anthropology, Stony Brook University; (6) Centre ValBio Research Station; (7) Madagascar Health and Environmental Research (MAHERY); (8) Mention Zoologie et Biodiversité Animale, Faculté des Sciences, Université d'Antananarivo; (9) Mention Anthropobiologie et Développement Durable, Faculté des Sciences, Université d'Antananarivo; (10) Department of Anthropology, Montclair State University, Montclair, NJ, USA

11. Investigating the U.S. primate pet trade and legislature
    Marshall, O.J. (1); Poindexter, S.A. (1).
    (1) University at Buffalo

12. Exploring the evolution of vocal range in non-human primates
    McCollum, K.M.E. (1), Maynard, K.Q (1), Poindexter, S.A. (1).
    (1) University at Buffalo

13. Understanding the ecology of wild slow lorises (*Nycticebus bengalensis*) in Thailand: Toward improving translocation success
    Quarles, L. F. (1) and Nekaris, K. A. I. (1).
    (1) Oxford Brookes University

14. Ecological Factors Underlying Group Fission in Blue Monkeys (*Cercopithecus mitis stuhlmanni*)
    Wakeford, R. (1); Cords, M. (1).
    (1) Columbia University

15. Socio-Sexual Behavior Frequency in the Presence of a Simulated Floater in Wild-Living Azara's Owl Monkeys (*Aotus azarae*) in the Humid Chaco, Argentina
    Santiago, L.C. (1); Pertile, J.A. (2); Williams, K.L. (1); Garcia de la Chica, A. (3); Corley, M.K. (1); Fernandez-Duque, E. (1).
    (1) Yale University; (2) Duke University; (3) Owl Monkey Project

16. Social factors predicting age at first reproduction in wild blue monkey females.
    Sciaky, L. (1); Cords, M.(1).
    (1) Columbia University

17. Does the absence of a silverback increase aggression frequency amongst female gorillas?
    Scinta, J. (1); Broikos, K. (1); Botticelli, J. (1); Margulis, S. (1).
    (1) Canisius College

18. Differences in Fecal Particle Size Across Age-Sex Classes in Wild Bornean Orangutans
    Swanson, M.E. (1); Kane, E.E. (1); Susanto, T.W. (2); Clauss, M. (3); Knott, C.D. (1).
    (1) Boston University; (2) Universitas Nasional; (3) University of Zurich

19. Seed-Dispersal Potential of Wild-living *Aotus azarae* in the Humid Chaco Region of Argentina
    Williams, K.L. (1); Juarez, C.P. (2); Barrios G.J. (2); Jojot, J. (2); Velazco, P.J. (2); Jaime, S. (2); Haas, S. (3); Corley, M (4); Fernandez-Duque, E. (4); De La Chica, A.G. (5).
    (1) NSF-IRES Owl Monkey Project, Yale College, USA; (2) Centro de Ecología y Biodiversidad del Chaco Argentino (CEBICO)- Facultad de Recursos Naturales- Universidad Nacional de Formosa, Argentina; (3) Duke University, USA,; (4)

Department of Anthropology and School of the Environment, Yale University, USA; (5) Universidad de Buenos Aires, Argentina.

Abstracts (alpha order by the first author)

Correlates of Chimpanzee Termite Fishing Variation in Mbam & Djerem National Park, Cameroon

Andres-Bray, T.C. (1)(2); Nichols, I. (3); Abwe, E.E. (4)(5); Gonder, M.K. (1)(2).
(1) Department of Biology, Drexel University; (2) Cameroon Biodiversity Protection Program; (3) Virginia Tech; (4) Ebo Forest Research Project, Cameroon; (5) San Diego Zoo Global

Tool use is an innovative, flexible behavior whose diversity has contributed to hominid evolution by facilitating access to previously inaccessible niches. This study explores variation in termite fishing, a ubiquitous tool-use behavior in chimpanzees, in a population of traditionally understudied Nigeria-Cameroon chimpanzees. Specific objectives address whether members of similar ages and social groups show greater similarity in termite-fishing behavior, and if termite fishing in these chimpanzees resembles that of other populations in similar ecological contexts. Camera traps collected 76 videos of eight chimpanzees termite fishing near Ganga Research Station in Mbam & Djerem National Park, Cameroon in 2020. These videos were coded using an ethogram of chimpanzee behavioral elements, and sequential strings of 2-4 elements were quantified to identify consistent tool-use techniques. Published data from a previous study examining termite fishing in 6 other chimpanzee populations were used for between-population comparisons. Five of the eight chimpanzees demonstrated unique technical repertoires ranging from 3 to 14 total technical variants. Similarity within age class and known social groups was not significant, indicating individual variation is high. Similarity between populations was correlated with measures of temperature and rainfall, but not with geographic distance, suggesting that environment plays a role in shaping how chimpanzees use tools. Quantification of this variation can be a powerful tool for assessing behavioral diversity in chimpanzees, which could provide insight into these populations' ability to persist in changing environments and inform our understanding of their risk to climate change and human disturbance.

The biomechanics of footwear differences during walking on uneven terrain

Apolito, Z.M. (1); Holowka, N.B, (1).
(1) University at Buffalo.

There is a discrepancy between the oldest anatomically modern human (i.e., approximately 250 thousand years ago) and the first evidence of footwear (i.e., 40

thousand years ago). Therefore, from an evolutionary perspective, the use of footwear is a recent innovation. Many researchers have addressed the biomechanical effects of footwear from various perspectives; none have attempted to compare the impact of shod walking versus barefoot walking on uneven terrain. Many real-world walking surfaces are challenging (e.g., uneven), and it is imperative to understand how shoes impact our ability to maintain stability and avoid falls. There is no question that humans evolved strategies to navigate barefoot across uneven terrain, but it is unknown how modern shoes (i.e., cushioned support) change strategies such as lower limb kinematics and muscle activation patterns. Here we attempt to isolate the adaptations specific to maintaining stability during barefoot walking by addressing how walking in a shod condition changes our walking biomechanics over uneven terrain. Using motion capture, electromyography, and ground reaction forces, we examined the biomechanical differences between shod and barefoot walking over uneven terrain. Preliminary analyses indicate similar lower limb kinematics and muscle activation patterns whether shod or barefoot while walking on uneven surfaces. However, our preliminary analysis demonstrates that wearing shoes increases preferred speed, step width, stance phase duration, and stride duration on uneven surfaces. The use of footwear appears to allow people to walk faster and take longer strides on uneven surfaces, but its effects on stability are still unclear.

Social conflict and injury rates in blue monkeys: do they tell the same story?

Arguelles, N. M. (1); Cords, M. (1).
(1) Columbia University

Injuries in wild animals often arise from intraspecific contests and can therefore provide insight into selection pressures. Using 13 years of injury records from 12 groups of wild Kenyan blue monkeys, we verified that most injuries of known cause resulted from conflict with conspecifics, and then evaluated whether previously documented aggression patterns predicted the likelihood of injury. We compared injury distributions across age-sex class and season. Adult males were 8 times more likely, adult females about equally likely, and immatures much less likely to sustain injuries relative to random expectation. Only adult males showed strong seasonal variation, with more injuries in the mating season. We then used multivariate models to analyze injuries in adult females and immatures, and found that injury counts per month were higher for adult females than immatures, and for individuals in groups with lower percentages of immature members. There was evidence of higher injury rates in the mating vs. inter-season, but no effect of group size. Among a subset of older juvenile and adult females, these same patterns persisted. Furthermore, pregnant and lactating females

experienced fewer injuries than non-reproductive peers, but there was no evidence that dominance rank influenced injury rates. While many findings support the presumption that aggression increases injury risk, others suggest that competition costs may manifest in other ways, especially for females. We highlight the importance of considering both within- and between-group aggression as injury sources, and recommend future studies focus on escalated aggression in behavioral records to estimate social conflict costs.

Parent-offspring social behavior in captive white-faced saki monkeys

Askren, Emma C (1).
(1) Bryn Mawr College.

White-faced saki monkeys (Pithecia pithecia) are understudied platyrrhines who live in the rainforests of northern South America. Their social organization is highly variable, but centered around the breeding pair, and characterized by same-sex aggression. However, extra-pair adults are often stable members of the social group, and solitary individuals have also been observed. Researchers have proposed that competing selective pressures for territory defense and mate access have resulted in this high level of intraspecific variation. Further variation is found in zoos, with more unusual captive group compositions that may not reflect what is encountered in the wild. To investigate this behavioral plasticity, I conducted an observational study of an all-male group of sakis living at the Philadelphia Zoo, one year after the death of the breeding female. I recorded general, affiliative, and agonistic behaviors of the father and his two sons. Due to sakis' reported tendency towards same-sex aggression, I expected to see more affiliative behavior between the father and each of his sons than between the sons. I observed the father interacting with the more assertive son during the day, mostly by grooming, but sleeping on the same platform as the more reserved son during the night. The keepers reported the monkeys' sleeping behaviors changed following the death of their mate/mother. The two sons rarely interacted, but the more reserved son scent-marked much more. It appears that, adjusting to the new group composition, the males employ alternative strategies for maintaining parent-offspring relationships while exhibiting low levels of aggression.

Vocal repertoire of the black-and-white ruffed lemur (Varecia variegata)

Batist, C.H. (1); Razafindraibe, M.N. (2); Randriamanantena, F. (3); Baden, A.L. (1,2)

(1) City University of New York Graduate Center; (2) University of Antananarivo; (3) Centre ValBio Research Stationl; (4) Hunter College

Vocal repertoires, including descriptions of calls' bioacoustic structures, provide important insights into the behavioral repertoire of a species. Quantitative descriptions of the bioacoustic properties of different call types within a species' repertoire are therefore essential to understanding the behavioral ecology of the species. Black-and-white ruffed lemurs (Varecia variegata) are frugivorous lemurs that live in large social groups that exhibit strong fission-fusion dynamics. Only one previous vocal repertoire exists for V. variegata, but it was generated from captive individuals and includes only qualitative data. We qualitatively described the vocal repertoire of V. variegata from Mangevo, Ranomafana National Park, Madagascar, and conducted a discriminant function analysis (DFA) to classify different call types. We characterized 11 call types using 33 bioacoustic parameters related to frequency, duration, tonality and composition (calculated by warbleR package). The repertoire consists of both monosyllabic and multisyllabic calls that are individually-given or emitted in contagious choruses. Eight of the 11 call types were given in combination with other calls; for example, 76% of roar-shrieks were preceded by another call type and 49% were followed by another. Similarly, 31% of barks were preceded by another call and 21% were followed by another. The DFA correctly assigned call types with 88% success, though this varied greatly by call type (range 1-64%). The most important variables contributing to the linear discriminants in the DFA were frequency-related. This study is (to our knowledge) the only vocal repertoire described from wild V. variegata and the only one that provides a quantitative bioacoustic analysis.

Morphological variation in strepsirrhine nails: implications for primate origins

Card, G.K. (1); Maiolino, S.A. (1).
(1) Stony Brook University.

Of the 24 genera of strepsirrhines, only two are known to possess keeled nails (nails that end in a sharp point and have a prominent ridge running down their midline). However, our preliminary observations from preserved primate skins held at the American Museum of Natural History suggest that keeled nails are more widespread than previously recognized. We conducted a study to describe the diversity of nail shapes among extant strepsirrhines and to investigate possible relationships among nail morphology, body size, positional behavior, and phylogeny. Manual nails from the skins of 83 strepsirrhines, representing 24 species and 20 genera of varying body sizes and positional behaviors were sampled. Based on observed diversity, we were able to define

five qualitative nail shape categories. We also quantified nail shape using an outline-based morphometric approach. TpsDig2 was used to take 100 equidistant x-y coordinates of the dorsal outline shape from digital photographs. Elliptic Fourier analysis was conducted in R using Momocs and the resulting data was summarized using principal component analysis. The results of this study indicate that nail shape does not significantly vary among positional behavior groups and body size does not significantly vary among nail shape categories. Phylogenetic signal was found to be significantly low. While additional work is needed to understand the functional significance of nail shape variation, our results suggest that primate nails should not be treated as a homogenous character. This material is based upon work supported by the National Science Foundation under Grant no. BCS-1341075 (SAM) and The Leakey Foundation (SAM).

Tongue-flicking: An idiosyncratic displacement behavior in a free-ranging and urban- dwelling population of Balinese long-tailed macaques

Chertoff, S. (1); Wandia, I.N. (2); Leca, J-B. (1,3).
(1) University of Lethbridge, (2) Udayana University, (3) School of Natural and Engineering Sciences, National Institute of Advanced Studies

Abnormal behaviors in non-human animals are almost exclusively reported in captive individuals. Described as being atypical in occurrence or rare, abnormal behaviors may be indicative of negative welfare. This brief report describes the occurrence of an idiosyncratic, potentially abnormal behavior or displacement behavior, labeled tongue-flicking, that was performed by one subadult male long-tailed macaque living in a free-ranging population in Bali, Indonesia. Tongue-flicking may be a displacement behavior in which the subject sticks his tongue out of his mouth and moves it either slightly up and down or in and out without bringing it all the way back into the mouth. Our preliminary descriptive analysis of tongue-flicking aims to highlight the need for understanding the motivational bases and affective implications (e.g., welfare) of abnormal behaviors in captive and free-living animals.

Genetic architecture of immune cell DNA Methylation in free-ranging rhesus macaques

Costa, C.E (1); Watowich, M.M (2); Goldman, E.A. (3); Sterner, K. (3); Negron-Del Valle, J. E. (4), Phillips, D. (4); Montague, M.J. (5); Platt, M. (5); Brent, L.J.N. (6); Higham, J. P. (1); Snyder-Mackler, N. (4); Lea, A.J. (7).

(1) New York University; (2) University of Washington; (3) University of Oregon; (4) Arizona State University; (5) University of Pennsylvania; (6) University of Exeter; (7) Vanderbilt University.

A major goal in evolutionary primatology is understanding genotype-phenotype relationships and the heritable basis of traits. Gene regulatory changes, like DNA methylation, may link genotypes to phenotypes, yet these links are rarely studied in natural primate populations. We quantified DNA methylation at 555,856 CpGs in peripheral whole blood across 573 free-ranging rhesus macaques from the island of Cayo Santiago, Puerto Rico. We mapped cis methylation quantitative trait loci (meQTL) testing for effects of 243,389 single nucleotide polymorphisms (SNPs) on DNA methylation variation. Of 776,092 tested SNP-CpG pairs, we identified 516,213 macaque meQTLs (FDR 5%), explaining an average 21.2% of methylation variance. Average narrow-sense heritability of sites in the analysis is 0.3. meQTL CpGs are depleted in inactive regions and enriched in functional regions of the genome like promoters, enhancers, transcription start sites, and open chromatin. meQTLs in functional regions explain a greater proportion of methylation variation compared to inactive regions. meQTL SNPs are enriched in transcription factor (TF) binding sites of a methylation-sensitive TF family, suggesting genotype-dependent TF-binding might mechanistically link QTLs to nearby methylation. Genes with many meQTLs are involved in cellular, metabolic, regulatory and immune functions. Our results indicate widespread genetic effects underlying inter-individual DNA methylation profiles, the majority of which lie in functional regions where methylation is likely to impact gene expression and downstream phenotypes.

Field-optimized selection sequencing of MHC-containing chromosome 17 of the vervet (Chlorocebus aethiops) using Oxford Nanopore technology

DeCamp, R.M. (1); Hauff, L.R. (1); Chaney, M. (2); Tosi, A.J. (2); Bergey, C.M. (1).
(1) Rutgers University; (2) Kent State University

The Oxford Nanopore MinION is a powerful, portable third-generation sequencing technology which can allow researchers to sequence DNA or RNA from samples in the field. While the MinION is most useful for sequencing smaller genomes, sequencing larger genomes, like those of primates,with the platform becomes cost-ineffective. Adaptive sampling refers to a method of targeted sequencing using Oxford Nanopore Technology in which DNA strands can be computationally accepted or rejected in real time based on similarity to a predefined target. Adaptive sampling therefore offers an avenue for targeted sequencing of genes or chromosome regions when whole-genome

sequencing is impractical. Here, we report a successful adaptive sampling experiment using the Oxford Nanopore MinION MK1B in which we enriched chromosome 17 from a vervet monkey (Chlorocebus aethiops). We isolated high molecular weight DNA from a captive monkey from a population originating in St. Kitts and Nevis, and prepared the library using the Oxford Nanopore Field Sequencing Kit (SQK-LRK001). We programmed the MinKNOW software to enrich sequences within our targeted region, and used the Guppy and MinKNOW software to perform live GPU-powered basecalling of our sample. Our adaptive sampling experiment totalled over 5,500 reads and generated over 5 million basepairs, while a control run of shotgun sequencing without adaptive sampling generated over 8,500 reads and 27 million basepairs. The success of this experiment paves the way for future adaptive sampling in the field using the MinION.

Slow loris venom: revisited

DesJardin, W. (1); Poindexter, S. A.(1).
(1) University at Buffalo

Venom is a unique adaptation among mammals. There are 6 species of venomous mammals, including the only venomous primate; the slow loris (Nycticebus spp.). What we know about slow loris venom is limited despite gaining interest from researchers and the public alike. A 2013 review “Mad, bad and dangerous to know: the biochemistry, ecology and evolution of slow loris venom” was the start of the uptick in papers released about slow loris venom. The authors hypothesized various functions for slow loris venom, such as immobilizing prey, defense against predators, defending from ectoparasites, or intraspecific defense. Here we sought to revisit these hypotheses and summarize what we have learned since this review about the form and function of slow loris venom. According to Web of Science, 24 papers on slow loris venom have been published since 2013. Each of the discussed functions have been tested in subsequent work, as well as an analysis of the chemical compounds within their venom. Addressing questions about slow loris venom is truly interdisciplinary. The benefit of an increased interest in this topic, means we are on the way to understanding the evolution of venom in mammals and how this trait emerged in slow lorises.

Fitness costs and benefits of social integration in wild female geladas

Feder, J.A. (1); Beehner, J.C. (2); Bergman, T.J. (2); Snyder-Mackler, N. (3); and Lu, A. (1). (1) Stony Brook University; (2) University of Michigan; (3) Arizona State University

In many primates, socially integrated females produce more surviving offspring. However, alpha male replacements (“takeovers”), which can trigger both short-term increases in infanticide risk and long-term offspring deficits resulting from maternal cost-cutting strategies, can obscure the benefits of maternal sociality. To avoid infanticidal males, mothers might even adaptively disengage from social interactions. Here, we evaluated the broad influence of maternal social integration (measured prior to offspring birth) on offspring survival to adulthood in a wild primate that experiences high rates of male infanticide, the gelada (Theropithecus gelada). Maternal grooming relationships with males and other adult females were both associated with the survival of offspring that experienced early-life takeovers, albeit in opposite directions and within different age brackets. Females with strong opposite-sex grooming relationships showed reduced infant survival, possibly due to their close proximity to potentially infanticidal leader males during subsequent takeovers. By contrast, females with strong same-sex grooming relationships showed improved juvenile survival, perhaps because their offspring were buffered against the nutritional impacts of abrupt, forced weaning. As a follow-up, we compared females’ pre- vs. post-takeover grooming effort. Overall, females spent less time grooming males during the six months following takeovers. Within this reduced grooming budget, females prioritized deposed, protective males (i.e., presumed fathers) while avoiding new, infanticidal males. Such maternal social strategies could shape both the short- and long-term impacts of male takeovers on offspring health and fitness. Altogether, these data indicate that sociality-fitness relationships are not ubiquitously positive and may vary across different timescales.

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Evidence Of Selection In The Fabp4 Gene Region Suggests Thermoregulatory Adaptation To Cold Temperatures In Savanna Monkeys

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Heat produced via the process of nonshivering thermogenesis (NST) comes primarily from the metabolism of fatty acids in brown adipose tissue (BAT). This adaptation which

is common among eutherian mammals was a key factor to their evolutionary success, particularly small bodied mammals, hibernators, and even our own lineage. Although its exact role in thermogenesis remains to be determined, expression of fatty acid binding protein 4 coded by the FABP4 gene has been linked to thermogenic activity in BAT. Due to this protein's critical role in providing the fuel required to power heat production in BAT, we hypothesize that variants of the FABP4 gene increasing the efficiency of transporting FFA would have been selected for in populations in colder environments. To test this hypothesis we conducted an analysis of the gene variation present in the FABP4 gene region in a sample of 65 savannah monkeys (Chlorocebus pygerethrus, hilgerti, cynosuros). Our analyses included 10 kb flanking regions of FABP4 to capture variation in potential cis-acting regulatory regions. Principal component analyses of FABP4 across the genus shows differentiation between taxa and local populations consistent with phylogenetic distance. Linkage-based analyses (iHS and EHH) suggest recent positive selective sweeps at several loci (8:76899549, piHS=1.485; 8:76901788, piHS=1.934; and 7:76904338, piHS= 1.748). Furthermore, allele frequencies at these loci are associated with climatic variables, further suggesting selection for these variants related to cold temperatures.

Can Insular Dwarfism be applied to Restricted Territories/Home Ranges within Larger Spaces? A Case to Explain Shortened Hominin Stature.

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Insular dwarfism is an ecogeographical rule asserting that large animals evolve to reduce body size on islands. Precisely why larger taxa get smaller under such circumstances is debated, with several competing hypotheses ranging from random genetic drift (i.e., founder effects, restricted gene flow, reduced genetic variation) to selection based on local ecology (i.e., lower food availability, reduced predation). Population density is a potentially unifying factor underlying these hypotheses, but that has not been explicitly tested as a potential explanation for insular dwarfism. Using the largest and smallest of three genera of mammals (e.g., cetaceans, proboscideans, and artiodactyls) the relationship between body size and population density as it relates to size of territory/home range will be analyzed comparatively within the context of hominin height variation. High-and low density environments in the context of territory/home range size will also be analyzed to observe further if any parallels in height occur between selected taxa. The goal of this research is to demonstrate that (A) the evolution of height in the hominin clade, both extant and extinct, may be in part a result of not just

local ecology but how it relates to larger population processes and (B) hominin height is a product of form and function.

Captioning does not affect social media viewers' perceptions of photographs depicting human-primate interaction

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(1) Princeton University; (2) Boston University; (3) Gunung Palung Orangutan Conservation Program; (4) Princeton University; (5) Lincoln Park Zoo; (6) Wake Forest University; (7) Princeton University

Promoting human contact with wildlife is detrimental to animal conservation and welfare efforts. It exposes animals to harmful situations, drives demand for wildlife tourism, and increases demand for exotic pets. As conservationists and researchers utilize social media to raise awareness, posting pictures of scientists with animals can become counterproductive. The IUCN published a Best Practice Guidelines for Responsible Images of Non-Human Primates, suggesting using captions with images of humans and primates to explain the photograph's context. Although this may deter non-professionals from wanting to handle wildlife, there is little research investigating whether captions are effective.
We investigate whether informative captions have an effect on viewers' desires to have primates as pets and attitudes towards wildlife conservation. We use four mock Instagram posts depicting a researcher observing a gorilla and a veterinarian holding a loris (two test posts with captions, two control posts without) to survey 3350 respondents and assess whether posts with captions result in different sentiments. A Wilcoxon Signed-Rank Test indicated captions resulted in no significant difference in responses about viewers' desire to own primates as a pets (gorilla $p=0.96$, loris $p=0.22$) or questions regarding primates' conservation status (gorilla $p=0.27$, loris $p=0.89$). Median responses for all mock posts was "agree" (4 on a Likert scale), that respondents want these animals as pets. Median responses for conservation status questions were also 4 for all posts, indicating respondents agree both primates are endangered. These preliminary findings suggest that captioning has no effect on viewers' interpretations of photographs.

Funding: Fund for this project was provided by Princeton University Committee on Research in the Humanities and Social Sciences and the Princeton Anonymous Fund.

Foraging Behavior of Black-and-gold howler monkeys (Alouatta caraya) in the Gran Chaco in Northern Argentina: A Preliminary Assessment of Possible Feeding Competition with Azara's night monkeys (Aotus azarae azarae)

Joslin, E. D. (1); Fernandez-Duque, E. (1); Corley, M. (1); García de la Chica, A. (2).
(1) Yale University; (2) Owl Monkey Project.

Due to their cathemeral behavior that differs from the typical nocturnal behavior of the genus Aotus, Azara's night monkeys (Aotus azarae azarae) present an excellent opportunity to study the possible causes of variation in primate sleeping patterns. Azara's night monkeys (Aotus azarae azarae) and Black-and-gold howler monkeys (Alouatta caraya) have overlapping ranges in the Argentinean Chaco. We hypothesize that the overlapping range causes feeding competition between the two species which leads to temporal niche partitioning; this temporal niche partitioning would provide one possible explanation for the cathemeral behavior of Azara's owl monkeys. During a two-week period in June-July 2022, I conducted daily follows of two groups of black-and-gold howler monkeys and systematically marked and identified the trees (n=27) I observed individuals feeding from. While this initial data set is very small to thoroughly explore our hypothesis, it is a preliminary step towards ascertaining if there is feeding competition between these two species as this data can be compared to existing data on the foraging behavior of Azara's owl monkeys. The preliminary foraging and demographic data will also serve as a foundation for future research of the black-and-gold howler monkeys in the area.

Funding for the study was provided through an NSF-IRES (National Science Foundation – International Research Experience for Students) award to Eduardo Fernandez-Duque.

A Geometric Morphometric Analysis of the Primate Clavicle

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(1) University at Buffalo; (2) Oregon Health and Science University

Objectives: The clavicle is an historically understudied bone when compared with other elements of the primate pectoral girdle, and little is known about levels of morphological variation within and among species. This study presents a geometric morphometric analysis of clavicular variation in multiple catarrhine species including Homo sapiens. Materials and Methods: Seven three-dimensional landmarks were collected on 215 right clavicles from Trachypithecus cristatus (n = 36), Pan troglodytes (n = 12), Gorilla gorilla (n = 27), Homo sapiens (n = 46), Hylobates lar (n = 36), and Macaca mulatta (n = 58).

Landmarks were superimposed using a generalized Procrustes analysis. Comparative clavicular morphology was visualized via a principal components analysis, and was quantified using Procrustes ANOVA with permutation. Within species morphological disparity was also analyzed using Procrustes variance, using species means. Results: The Procrustes ANOVA results showed significant shape differences among species in general ($F(5,209) = 39.905$, p-value < 0.001), but pairwise comparisons found that the African apes were an exception to this general pattern. Differences among species was largely related to acromial end curvature, and to the position of the conoid tubercle relative to the acromial end. Additionally, Gorilla gorilla has significantly more shape variation than the other species, related to the relative distance of the conoid tubercle from the acromial end. Sexual dimorphism in shape was only present in Trachypithecus cristatus. Discussion: Results suggest a substantial taxonomic signal in clavicular shape among catarrhines. Further research on non-ape primate clavicular sexual dimorphism may potentially increase primate taxonomic divergence information.

A Usable Feast? Red-ruffed lemur (*Varecia rubra*) food resources and utilitarian plants in northeastern Madagascar

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While natural resource use is commonly framed as a pressing concern for primate conservation, a quantitative understanding of how human plant use overlaps with provisioning services for primates is lacking. We used data from botanical plots (N=155 plots sampled 2015-2016; 50 plots sampled across 5 years) in Masoala NP and 13 surrounding communities in northeastern Madagascar to assess the availability of plant species consumed by the CR red-ruffed lemur (Varecia rubra). We constructed

zero-inflated GLMMs to evaluate the impact of the following proxies of resource use on the count and species richness of lemur food trees (LFT): protected area status, community factors (i.e., population size, distance to community), and time. We conducted focus groups (N=2 communities) to assess how plant species were used by local people. Of 59 available V. rubra food tree species, only 9 had no reported human use. The majority (78.0%) of LFT species could be used by local people as timber, with other use-cases including medicine and food. LFT count was significantly higher in Masoala National Park (GLMM: $z=3.59$, $p=0.007$) and declined significantly with population size ($z=-7.42$, $p<0.0001$) and time ($z=-3.34$, $p<0.001$). LFT species richness exhibited the same significant relationships with these tested factors, but neither measure of availability was impacted by distance to ommunity. Given that lemurs are important seed dispersers, our results emphasize the importance of considering provisioning services for both people and wildlife in landscape restoration efforts.

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Rethinking the relationship between fruit availability, gregariousness, and orangutan flanging

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Orangutans display a phenomenon known as male bimaturism, a plastic polymorphism where some male orangutans develop into flanged males shortly after reaching sexual maturity and others delay the development of flanges up to 20 years or may never flange. Recent research is upending longstanding notions of the phenomenon, requiring a new evolutionary framing. We assess the argument that adult unflanged males fill a niche in response to severe periods of low fruit availability and less gregariousness occurring in the last 3-5 million years. We examine frequency of occurrence of each morph, markers of stress (dental defects and cortisol levels), and social behavior. The ratio of flanged to unflanged males is higher on Borneo, which has lower fruit availability than on Sumatra. Periods of low fruit availability are stressful, and flanged males show evidence of more severe stress events in early life than adult unflanged males. Further, flanged males are less gregarious than adult unflanged males. An examination of 42 males at Gunung Palung showed that flanged males spent only 16% of their time social

compared to 30% for unflanged males. Flanged males also experienced elevated cortisol levels when social (t708=2.099, p=0.036) compared to adult unflanged males which did not. These data suggest the need to re-think the adaptive significance of flanging. We consider the possibility that the flanged male status has become increasingly common over the last several million years with increasing periods of low fruit availability and less gregariousness and discuss the implications of this for the future.

Using gaze tracking to provide insight into conspecific visual recognition in the nocturnal aye-aye (*Daubentonia madagascariensis*)

Laurita, A.J. (1); Poindexter, S.A. (1).
(1) University at Buffalo

Nocturnal primates are known to use olfaction and auditory stimuli in conspecific recognition and communication, but the role of vision in these functions is comparatively understudied. From an evolutionary perspective, it is suggested that during primate evolution there was a trade-off between olfaction and vision as the most salient sense. Here we sought to identify and measure the functionality of visual cues in the communication of the nocturnal aye-aye (Daubentonia madagascariensis). We conducted the study at the Duke Lemur Center in Durham, NC from July to August 2022. Five individuals participated in two restraint-free, noninvasive eye tracking paradigms (preferential looking and the Thatcher Illusion paradigm). Based on preliminary data from the preferential looking time paradigm, aye-ayes have longer fixations on facial features belonging to familiar conspecifics (0.64 + 1.07 milliseconds) compared to unfamiliar conspecifics (0.27 + 0.88 milliseconds). The Thatcher Illusion paradigm yielded evidence of an increased average duration of whole fixations on Thatcherized images to that of normal (56.029 to 10.014 milliseconds) or inverted images (56.029 to 21.013 milliseconds); suggesting that aye-ayes utilize holistic processing for image recognition akin to haplorrhine primates. The results of this study provide insight into the significance of visual features to nocturnal primates during conspecific recognition.

Investigating the U.S. primate pet trade and legislature

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The recent proposal of H.R.3135/S.1588--Captive Primate Safety Act-- to Congress, brought to attention how little we know about the primate pet trade within the United States. The act, if passed in whole, would ban private ownership of pet primates, and ban intrastate trade of primates. Some recent works have quantified the number of primates available for sale, but we still lack information on the dynamic relationship between state legislation and the primate pet trade. Our initial hypothesis holds that states with tighter regulation on the sale and ownership of primates will be associated with fewer listings in our sample data set. To test our hypothesis, we created a dataset comprised of primates for sale within the United States between June 2020 and September 2022. We looked at the website Exoticanimalsforsale.net and extracted information on price, location, quantity available, the description associated with the listing. In addition, we collected information on state's law pertaining to keeping primates as pets. We found that the state with the most listed primates for sale was Florida, followed by Tennessee and Texas making up 68% of all listings. These states also have considerably less restrictive primate sale and ownership laws. The most popular primate type was a marmoset followed by various lemurs and capuchin. Within our sample of listings, only sixteen states were associated with all listed primates. Within this dataset, we found support for our hypothesis. More restrictive legislation reduces the incidence of primate ownership and advertised sales, including on the interstate level.

Exploring the evolution of vocal range in non-human primates

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(1) University at Buffalo

Primate vocalizations vary from low frequency chirps in mouse lemurs to duetting songs in gibbon pairs. These sonic vocalizations are a way for primates to communicate information to conspecifics, such as territorial range, mating solicitation, and predator alarm calls. All primates have sonic vocalizations which are within the hearing range of humans (<0.020 kHz), but some can vocalize in the ultrasonic range which is too high for the human ear to perceive (>20 kHz). There is ongoing discourse among primate communication researchers as to how and why vocal range is so diverse in non-human primates. Body size and acoustic variation has been linked to the acoustic allometry principle which states that there is a negative relationship between body size and acoustic range. Here we sought to estimate the vocal range of the primate most recent common ancestor (MRCA) through the creation of a dataset which included vocal range and body size for 72 extant primates. The results place the primate MRCA vocal range closest to the families Lemuridae, and Cercopithecidae with a vocal range of 10.82 kHz

to 41.65 kHz (mean: 26.53 kHz). We can infer from the vocal range that the primate MRCA could have been a medium to small-sized primate. Our data did support the acoustic allometry principle, but suggested that the MRCA had a vocal range typically seen in diurnal primates. This contributes to ongoing debates as to the diel pattern for the primate MRCA.

Understanding the ecology of wild slow lorises (*Nycticebus bengalensis*) in Thailand: Toward improving translocation success

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(1) Oxford Brookes University

Little is known about the lives of the two Endangered species of slow lorises from Thailand (Nycticebus bengalensis & N. coucang). Gaps in our understanding of their habitat use need to be filled before conservation interventions can be successfully implemented. Slow lorises are threatened in part by the illegal wildlife trade and individuals confiscated from the trade or captured in urban areas are often sent to rescue centers or released directly back into forests for which they are likely not adapted. These releases are often uninformed by research and display limited success. To improve translocation efforts within Thailand and to explore the ability of lorises to live within human-dominated landscapes, I focused on defining the baseline behavioral repertoire of slow lorises in the area of Khao Lak, Phang Nga Province, Thailand. I was additionally interested in the potential of private land ownership in the conservation of these Endangered primates. Thus, I conducted the bulk of my research at the Khao Lak Merlin (KLM) Resort, an eco-resort with a population of lorises (N. bengalensis) that lived in the highly human-modified old growth jungle habitat of the hotel. Through 1,393 events, spread between four slow lorises at KLM, I set a baseline for loris behavior in Thailand. In addition, I describe a novel feeding behavior on Areca catechu. My findings are not only informative for understanding the dietary and habitat requirements of N. bengalensis, but additionally suggest that KLM provides viable habitat for lorises and that they can persist in human-altered habitats.

Ecological Factors Underlying Group Fission in Blue Monkeys (*Cercopithecus mitis stuhlmann*i)

Wakeford R. (1); Cords, M. (1)
(1) Department of Ecology, Evolution, and Environmental Biology, Columbia University

Abstract: Although group-living may reduce predation risk and increase opportunities for beneficial social ties, it may also increase competition for resources and mates. One way to investigate these trade-offs is to examine group fission. We report five fission events in wild blue monkeys, focusing on underlying ecological mechanisms. Specifically, we examined seasonal patterning of fissions, and changes in adult female activity budgets and reproductive status in the months surrounding each event. Using data from focal samples of all adult females in each group, we compared time spent feeding and traveling across four 60-day periods: a year before fission started (baseline), 2-months before fission started, 2-months after fission was complete, and a year after fission was complete. Fission events clustered significantly in July through September. Female activity budgets differed in the period immediately before fission compared to all other periods, with less time feeding and feeding on fruits (a preferred food), and a lower ratio of feeding to moving time. These metrics then recovered to baseline values a year post-fission. These shifts were not related to changes in fruit availability and may reflect within-group feeding competition. Additionally, females were less likely to be pregnant in the period just before fission than in other periods. A year post-split, females were more likely to be lactating than in periods before split. Both reproductive status and feeding and moving time influence energetic demands of adult females, and so these changes before and after fission suggest that energetic constraints and competition drive group fission.

Socio-Sexual Behavior Frequency in the Presence of a Simulated Floater in Wild-Living Azara's Owl Monkeys (*Aotus azarae*) in the Humid Chaco, Argentina

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(1) Yale University; (2) Duke University; (3) Owl Monkey Project

The presence of solitary floater individuals among owl monkeys in Formosa, Argentina is newly discovered and poorly understood, but has immense importance towards understanding the evolution of social and mating systems. We examined the effect on three groups of the simulated presence of a floater within 500 meters of their territory. We conducted playback trials three consecutive days per week for three weeks. All groups were simultaneously presented with one trial each per week of graff hoots, tonal hoots, and control bird calls. The experiment was divided into a forty-minute pre-playback period, a ten-minute peri-playback period, and a sixty-minute post-playback period. The groups were located with telemetry. Observers recorded frequency of known socio-sexual behaviors, as well as the actor's identity and group range, while also searching for and following detected floaters. For analysis, given the limitations of the study, we emphasized exploratory data analysis over statistical

inferential modelling. Our data demonstrate an increase in socio-sexual behaviors in the simulated presence of a floater, compared to the control (0/3 control; 5/6 stimulus). Floaters were most often sighted during playback of graff hoots (4/5). Given that the nature of the program was focused on learning how to conduct scientific research, we emphasized developing a rigorous study design. Our data provides additional evidence to support the hypothesis that the presence of floaters influences an increase in socio-sexual behavior in established groups. Understanding the challenges both exerted and experienced by floaters will deepen our understanding of the evolution of social monogamy in owl monkeys.

Social factors predicting age at first reproduction in wild blue monkey females.

Sciaky, L. (1); Cords, M. (1).
(1) Columbia University

Age at first reproduction influences reproductive lifespan and thus can contribute importantly to lifetime reproductive success. In female primates, social factors such as birth order, sibling and parental presence, group size and the presence of novel males have been reported to influence age at first reproduction. We examined how social factors predicted age at first conception (AFC) in 128 wild blue monkey (Cercopithecus mitis stuhlmanni) females in the Kakamega Forest, Kenya, inferring conceptions from subsequent births. Blue monkeys live in modally one-male groups that non-resident males join temporarily, mainly during the breeding season, exposing females to novel males. Females that experienced enhanced presence of novel males (total attendance of non-resident males) in the 30 days before first conception and those that had more older sisters in the group at first conception conceived at an older age. Females whose mothers were older at the time of their own birth and whose mothers were present in the group had their first conception at a younger age. A female's dominance rank and being a first-born were not associated with AFC. The slowdown in maturation associated with novel males in blue monkeys contrasts with effects of male-takeover in one-male groups of geladas, which causes females to mature earlier. Novel males may influence maturing females differently across species, or this difference may reflect alternative ways of assessing maturation, possibly in combination with pregnancy termination when novel males are present. Our results also support previous findings that rank does not affect fitness in blue monkeys.

Does the absence of a silverback increase aggression frequency amongst female gorillas?

Scinta, J. (1); Broikos, K. (1); Botticelli, J. (1); Margulis, S. (1).
(1) Canisius College

The silverback, being the primary source of intervention for both internal and external threats to the health and cohesion of the troop, is predicted to have a significant effect on the social behaviors of the other members by his mere presence. We have conducted observational research on the gorillas at the Buffalo Zoo. During a period of time in which the silverback was separated from the troop, we examined the frequency of aggressive behavior amongst the adult females in the group. We predict that the frequency of aggressive behavior will increase as a result of the silverback's absence. We compared behavior during periods ranging from 3 weeks to 3 months when the silverback was absent to comparable periods when he was present. We found that female-female aggression was higher when the silverback was absent ($X^2=5.33$, $df=1$, $P<0.05$). The frequency of aggression declined over time while the silverback was absent, with aggression returning to baseline levels within a month. Our observations suggest that, although the male intervened in aggressive episodes rarely, his presence in the group was a stabilizing factor. The absence of this stabilization led to higher levels of aggression.

Differences in Fecal Particle Size Across Age-Sex Classes in Wild Bornean Orangutans

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(1) Boston University; (2) Universitas Nasional; (3) University of Zurich

Wild Bornean orangutans (Pongo pygmaeus wurmbii), experience extended periods of low food ability and accordingly have one of the slowest metabolisms and growth rates of any mammal. When fruit is scarce orangutans rely on bark, leaves, and pith to sustain themselves. We investigated the oral and digestive processing orangutans use to extract nutrients from these foods through the measurement of fecal particle size (FPS). Fecal samples were collected from wild orangutans in Gunung Palung National Park, processed at Boston University and analyzed (N=123) for FPS at University of Zurich's Animal Hospital. We predicted that mean particle size (MPS) would be inversely related to body size, with juveniles having the largest and flanged males having the smallest MPS due to their larger jaws and greater chewing abilities. Each fecal sample was weighed and dissociated into individual particles. Samples were washed through a series of eleven sieves with increasingly smaller pores to separate samples based on particle size. Particles from each sieve were dried and weighed and

dry matter determined. Our analysis found MPS values of 2.05 mm, 2.33 mm, 1.63 mm, and 1.99 mm for juveniles, adult females, unflanged males, and flanged males respectively. These results partially supported our hypothesis as adult males (both flanged and unflanged) had the smallest FPS. However, the largest MPS was found in adult females, not in juveniles. This may be because juveniles are avoiding foods that are hard to process. Future analysis will compare these results to diet intake across periods of varying food availability.

Seed-Dispersal Potential of Wild-living Aotus azarae in the Humid Chaco Region of Argentina

Williams, K.L. (1); Juarez, C.P. (2); Barrios G.J. (2); Jojot, J. (2); Velazco, P.J. (2); Jaime, S. (2); Haas, S. (3); Corley, M (4); Fernandez-Duque, E. (4); De La Chica, A.G. (5).
(1) NSF-IRES Owl Monkey Project, Yale College, USA; (2) Centro de Ecología y Biodiversidad del Chaco Argentino (CEBICO)- Facultad de Recursos Naturales- Universidad Nacional de Formosa, Argentina; (3) Duke University, USA,; (4) Department of Anthropology and School of the Environment, Yale University, USA; (5) Universidad de Buenos Aires, Argentina.

Owl monkeys (Aotus azarae) pass seeds through their digestive tracts when consuming fruits. The successful passage of the seeds may influence their capacity to germinate; they may be damaged by defecation or have enhanced viability. One potential implication of this is owl monkeys may act as seed dispersers, and aid in forest regeneration. We followed four groups of radio-collared owl monkeys during June-July 2022 to evaluate their potential as seed dispersers of fruiting tree species during the dry season of the Argentinian Humid Chaco. We collected digested seeds from fecal samples and fruits of trees being fed on by the groups both from the ground and from trees. We processed digested (n=296) and undigested (n=534) seeds and set them to germinate in the laboratory. The number of days (range = 5-60) to germination has been longer than anticipated. Of the 100 samples processed so far, 11 have germinated (10 undigested seeds and 4 digested seeds from various samples). These very preliminary results do not suggest a noticeable positive influence on the rate of germination of digested seeds compared to undigested ones. Our work highlights the need for further research in the impact of digestion by owl monkeys on dry season fruit seeds. This study will generate evidence about germination rate that demonstrates how owl monkeys may drive succession in different tree species. Funding for the study was provided by an NSF-IRES (International Research Experience for Students) award to E. Fernandez-Duque.

Local Food Option

Vegan/Vegetarian

^Gluten free option

Amherst, NY (~5 mins)

Breakfast

*^Tim Horton's - 1950 Sweet Home Rd, Amherst, NY 14228
*^Break'n Eggs - 1280 Sweet Home Rd #104, Buffalo, NY 14228
*Bob Evans - 1925 Niagara Falls Blvd, Amherst, NY 14228

Lunch/ Dinner

*Taisho Bistro Japanese Izakaya Buffalo - 3332 Sheridan Dr, Buffalo, NY 14226
*^Blaze Pizza - 1595 Niagara Falls Blvd Suite 900, Amherst, NY 14226
*Naan-Tastic - 1595 Niagara Falls Blvd Suite 700, Amherst, NY 14226
Anchor Bar - 4300 Maple Rd, Amherst, NY 14226
*Brick Tavern - 4120 Maple Rd, Amherst, NY 14226

Williamsville, NY (~10 mins)

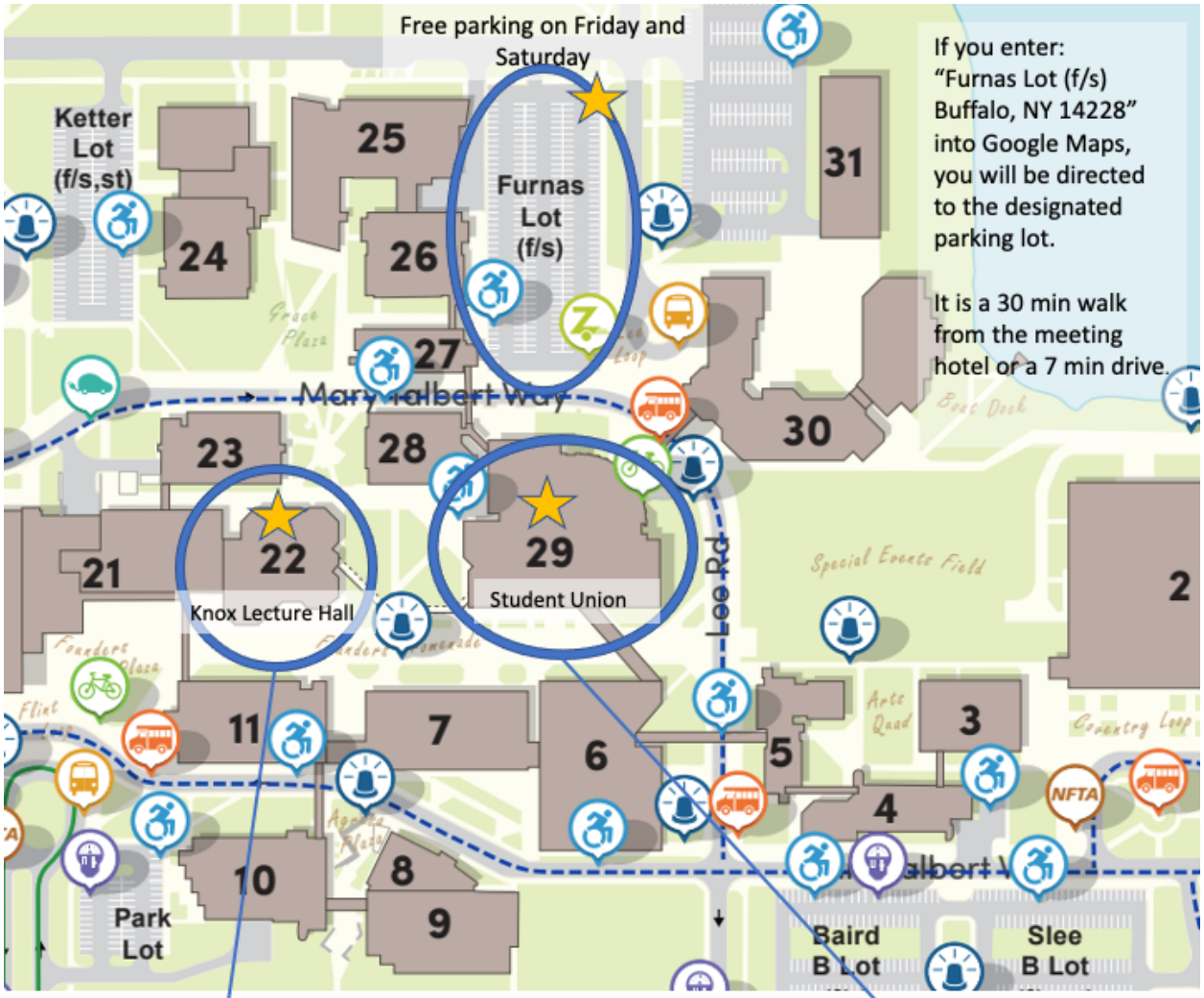
Lunch/Dinner

Eagle House Restaurant - 5578 Main St, Williamsville, NY 14221
The Irishman Pub and Eatery - 5601 Main St, Williamsville, NY 14221
*^Creekview Restaurant - 5629 Main St, Williamsville, NY 14221
*^The Village Grille - 5650 Main St, Williamsville, NY 14221

Elmwood, NY (20 mins)

Lunch/ Dinner

*^ The Place - 229 Lexington Ave, Buffalo, NY 14222
*^ Trattoria Aroma - 307 Bryant St, Buffalo, NY 14222
*^ Daniela - 387 Forest Ave, Buffalo, NY 14213
*^ Thin Man Brewery - 492 Elmwood Ave, Buffalo, NY 14222



Zoomed in view of meeting locations

Knox Lecture Hall rm 109

Friday:

- Registration (upstairs entrance to rm 109)
- Keynote lecture 5:30 pm

Saturday:

- Podium presentations

Student Union

Saturday:

- Lunch
- Poster presentations