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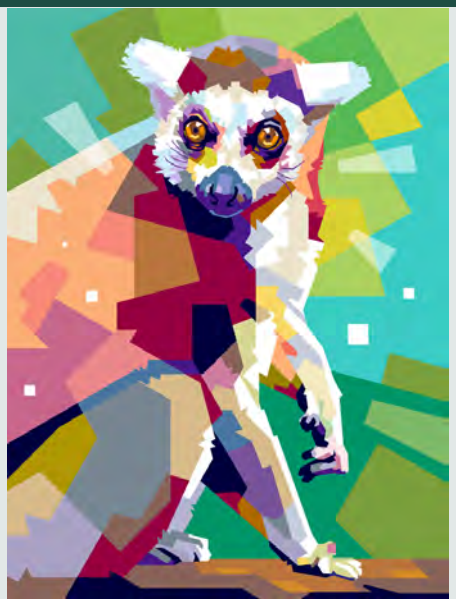


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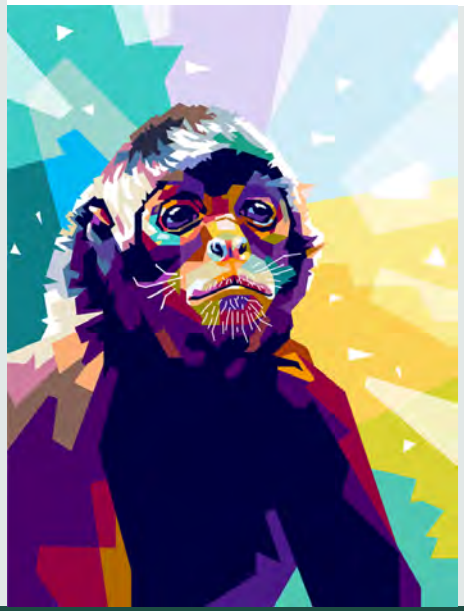
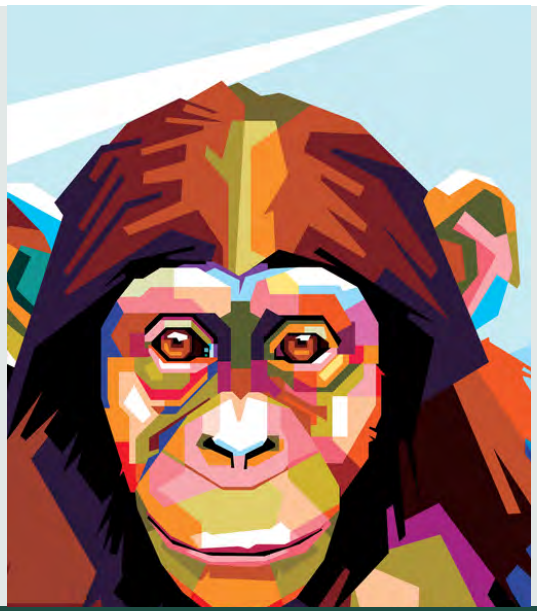


AUGUST 19-25, 2018 | UN NAIROBI

Event # 920

THE ECOLOGY OF CHIMPANZEE TECHNOLOGY: NEW APPROACHES FOR MODELLING EARLY HOMININ RANGING PATTERNS AND RESOURCE EXPLOITATION

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Since the discovery of the first Oldowan tools, understanding how our earliest ancestors produced tool assemblages has been key in discerning the evolution of our behaviour. Nevertheless, some of the most fundamental questions remain unanswered: How did early hominins exploit the landscape? How were locations for tool-use selected? Studying tool-use in our closest living relatives, the chimpanzees (*Pan troglodytes* sp.), particularly their nut-cracking behaviour, offers a unique opportunity to tackle these questions, as it leaves an archaeological footprint akin to the earliest records. However, the lack of a standardized method of archaeological data collection across the primate order, has hindered direct comparative studies. Our study is the first to combine GIS and speleological survey tools: the EOS Arrow Gold GPS/GNSS receiver (HRMS <10 cm), paired with the Disto X2 – a hand-held laser with integrated compass and clinometer. The combined system delivers fast and precise spatial georeferenced spatial surveys, providing an alternative to less reliable traditional methods, and heavy survey equipment, e.g. Total Station. Application of this method in the chimpanzee field site of Bossou (Guinea), where nut-cracking is habitual, has revealed that there is significant variation in artefact density at the 25 documented tool assemblages (n=209, $p<0.01$). Studying the socio-ecological factors driving this variation will provide valuable insight into the resource exploitation strategies and mechanisms of site selection and re-use in the early hominin record.

Event # 812

MAPPING PRIMATE ARCHAEOLOGY: NEW TOOLS FOR STANDARDIZING SPATIAL DATA COLLECTION ACROSS THE PRIMATE ORDER

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The study of non-human primate tool use, particularly that of chimpanzees (*Pan troglodytes* sp.) has provided a comparative framework for the study of human evolution and the contexts surrounding the emergence and development of technology in our lineage. As our closest living relatives, chimpanzees, like early hominins, use stone tools for percussive activities which leave traceable archaeological footprints akin to the earliest records. Nevertheless, the lack of a standardized method of data collection for extinct and extant primate archaeological tool-sites, has hindered direct comparative studies. We present a new method that combines GIS and speleological survey tools that guarantee accuracy and portability: the EOS Arrow Gold – providing an absolute accuracy of <10 cm – paired with a Disto X2 – a hand-held laser with integrated compass and clinometer. The combined system delivers fast and precise georeferenced spatial surveys, which should be used as an alternative to less reliable traditional methods, and to heavy, non-portable, survey equipment, such as the Total Station.

Event # 93

THREATS TO CHIMPANZEE SURVIVAL IN THE UNPROTECTED AREA OF TOMBORONKOTO COMMUNE (KEDOUGOU, SENEGAL)

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The West African chimpanzee (*Pan troglodytes verus*) is found in eastern Senegal, which is the northern limit of the species' range. We studied these savanna chimpanzees in the municipality of Tonboronkoto (UTM Zone 28N, 794000 E, 1416733 N), an unprotected area where there is concern about the misuse of natural resources. We used a mixed-methods approach to identify threats to chimpanzee habitat. Informants described the local activities that degraded chimpanzee habitats, and we surveyed a 750 km² area using the recce method to identify these factors as well. We identified 816 threat indices within a total of 431 km of recce walk distance. Transhumance activities were most frequently encountered [62.45%], followed by deforestation for cultivation [15.9%], and the exploitation of non-timber forest products [10.40%], including Saba senegalensis fruit, Oxytenanthera abyssinica culms, Adansonia digitata fruit, and Apis mellifera honey. Small-scale artisanal gold mining activities comprised [3.11%] of our sample. The remaining threat indices included poaching [2.78%], plastic waste [3.60%], and timber extraction [1.63%]. These figures indicate that foodway activites have the largest footprint in Tomboronkoto. However, the indirect effects of gold mining, such as the increasing demand for timber and non-timber forest products, also pose a threat to chimpanzee habitats. For this reason, we believe that the authorities in charge must deeply reflect on this issue and adjust their natural resource management plans.

Event # 718

DO WILD CHIMPANZEES SAY "GOODBYE"? A STUDY ON LEAVE-TAKING IN *PAN TROGLODYTES* OF THE BOSSOU OUTDOOR LABORATORY

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Humans in modern societies often greet when coming together and take leave of one another when parting; albeit with contextual variation. Though the evolutionary origins of greeting were occasionally addressed in non-humans - most notably in the chimpanzee - studies of leave-taking are entirely absent when looking beyond humans. We report the first study on non-human leave-taking, focusing on wild chimpanzees (*Pan troglodytes verus*), in Bossou, Guinea. Patterns of behaviour leading to inter-individual parting were defined and 30 hours of video footage were subsequently coded manually. Behaviours preceding 70 parting events, in 11 adults and juveniles, were recorded during a 6-minute window prior to parting. An increased frequency of behaviours associated with taking leave was predicted, hence the 6-minute period was analysed in two-minute intervals (0-2, 2-4 and 4-6). Using Cochran-Armitage tests, results indicate an increase in self-scratching [$n=70$, $p<0.001$] and fixed gaze in the direction of parting [$n=70$, $p<0.001$] towards the parting event. Leave-taking is unlikely unique to *Homo sapiens*, and differences between human and chimpanzee leave-taking seem one of degree, not kind. It may function in both as a mechanism to facilitate and mitigate the costs of fission-fusion. Current work focusing on investigating contextual and cultural variation in leave-taking across species will further contribute to the nature-nurture debate on the role of biology and culture in human communication.

Event # 711

THE UNKNOWN PRIMATES OF THE UREMA RIFT: WHY ARE GORONGOSA BABOONS UNIQUELY GOOD MODELS FOR BEHAVIOURAL EVOLUTION?

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The ecosystem of Gorongosa National Park, in central Mozambique, harbours a multitude of different habitats, and their mosaics are home to over 200 troops of baboons (*Papio* spp.). By virtue of inhabiting areas with different resource distributions, vegetation types and predation levels, these troops allow us to seek ecological correlates of behavioural adaptations and flexibility on a large scale. Here, we introduce ongoing behavioural work on Gorongosa's baboons, focusing on habituation efforts in the context of which we tested the hypothesis that baboons' perception of threats from heterospecific agents varies as a function of how far these agents are from their natural ranging area as well as of habitat openness affecting perceived safety. We used instantaneous scan samples, conducted at 15-minute intervals and lasting 1 minute, during daily follows of two focal troops and yielding a total of 438 scans, to record (a) alarm calls, (b) direct gazing directed at human observers, and (c) degree of arboreality. Generalised Linear, Additive and Mixed models showed that these behaviours varied as a function of (a) the observers' distance from 'human territory' such as roads and (b) the percentage of tree cover categorised from satellite imagery in an automated fashion via machine learning techniques. We conclude by highlighting the potential of Gorongosa's baboons for testing key hypotheses in hominin evolution.

Event # 370

PREVALENCE OF GASTROINTESTINAL PARASITES OF GOLDEN LANGUR (*TRACHYPITHECUS GEEI*) IN FRAGMENTED LANDSCAPE OF WESTERN ASSAM, INDIA

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Habitat alteration and fragmentation is known to influence infection risk and disease emergence in wild primates. Here we reported the prevalence of gastrointestinal parasites of golden langur (*Trachypithecus geei*) in fragmented landscape. We collected 205 fecal samples from 7 natural forest fragments of Western Assam, India and examined gastrointestinal parasites using fecal flotation and sedimentation techniques. 87 (42.43%) samples were found to be positive for either protozoan or helminthes or both parasites and a total of 10 gastrointestinal parasite taxa were recovered. 63% were infected by a single species of either protozoan (4.2%) or helminths (95.8%) parasites and 36.8% were positive with mixed infection. A greater number of parasite taxa with greater prevalence rate were recorded in disturbed forest fragments than undisturbed forest fragments. We found *Ascaris* sp. to be the most prevalent parasite taxa followed by *Trichuris* sp. and *Coccidia* sp. Fragment size, proximity to human settlements and other habitat variables have significant relationship with parasitism in golden langur, which might be attributed to their dwindling population size in a disturbed landscapes.

Event # 713

NEW MIO-PLIOCENE FOSSIL SITES FROM GORONGOSA NATIONAL PARK AND THE BIOGEOGRAPHY OF HOMININ ORIGINS

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The latest Miocene and earliest Pliocene was a time of profound climatic, environmental, and evolutionary changes in Africa. The hominin lineage first appeared during this time, but the biogeography of hominin origins remains poorly understood because of a sparse Mio-Pliocene fossil record. The Paleo-Primate Project Gorongosa set out to survey and document new Mio-Pliocene paleontological sites at the southernmost end of the East African Rift System, in the Urema Rift of Gorongosa National Park, Mozambique. After two field seasons (2016-2017), this project has discovered nine new paleontological localities with 157 fossil vertebrates, including a possible hominoid primate. Geological, sedimentological, paleobotanical, and paleontological evidence indicates that the Gorongosa sites derive from an estuarine setting that included brackish marine conditions, but also terrestrial settings with mesic woodlands and brachyodont browsing mammals. On-going analyses of the fauna will produce stable isotope signatures from the fossil teeth, and micro-CT scans will help refine taxonomic assessments of fragmentary fossils. The new Gorongosa fossil record documents the first estuarine setting and coastal forests in the East African Rift System, and provides evidence that hominoids may have present in these Mio-Pliocene contexts. This evidence allows us to test key hypothesis of hominin origins such as the idea that hominins first emerged in the coastal forests of eastern Africa.

Event # 584

A THIRD-PARTY PERSPECTIVE ON INEQUITY AVERSION IN CAPTIVE CALLITRICHIDS: DO MONKEYS CHOOSE TO DISTRIBUTE RESOURCES EQUITABLY?

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Inequity aversion and fairness in primates have been widely assessed with token-exchange paradigms in which a subject interacts with a human experimenter. However, in these studies subjects can only choose whether to accept a food item or not, rather than having the possibility to decide how rewards are distributed. The inequitable decision is made by the human experimenter. Our goal was to develop a new experimental paradigm addressing these issues, and use it with common marmosets (*Callithrix jacchus*, n=15). The subjects were tested in trios, with a donor individual in a middle compartment and two potential recipients in adjacent compartments to the left and the right of the donor. The two recipients were the youngest couple of twins in their family group (age 1 to 2 years). The donor could choose to provide food with a 1/1 or a 2/0 distribution, by the means of a tray pulling apparatus. We hypothesized that donors would be more prone to share the resources equitably (1/1 distribution), in particular in groups characterised by tight social networks of strong bonds.

Event # 635

EVALUATING THE EFFECTS OF HABITAT LOSS AND FRAGMENTATION ON PRIMATE POPULATIONS: THE IMPORTANCE OF LANDSCAPE-SCALE VARIABLES

X. Carretero-Pinzon[1,2] and L. Marsh[3]
[1]Zocay Project, Bogota, Colombia, [2]Chubu University, Japan, [3]Global Conservation Institute

Habitat loss and fragmentation are main drivers of primate biodiversity and biomass reduction. On the ground management is difficult and uncoordinated throughout much of the region where primates encounter fragmented landscapes. Changes in the scale at which conservation actions are needed to be implemented worldwide are of great concern and are rarely addressed. Variables that measure the structure and composition of landscapes have been poorly used in primate studies. Topics discussed in this symposium include variables at all scales (site, patch, and landscape) affecting primate populations in Latin America, Africa and Asia. We will discuss the importance of landscape variables and the relationship between spatial modelling and landscape ecology concepts to address large-scale processes and their impact on prioritizing conservation areas for primate species. Conservation actions focused on increasing/maintaining the amount of forest, its connectivity, and quality are of great importance for primate species occurrence and abundance in fragmented landscapes. As a result of this symposium, the first ever "Guidelines for the Conservation of Primates in Fragmented Landscapes" document will be created for IUCN.

Event # 709

INTEGRATIVE APPROACHES TO BEHAVIOURAL EVOLUTION: CASE STUDIES FROM GORONGOSA NATIONAL PARK, MOZAMBIQUE

S. Carvalho and D. Biro
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The Paleo-Primate Project Gorongosa (PPPG) is a new, interdisciplinary long-term project focusing on primate behaviour and hominin evolution at Gorongosa National Park, Mozambique. This project develops new approaches to integrate data from primate behaviour with the emerging Mio-Pliocene fossil record at Gorongosa. We aim to find new fossil sites, and to use the behavioural repertoire of extant primates ranging in complex mosaic environments as models to understand key behavioural innovations, thus integrating palaeontological evidence with modern primatology. The symposium's organisers, Susana Carvalho and Dora Biro (Oxford University) bring together presenters from primatology, palaeoanthropology, machine learning approaches, and genetics, to report on the project's recent advances, demonstrating that a) Gorongosa is a fossiliferous area, bearing open air and cave sites, b) the extant primates of Gorongosa are unique behavioural models, due to their quasi-experimental ecological conditions, c) Gorongosa's ecosystem is an unparalleled analogue for the environments where hominins evolved, and d) our emerging fossil record allows us to test, for the first time, key paleobiogeographic hypotheses of hominoid evolution. The project aims to integrate these lines of research into a single overarching framework: to understand the evolutionary history of the Gorongosa region with emphasis on its primate fauna, past and present, and to thus place it within the wider contexts of primate biogeography and evolution in Africa. Richard Wrangham (Harvard University) will participate as a discussant.

Event # 710

THE PALEO-PRIMATE PROJECT GORONGOSA: A HOLISTIC APPROACH TO STUDY HUMAN BEHAVIOURAL EVOLUTION

S. Carvalho[1,2,3,4] and G. Paleo-Primate Project[2]
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A major puzzle in human evolution is the question of where in Africa our lineage originated, and under what environmental conditions, but answers are hampered by major gaps in the geographic distribution of paleontological sites and by the absence of holistic approaches to the study of human evolution. To help fill these gaps, we initiated a multi-disciplinary long-term project at Gorongosa National Park, Mozambique, which is located at the southern end of the East African Rift System. The main objective is to integrate paleontological evidence with studies of modern behavioural ecology to test key hypotheses in human evolution. We aim to find new fossil sites, and to use the behavioural repertoire of extant primates ranging in complex mosaic environments as models to understand key behavioural innovations in our lineage. Primatologists, palaeontologists, geologists, archaeologists work daily side-by-side, collecting data that converge on a single goal: to integrate palaeontological evidence with studies of extant primates to finally mind the (Rift) gap. Our first results indicate that a) Gorongosa is a fossiliferous area, bearing open air and cave sites, b) The extant primates of Gorongosa are unique behavioural models, due to their quasi-experimental ecological conditions, c) Gorongosa ecosystem is an unparalleled analogue for the environments where hominins evolved, and d) Our emerging fossil record allow us to test, for the first time, key paleobiogeographic hypotheses of hominoid evolution.

Event # 397

CONSTRUCTION AND IMPLEMENTATION OF A PROGRAMMABLE AUTOMATIC FOOD DISPENSER POWERED BY SOLAR ENERGY FOR PRIMATES LIVING IN GROUP

M. Castro-Garcia, M. Aguillon-Pantaleon, R. Arenas-Rosas and A. Santillan-Doherty
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Captive animals usually present overweight due to inadequate feeding practices and lack of exercise. A previous survey of a group of stumptail macaques (*Macaca arctoides*) assessed them as overweight, causing the need to improve their diet and feeding procedures. The group consisted of 9 adult males (weight range: 11-14 ± 0.5 kgs.) and 12 adult females (weight range: 9-12 ± 0.5 kgs.) living in outdoor enclosures. A programmable automatic dispenser was implemented to provide them with balanced food at set times, granting several smaller meals a day, seven days a week. This system has a microcontroller (PIC18F4550) with the necessary resources to operate the motor of the dispenser, internal clock, as well as the ease to be programmed by the user supply needs through a screen and keyboard. The dispenser has a cylindrical container of 30 kilograms, which is divided into 6 compartments attached to the main shaft which is moved by an engine. The power supply is provided by solar panels and a battery bank. This was a pilot test, but after 6 months the average weight of males was reduced to 10-12.5 ± 0.5 kgs., and female´s average weight was 8-10.5 ± 0.5 kgs. Other physical and mood improvements were also observed using the same survey. We intend to implement this device in Mexican rehabilitation centers where primates live in semi-free conditions.

Event # 714

WHY BOTHER SURVEYING? HOW AUTOMATED SEARCH OF FOSSIL SITES IN AFRICA CAN HELP FILL GAPS IN HOMINOID EVOLUTION

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Aerial photography and satellite imagery typically guide fossil surveys aimed to find primates, including hominins, and their associated assemblages. However, this disregards the ever-growing available data and computing power to automate such process. When fossil localities are known for a certain area, machine learning techniques can be applied onto satellite images to detect new localities with similar spatial features. This framework is currently being tested within the context of the East African Rift System, in Gorongosa (Mozambique), a promising but unexplored corridor between East and South African sites containing the majority of the known African hominins. An atmospherically corrected scene of LANDSAT8 data from 28/06/2017 was cropped to a small area in Gorongosa, of 25000m2, containing Mio-Pliocene deposits. A matrix with all spectral bands was then processed through K-means, an unsupervised learning algorithm for clustering. A single cluster (out of 8) matched 7 new fossil localities. This cluster represents only 4.7% of the total area analysed and highlights priority target areas for future exploration. Increasing the sample of available fossil sites is paramount if we aim to reconstruct hominoid evolution. Only by filling the geographic gaps of fossil locations can we ground truth current data on ranging patterns of hominin species, processes of speciation and extinction, and enlarge the virtually non-existent sample of late Miocene African hominoids.

Event # 364

USE OF EMPTY NEST BOXES TO INCREASE RICHNESS OF SLEEPING TREES FOR THE WILD BLACK LION TAMARINS, *LEONTOPITHECUS CHRYSOPYGUS*, IN AN ALTERED FRAGMENT, PONTAL DO PARANAPANEMA, SAO PAULO, BRAZIL

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Trees are an important resource for black lion tamarins (BLTs), which preferentially select tree cavities for sleep. In second-growth forests, the availability of tree cavities is limited. Provision of different nest box models (tunnels, shelves or empty) may increase the richness of sleeping cavities for wild BLTs. We investigated behaviors expressed by a BLT group when encountering nest boxes, hypothesizing exploratory behavior by adults. We selected three locations within the group's home range and installed one nest box in each area. We placed a camera in front of each nest box and monitored use by BLTs for six months, adding a partial total of 480 trap-days. We recorded three exploratory events by BLTs (0.6%) in a single nest box. In the three locations, only one single adult individual manually explored the nest box while the others remained distant. The results indicate that there was some exploratory behavior of an empty nest box. However, the few records and limited time spent in the box may indicate disinterest of BLTs in the empty nest box model, which suggests that it may not provide adequate security to be used as a sleeping cavity. The continuity of the study with different models of nest boxes is important to understand if physical factors of the nest boxes may shed light on the selection of BLT sleeping sites.

Event # 892

DOES PERSONALITY EXPLAIN INTERINDIVIDUAL BEHAVIORAL DIFFERENCES IN WILD CAPUCHIN MONKEYS (*SAPAJUS XANTHOSTERNOS*)?

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Personality can be defined as interindividual differences in behavioral tendencies maintained across time and situations. However, other factors different than personality, like socio-demographic or life history traits, could also promote persistent individual differences in behavior. Which of these variables better describe the observed behavior? To answer this question we analyzed 18 behaviors related to personality traits (boldness, activity level, aggressiveness and sociability) registered from a group (N=26) of wild capuchin monkeys (*Sapajus xanthosternos*) during one year. We conducted a PCA to test whether behaviors cluster according to personality traits. Secondly, we clustered individuals by similarity in behaviors, and conducted an ANOSIM to test whether sex, age, and length of group membership affected clustering. Behaviors did not cluster according to personality traits. However, capuchin monkeys showed behavioral similarities that were well explained by age (global R: 0.522, sig: 0.01) and by length of group membership (global R: 0.608, sig: 0.01) but not by sex (global R: 0.014, sig: 0.38). We repeated the personality behavior PCA with a sample of adult members that were in the group for more than two years, and even then, behaviors did not cluster according to personality traits. These results enhance the importance of socio-demographic and life history traits in shaping interindividual behavioral differences that should be taken into account in animal personality studies.

Event # 716

ON-GOING RESEARCH ON BABOON GENETICS AS A TOOL TO UNDERSTAND PRESENT AND PAST SPECIES ADMIXTURE IN GORONGOSA NATIONAL PARK, MOZAMBIQUE

M. Ferreira da Silva[1,2], C. Capelli[3], P. Tralma[4] and F. I. Martinez [5]
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The genus *Papio* is generally classified into five or six morphotypes/species, but several hybridization areas between morphotypes have been described. Molecular data collected at contact areas can provide insights into the evolutionary history of baboons, speciation processes and determinants of dispersal in primates. Gorongosa National Park (GNP) is located near a predicted boundary area between two baboon morphotypes: *Papio ursinus griseipes* (gray-footed chacma baboon) and *Papio cynocephalus* (yellow baboon). GNP baboons have morphological features common in both chacma and yellow baboons, which suggests ancient and/or recent events of admixture in the region. Nevertheless, only two mtDNA samples from GNP have been collected and analyzed, and the hypothesis of hybridization remains untested. We provide the first comprehensive description of the genetic variation present in the GNP baboon population. As part of our on-going research, we analyzed 185 non-invasive fecal samples collected from social groups within the GNP limits by genotyping 14 to 20 microsatellites loci and sequencing the mitochondrial DNA cytb gene. The analysis of molecular data provided insights into the degree of population structure among GNP baboon troops and suggested a considerable degree of variation within the Park. Further work will refine these observations and better understand the relationship of GNP baboons with yellow and chacma baboons.

Event # 719

BABOON ADAPTATIONS TO VARYING LEVELS OF PREDATION PRESSURE IN GORONGOSA: TESTING KEY HYPOTHESES FOR HOMININ BEHAVIORAL EVOLUTION

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Behavioural ecology provides key insights to our understanding of both modern and pre-historic primate adaptations to predation pressure. There are fundamental questions to be explored around a concurrent drop apparent in the East African carnivore fossil record and behavioural innovations in *Homo* species. Gorongosa National Park, in Mozambique, harbours 200 baboon troops (*Papio ursinu*s) exposed to major fluctuations in numbers of predators since the 1970's civil war, providing an ideal sample to test the effects of predation pressure on behaviour. Our study, the first primatological research in the area, focuses on two troops (n= ca. 140 individuals) ranging in woodland and floodplain habitats. We examine geographical and seasonal variation in their ranging patterns, social, and sleeping behaviours as a function of predator presence. An upcoming leopard release facilitates measurement of both cross-sectional and longitudinal changes in the risk of predation. Data is collected via all day focal follows, and predator presence and ranging behaviours are tracked using camera trap grid data and GPS collaring. Here, we report results of baseline habituation, ranging, and activity data after ten months of daily observational study. We discuss the implications of variation in the behavioural repertoire of the Gorongosa baboons, and how they might shed light on the predator-prey "arms race" that is likely to have influenced key transitions in our own evolutionary history.

Event # 589

WORKSHOP ON MEASUREMENT OF WEATHER VARIABLES IN PRIMATE HABITATS

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Primate field researchers are measuring weather variables in tropical environments around the globe. Many people are measuring temperature, relative humidity, light flux, rainfall, and other variables. These data are important for specifying ecological influences on primate behavior and survival, and perhaps for tracking climate change. However, for maximum utility there is a need for standardization so that measurements from different sites will be compatible, which will enhance the likelihood of contributing to knowledge of the effects of climate change. In this workshop, we will share knowledge and experience to help identify practical and affordable ways to collect weather data within the constraints of our field studies. We hope to converge on approaches that can be widely implemented as standard methodology in our community. Attendees are encouraged to bring descriptions of their measurement approaches and recommendations for ways that we can achieve this goal.

Event # 717

WILD CHACMA BABOON (*PAPIO URSINUS*) NAVIGATION DECISIONS IN A COMPLEX ENVIRONMENT, GORONGOSA NATIONAL PARK, MOZAMBIQUE

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Throughout their radiation, primates have been faced with myriads of challenges when navigating diverse landscapes, both during daily foraging and larger migration events. To maximise their fitness, primates must avoid predation, obtain energy and, in the case of highly social primates such as baboons, remain in a cohesive group day-to-day. This study strives to understand how environmental, demographic, and physiological factors influence movement-based decision making in extant primates. We combine traditional in-situ behavioural observations with remote sensing GPS/accelerometer collars, and landscape data collected via aerial photography to examine baboon (*Papio ursinus*) movement and decision making in the diverse mosaic habitats of Gorongosa National Park, Mozambique. We study two groups (n = ca. 140 individuals) in differing habitats to determine how the risks, costs and benefits of living in a mosaic landscape influence their ranging patterns, daily activity budgets and behavioural repertoire. Here, we report the results of the initial four months of behavioural observation, movement patterns recorded using hand-held GPS devices, and aerial image surveys. We also explain how these data will complement the higher-resolution data to be collected in subsequent months, as well as the upcoming implementation of faecal glucocorticoid data in understanding the larger physiological consequences of the “landscape of fear”. Finally, we propose how our data can be used to create models that predict primate movement in diverse or rapidly changing landscapes.

Event # 696

ADVANCE IN CHINESE PRIMATE BEHAVIORAL ECOLOGY AND CONSERVATION

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In this symposium, we (Prof. Baoguo Li, Northwest University, Prof. Jinhua Li, Anhui Normal University, and Prof. Song-Tao Guo, Northwest University, from China) attempt to summarize study progress on gibbons, leaf monkeys, snub-nosed monkeys and macaques in China and to seek possibilities for collaboration in the future. Primate studies in China have a long history, beginning in 1863. Many foreign and Chinese researchers have published thousands of scientific papers related to Chinese primates during the last two centuries. However, many of them are not widely known because they were published in Chinese. As one of the countries with the richest diversity of nonhuman primates, China has abundant fossil primate species and living species, including more than 23 living species in 6 genera and 3 families. Unfortunately, like other developing countries, most of the nonhuman primates in China are endangered due to a dramatic explosion of the human population and rapid industrialization. To promote awareness of conservation of endangered species and better involve in the International Primate Society, it is needed to exchange and share information among Chinese and international researchers.

Event # 715

PLACING GORONGOSA BABOONS MORPHOLOGICAL DIVERSITY IN THE AFRICAN CONTEXT

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Baboons are distributed across sub-Saharan Africa and in a small part of the Arabian Peninsula. Most authors recognize six baboon morphotypes. However, there is still debate regarding the species status of baboon morphotypes, their evolutionary relationships and the amount of hybridization occurring between morphotypes. Here, we present ongoing research on baboon morphological diversity in Gorongosa National Park (GNP) in central Mozambique. The park hosts more than 200 baboons' troops, previously classified as chacma baboons (*Papio ursinus*). However, GNP baboons exhibit great phenotypic diversity; some of their morphological features are common in yellow baboons (*P. cynocephalus*). We provide a description of the external phenotypic diversity observed in GNP baboons, such as coloration and body size. In addition, we present a landmark-based morphometrics analysis of 43 craniofacial 3D landmarks in 11 specimens from Gorongosa compared to a pan-African sample (n = 352). Results from PCA and UPGMA show a dichotomy between "southern" and "northern" baboons. Southern branch clusters together *P. cynocephalus* south and *P. ursinus* (including *P. ursinus griseipes*). Gorongosa baboons are located within the southern branch. CVA and DFA cross-validations do not differentiate between Gorongosa / *P. cynocephalus* south and Gorongosa / *P. ursinus griseipes*. These results indicate Gorongosa baboons are intermediate between *P. cynocephalus* south and *P. ursinus griseipes*. We discuss the potential of Gorongosa National Park for research related to baboon biogeography.

Event # 98

MOLECULAR SYSTEMATICS AND HISTORICAL BIOGEOGRAPHY OF NIGHT MONKEYS (*AOTUS*, CEBIDAE)

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The genus *Aotus* (owl monkeys) is still one of the most neglected New World monkey genera. The number of species and the historical biogeography of owl monkeys are poorly known. Recently, some studies have questioned the proposed division of the genus in the "red" and "gray-necked" groups. Our work aims to understand the diversity of species, evolutionary relationships and the biogeographical history of Aotus using a multiloci nuclear (10 markers) and mitochondrial (10 markers) approach. We used 45 samples of seven species: *A. giseimembra, A. lemurinus, A. nancymaae, A. vociferans, A. nigriceps, A. infulatus* and *A. azarae boliviensis*. We applied the maximum likelihood, genetic p-distance and Bayesian approaches to estimate the phylogenetic topologies and divergence times. The origin and the biogeographical history of the genus were tested through 'BioGeoBEARS'. The origin of Aotus was 4.11 Ma (HPD 3.27 – 5.13 Ma) in the northwest amazon region, encompassing the Napo, Jau, Imeri and Pantepui Duida endemism centers. Our results did not support the "red" and "gray" necked groups of *Aotus*, with *A. nancymaae* within the "gray-necked" group instead of "red-necked" one. All species used in the current work were recovered and confirmed (bootstrap value > 90), and a new species in the Brazilian Amazon is proposed. The analyzes indicates that the *A. infulatus* and *A. a. boliviensis* are too similar to be considered different species.

Event # 852

BIOACOUSTICS AND THE BIOLOGY OF NOCTURNAL PRIMATES

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This presentation provides an introduction to our symposium, and discusses some of the major issues and challenges to primate bioacoustic studies. All primate species include vocal signals in their communication repertoires, and for many taxa, species identity is encoded into particular call structures, making them readily accessible characters for recognizing species in the field. This is particularly useful when working with cryptic species that do not differ much in morphology, like clades of nocturnal primates. As with morphological characters, though, not all vocalizations convey specific information, and not all aspects of a species' repertoire carry the same systematic significance. The fact that both the emission and reception of vocal signals involve basicranial structures means that fossil skulls are likely to bear traces of their vocal behaviour, so that even transitory signals have the capacity to leave a fossil record. Vocalizations also contain (a) phylogenetic information, allowing us to reconstruct relationships, and (b) environmental information. Calls must be transmitted through a medium to a receiver, and must be adapted so that the meaning does not degrade beyond recognition during the call's transmission. This indicates that the acoustic structure of a specific habitat may be one of the most important features contributing to species survival, and needs the attention of conservation biologists.

Event # 712

DIVERSITY, RELATIVE ABUNDANCE AND DISTRIBUTION OF MAMMALS ACROSS GORONGOSA HABITATS

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Species abundance distributions and changes over time can be monitored through the documentation of osteological remains in modern ecosystems. At Gorongosa National Park in Mozambique we are documenting osteological remains of mammals, including primates as baboons (*Papio cynocephalus*), guenons (*Cercopithecus* sp.), vervets (*Chlorocebus pygerythrus*), to establish patterns of diversity, abundance, and distribution, and to test how these variables change over time. These bone surveys form a base for the interpretation of climate and ecosystem changes. We carried out 23 transects, 40-50m wide and 3-4 km long across five habitats of Gorongosa: 1) Rift Valley Riverine & Floodplain Landscape, 2) Argillaceous and Limestone Landscapes, 3) Rift Valley Colluvial Fan Landscape, 4) Rift Valley Alluvial Fan Landscape, and 5) Midlands Rocky Riparian & Midlands Alluvial Landscape. Samples were photographed and GPS coordinates were taken. Bones representative of each animal species were collected for osteological reference. Most of the samples remained in place for later annual monitoring to determine the timing of bone decomposition and the interpretation of the fossilization process. We collected 93 specimens from 13 wild mammal species, including 4 baboon specimens. Midlands Rocky Riparian & Midlands Alluvial Landscape had lower diversity, and the other four habitats had approximately equal diversity. These surveys provide a basis for the long-term monitoring of species abundance across Gorongosa landscapes, and contribute to conservation efforts.

Event # 50

CHIMPANZEE DEEP FACE RECOGNITION

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The aim was to create the first unified and fully automated pipeline for image-based face detection and identification of chimpanzees (*Pan troglodytes verus*) in the wild, using raw unedited video data from Bossou, Guinea. Over 30 hours of archive video footage were sampled (n= 22 individuals) over 8 years (2000-2008). We divided our approach into two main steps: A) Face tracking: Here we detect faces in a shot and track individuals across frames using a 'detection by tracking' approach involving four key steps, trained on a dataset of chimpanzee faces annotated manually i) frame extraction ii) shot boundary detection iii) face detection (training our own Single Shot Detector) and iv) face tracking (using a Kanade-Lucas-Tomasi-based tracker); B) Facial recognition: faces are identified using a deep Convolutional Neural Network model. Our initial detector model, trained on the sample data-set achieved 75% average precision on a wide range of faces of different scales, comparable to state-of-the-art human face detection models trained on larger datasets. Thus, we predict a complete working model with high precision by April 2018. This novel tool will have numerous applications, including large scale censusing and monitoring of wild chimpanzee populations from camera trap footage, and age invariant recognition of individuals across longitudinal datasets, while establishing the foundations for further automated analyses of wild primate behaviours.

Event # 752

THE RELATIONSHIP BETWEEN FEEDING COMPETITION AND ACTIVITY AND SPATIAL COHESION PATTERNS IN MANTLED HOWLER MONKEYS (*ALOUATTA PALLIATA*) IN A COSTA RICAN FOREST FRAGMENT

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Primates inhabiting forest fragments contend with decreased food availability, thereby increasing feeding competition. Primates might mitigate competition by modifying their activity patterns or spatial cohesion. We investigated this relationship in *Alouatta palliata* at La Suerte Biological Research Station, a fragmented forest in Costa Rica. Resource availability at La Suerte is higher in the interior than the edge of the fragment. Therefore, we hypothesized that *A. palliata* would spend less time traveling and more time feeding and resting in the interior, and would be more spatially cohesive within the interior as higher food availability would allow them to remain closer together compared to the edge. From May-August 2017, we collected 278 hours of activity data using focal point sampling and recorded the number of individuals within 5m of focal subjects. Contrary to predictions, generalized linear mixed models showed that forest zone did not significantly influence activity or spatial cohesion in *A. palliata*, with no significant differences in feeding, resting, or traveling activity budgets between edge and interior (all $p>0.05$). Likewise, there was no difference in the median number of individuals within 5m in edge (1.0) vs. interior (0.9; $p=0.76$). These results suggest that mantled howlers at La Suerte have adjusted to an anthropogenically-modified forest and mitigate feeding competition at the edge in ways other than altering their activity and spatial cohesion patterns.