

# The **10<sup>th</sup>** International Symposium on **P**rimatology and **W**ildlife **S**cience The **10<sup>th</sup>** Anniversary of **W**ildlife **R**esearch **C**enter

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Date

September **22<sup>nd</sup>** (Sat)-**24<sup>th</sup>** (Mon), 2018

※Monday is a national holiday

Venue

Science Seminar House,  
North Campus, Kyoto University



**The 10th International Symposium on Primatology and Wildlife Science  
~ The 10th Anniversary of Wildlife Research Center ~**

	22nd September (Sat)	23rd September (Sun)	24th September (Mon)
9:00-		<b>WRC 10th Anniversary Special Event II</b> [10min] Shiro Koshima (Chair), [20min, Final report]	<b>PWS Faculty meeting</b>
9:30-		Nachiketha Sharma, Kei Matsushima	<b>Poster Award Presenters</b> [10min] x 3 (Chair: Lucie Rigail)
10:00-		<b>Coffee Break [Group Photo]</b>	<b>Field and laboratory studies on primate species II</b> [15min] x 3 (Chair: Yuta Shintaku)
10:30-		<b>Penguins, in full color</b> (Chair: Andrew MacIntosh)	Maciej Trojan, Tomoyuki Tajima, Henry Bernard
11:00-		[30min] Lloyd Davis [20min] x 3	<b>WRC 10th Anniversary Special Event III</b> [10min] Miho Murayama (Chair), [15min] x 4
11:30-		Andrew MacIntosh, Jean-Baptiste Thiebot, Takashi Yamamoto	Fred Bercovitch, Claire Watson, David Hill, Takushi Kishida
12:00-	<b>Registration Open</b>		<b>Closing remarks by Prof. Matsuzawa</b>
12:30-			<b>Lunch seminar (Ministry of the Environment)</b> (Chair: Seiko Fukushima)
13:00-	<b>Opening remarks by Prof. Matsuzawa</b> <b>WRC 10th Anniversary Special Event I</b>	<b>Workshop on Science Communication</b> Wiebke Finkler and Lloyd Spencer Davis	Yuko Tawa Saeko Terada
13:30-	[10min] x 4 Satoshi Hirata (Chair), Yutaro Sato, Kristin Haverkamp, Sota Inoue		
14:00-	<b>Field and laboratory studies on primate species I</b> [20min, Final report] Jie Liu, (Chair: Lira Yu)		<b>Conserv'Session (14:00-17:30)</b> <i>"Last of the Longnecks"</i>
14:30-	[10min] x 4 Raquel Costa, Shohei Shibata, Jie Gao, André Gonçalves		
15:00-	<b>Coffee Break</b> <b>Invited talks by new PWS members</b>		
15:30-	[15min] x 6 (Chair: Yuko Hattori ) Lucie Rigail, Sayuri Takeshita,		
16:00-	Kanthi Widayati, Kaoru Sekiyama,	<b>Coffee Break</b>	
16:30-	Eriko Kawai, Yoshihiro Kawai	<b>Field and laboratory studies on wild mammals</b> (Chair: Takushi Kishida)	
17:00-	[15min] Yumi Yamanashi (Chair), [10min] Momoko Oka, Nelson Broche, Josue Pastrana	[20min, Final report] Aya Yokotsuka, Kazuya Toda [15min] Takashi Hayakawa	
17:30-	<b>Poster session/PWS entrance examinations</b>	<b>Poster session/PWS entrance examinations</b> (voting for Best Oral and Poster presentations will be closed)	
18:00-			
18:30-		<b>Get-together party</b>	

# The 10<sup>th</sup> International Symposium on Primatology and Wildlife Science - The 10<sup>th</sup> Anniversary of Wildlife Research Center -

## PROGRAM

### Day 1 September 22nd (Sat)

Time		(min)	Title	Speaker	Affiliation
12:00-13:00	Registration				
13:00-13:10		(10)	Opening Remarks	Tetsuro Matsuzawa	PWS Program Coordinator
WRC 10th Anniversary Special Event I					Chair: Satoshi Hiratai
13:10   14:00	O-01	(10)	Introduction to the WRC 10th Anniversary Special Event	Satoshi Hirata	Wildlife Research Center, Kyoto University
	O-02	(10)	Attentional and physiological response toward others' injury and pain among chimpanzees	Yutaro Sato (L2)	Wildlife Research Center, Kyoto University
	O-03	(10)	Utilizing The Great Ape Information Network (GAIN) to understand longevity and mortality patterns of chimpanzees in Japan	Kristin Havercamp (L3)	Wildlife Research Center, Kyoto University
	O-04	(10)	Lateral position preference in feral horses	Sota Inoue (L3)	Wildlife Research Center, Kyoto University
Field and laboratory studies on primate species I					Chair: Lira Yu
14:00   15:00	O-05	(20)	Modeling Habitat Suitability for Yunnan Snub-nosed Monkeys ( <i>Rhinopithecus bieti</i> ) in Laojun Mountain	Jie Liu (L5)	Wildlife Research Center, Kyoto University
	O-06	(10)	Assessment of the current impact of mountain gorilla ecotourism in Bwindi National Park, Uganda	Raquel Costa (L4)	Primate Research Institute, Kyoto University
	O-07	(10)	Male-male relationships of chimpanzees in Kalinzu forest: Aggressive behavior and party composition	Shohei Shibata (L2)	Primate Research Institute, Kyoto University
	O-08	(10)	The understanding of body structures in chimpanzees	Jie Gao (L3)	Primate Research Institute, Kyoto University
	O-09	(10)	Death Among Primates: A critical review of non-human primate interactions towards their dead and dying	Andre Goncalves	Primate Research Institute, Kyoto University
15:00-15:15		(15)	<Coffee Break>		
Invited talks by new PWS members					Chair: Yuko Hattori
15:15   16:45	O-10	(15)	Read my lips: when the red gets redder	Lucie Rigaille	Primate Research Institute, Kyoto University
	O-11	(15)	Images speak louder than numbers? Evaluation of liver function by ultrasound and serum biochemistry in owl monkeys	Sayuri Takeshita	Primate Research Institute, Kyoto University
	O-12	(15)	Sensitivity to Bitter Molecule Phenylthiocarbamide (PTC) in Four Species of Sulawesi Macaques	Kanthy Widayati	Department of Biology, Bogor Agricultural University, Indonesia
	O-13	(15)	How to rejuvenate the super-aged society	Kaoru Sekiyama	Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University
	O-14	(15)	Working for International Organizations	Eriko Kawai	Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University
	O-15	(15)	Working for an international organization: communication skill	Yoshihiro Kawai	Graduate School of Management, Kyoto University
Enrichment studies and an invitation to the 14th ICEE					Chair: Yumi Yamanashi
16:45   17:30	O-16	(15)	Filling the gap: an update from the Kyoto City Zoo and an invitation to the ICEE2019	Yumi Yamanashi	Kyoto City Zoo
	O-17	(10)	Verification of the effectiveness of environmental enrichment and the influence by visitors in captive tigers	Momoko Oka (L2)	Wildlife Research Center, Kyoto University
	O-18	(10)	Salivary alpha-amylase enzyme as a non-invasive biomarker of acute stress in Japanese macaques ( <i>Macaca fuscata</i> )	Nelson Broche (L2)	Primate Research Institute, Kyoto University
	O-19	(10)	"Bar hanging" behavior: a look into a potentially culturally propagated behavior and its relation to stress	Josue Pastrana (L4)	Primate Research Institute, Kyoto University
17:30-18:30	Poster session/ PWS exam				

## Day 2 September 23rd (Sun)

Time		(min)	Title	Speaker	Affiliation
			WRC 10th Anniversary Special Event II		Chair: Shiro Koshima
9:00   9:50	O-20	(10)	Studies on ecology and behavior for wildlife conservation	Shiro Koshima	Wildlife Research Center, Kyoto University
	O-21	(20)	Eavesdropping on elephants: How and what do Asian elephants talk with each other?	Nachiketha Sharma (L5)	Wildlife Research Center, Kyoto University
	O-22	(20)	Short-term gut microorganism dynamics induced by gumnivorous feeding for lesser slow loris	Kei Matsushima (L5)	Wildlife Research Center, Kyoto University
9:50-10:00		(10)	<Group Photo>		
			Penguins, in full color		Chair: Andrew MacIntosh
10:00   11:30	O-23	(30)	Marching with Penguins	Lloyd Davis	University of Otago, New Zealand
	O-24	(20)	Just like clockwork? On the significance of periodic penguins	Andrew MacIntosh	Primate Research Institute, Kyoto University
	O-25	(20)	Jelly in the Belly: Why do penguins eat jellyfish?	Jean Baptiste Thiebot	BioScience Group, National Institute of Polar Research, Tokyo
	O-26	(20)	Solving the mystery of female-biased stranding in Magellanic penguins	Takashi Yamamoto	Research and Development Center for Data Assimilation, The Institute of Statistical Mathematics, Tokyo
11:30-13:00		(90)	<Lunch Break>		
13:00   16:00		(180)	<b>Workshop on Science Communication</b> Wiebke Finkler and Llyoyd Spencer Davis		
16:00-16:30		(30)	<Coffee Break>		
			Field and laboratory studies on wild mammals		Chair: Takushi Kishida
16:30   17:30	O-27	(20)	Is a Bonobo Older Brother or just Meat for Bongando Ethnic Group? -Focusing on Local Perceptions towards Bonobos in DR Congo-	Aya Yokotsuka (L5)	Graduate school of Asian and African Area Studies, Kyoto University
	O-28	(20)	Social and Sexual Development up to Natal Dispersal in Female Bonobos	Kazuya Toda (L5)	Primate Research Institute, Kyoto University
	O-29	(15)	Did life in trees drive the adaptive evolution of taste in koala and primates?	Takashi Hayakawa	Japan Monkey Centre / PRI
17:30-18:30	Poster session/ PWS exam				
18:30-	Get-together Party				

### Day 3 September 24th (Mon)

Time		(min)	Title	Speaker	Affiliation
9:00-9:15		(15)	PWS Faculty meeting		
Poster award					Chair: Lucie Rigai
9:15-9:45		(10)	Presentation 1	Award Winner 1	
		(10)	Presentation 2	Award Winner 2	
		(10)	Presentation 3	Award Winner 3	
Field and laboratory studies on primate species II					Chair: Yuta Shintaku
09:45   10:30	O-30	(15)	Chimpanzees' behaviour in the prosocial choice paradigm depends on the position of the token in the feeder	Macjei Trojan	Department of Ethology and Comparative Psychology, Nicolaus Copernicus University, Poland
	O-31	(15)	Male Reproductive Success in Bornean Orangutans ( <i>Pongo pygmaeus</i> )	Tomoyuki Tajima	Graduate School of Science, Kyoto University
	O-32	(15)	Research, Conservation and Management of the Proboscis Monkey Population in Klias Peninsula, Sabah, Malaysia	Henry Bernard	Institute for Tropical Biology and Conservation, University Malaysia Sabah, Malaysia
WRC 10th Anniversary Special Event III					Chair: Miho Murayama
10:30   11:50	O-33	(10)	The way forward of wildlife research	Miho Murayama	Wildlife Research Center, Kyoto University
	O-34	(15)	The Arctic Tundra & the African Savannah: Common Conservation Conundrums Confronting Caribou and Giraffes	Fred Bercovitch	Save The Giraffes, San Antonio, TX, USA
	O-35	(15)	Culture, social learning and death in Japanese monkeys	Claire Watson	Wildlife Research Center, Kyoto University
	O-36	(15)	Bats: How to study animals you cannot see	David Hill	Wildlife Research Center, Kyoto University
	O-37	(15)	Evolution of the loss of olfaction in whales provides new perspectives on conservation of the marine amniotes	Takushi Kishida	Wildlife Research Center, Kyoto University
11:50-12:00		(10)	Closing remarks	Tetsuro Matsuzawa	PWS Program Coordinator

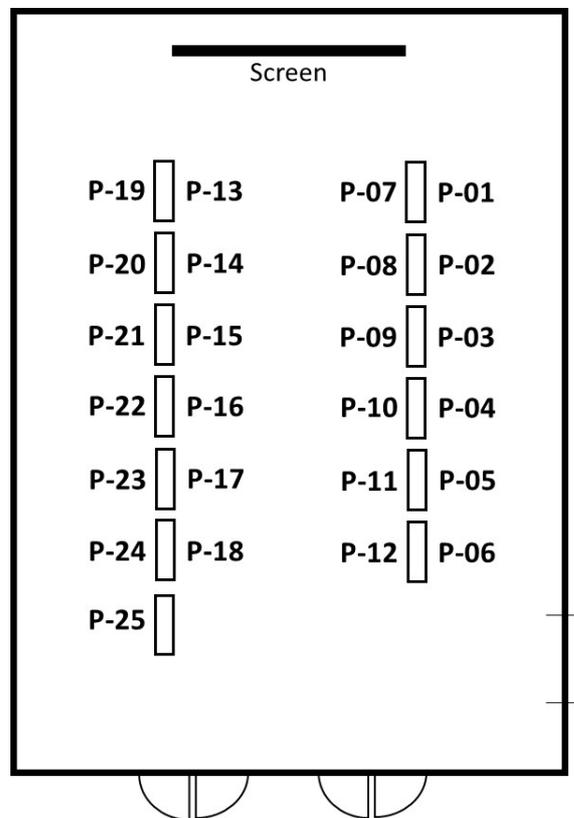
12:30-13:30	Lunch seminar (Report on Ministry of the Environment " Wildlife Conservation")			Chair: Seiko Fukushima	
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14:00   17:30	<h2>Conserv' Session</h2> <p><i>Last of the Longnecks</i></p>				
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## Poster Session

	Title	Presenter
P-01	Effectiveness of species recognition depends on body size in the sailfin tetra: a bridge between mate choice and ontogeny	Elio Borghezan
P-02	Seasonal changes in bats occurrence and activity in the Janówek Fort (Masovian District, Central Poland)	Judyta Gulatowska
P-03	Genetic diversity analysis of the Ryukyu flying fox	Yuto Taki
P-04	Vocalizations of a new population in an avian ring species & research plan for the conservation genetics of the Japanese golden eagle	Annegret Moto Naito
P-05	Do primates yuck? Pathogen and parasite avoidance behaviors in Papionini and Hominini	Cécile Sarabian
P-06	Networks and the role of incomplete data in assessing the impacts of social structure on parasite flow	Zhihong Xu
P-07	Where do female bonobos migrate?: Implication from mitochondrial DNA analysis	Shintaro Ishizuka
P-08	Ordering strategies of three-choice task by free-ranging Japanese macaques	Shenwen Xu
P-09	Food transfer occur between closer individuals?	Makiko Take
P-10	Waiting as Infant Care in Wild Chimpanzees	Hiroko Sakuragi
P-11	Social grooming in rescued chimpanzees: how early social disruption and time of rehabilitation affect sociality?	Evelina Daniela Rodrigues
P-12	Reaction of a group of chimpanzees to the death of the oldest female in the City Zoological Garden of Warsaw	Julia Sikorska
P-13	Spatial representation of age in chimpanzees	Yuri Kawaguchi
P-14	Eye Contact During Gestural Communication in Captive Chimpanzees and Bonobos	Hanling Yeow
P-15	Development of Combinatory Manipulation in Great Apes and Humans: Implication for Action Patterns in Tool Use	Misato Hayashi
P-16	An ongoing research: familiar vs. unfamiliar human face recognition in chimpanzees	Yena Kim
P-17	Chimpanzee's categorical classification of the sound: The voice of chimpanzee vs pure tone	Hiroya Takiyama

P-18	Informing conservation efforts through quantitative assessments of habitat suitability for chimpanzees in the Greater Nimba Landscape, Guinea, Africa	Maegan Fitzgerald
P-19	Characterization of bitter taste sensitivity of four species of Sulawesi Macaques	Xiaochan Yan
P-20	Sedative and Antinociceptive Effects of S(+)-Ketamine and Midazolam or Fentanyl and Droperidol in Black-tufted-ear marmosets	Vanessa Gris
P-21	Inter-group relationships of feral horses ( <i>Equus caballus</i> ) in Serra D'Arga, Portuga	Tamao Maeda
P-22	Investigating the social behaviour and structure differences between single and multi-stallion groups of feral horses	Pandora Francisca Costa Barão Pinto
P-23	Do female feral horses ( <i>Equus caballus</i> ) choose their herd?	Sakiho Ochi
P-24	A study plan about feeding behavior in captive giraffes	Anna Kawakita
P-25	Using dynamic animal social networks to improve the study of infectious disease transmission	Kenneth Keuk



## Introduction to the WRC 10th Anniversary Special Event

Satoshi Hirata<sup>1\*</sup>

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In my talk I will start by giving a brief introduction to this series of special events during the symposium, the WRC 10th Anniversary Special Event, followed by a progress report of my own activities. What are human beings? What are minds that question about human beings? Starting with such questions, I have entered into the academic world to study nonhuman primates from comparative cognitive perspectives. The main target of my research is the chimpanzee, one of the closest living relatives of humans, since my graduate course. I would like to explore the evolution of human mind through the investigation of social intelligence in great apes. As the Director, I have been conducting works at Kumamoto Sanctuary, Wildlife Research Center, Kyoto University, since 2015. Kumamoto Sanctuary houses the largest population of captive chimpanzees in Japan, and the only group of bonobos in Japan. Our work at Kumamoto Sanctuary include experimental cognitive studies with the chimpanzees and bonobos, naturalistic observation of their behavior from ethological perspectives, and monitoring their health and stress from an animal welfare perspective. Integration of research and animal welfare is the important direction of our organization. In addition to the studies with great apes, I have also started a project to study wild horses in Portugal. In our study, use of drones has opened a new window to investigate group behaviors of mammals. Predator-prey relationship between horses and wild wolves is one of interesting research topics. Following my talk, some students of mine will provide progress reports about their own studies with great apes and horses.

## Attentional and physiological response toward others' injury and pain among chimpanzees

Yutaro Sato<sup>1\*</sup>, Fumihiro Kano<sup>2</sup>, Satoshi Hirata<sup>1</sup>

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Nonhuman animals are known to express negative emotions when observing others' negative emotional expressions, a behavior often regarded as an expression of empathy. It is also known that humans experience negative emotions (e.g. disgust or pain) when observing others' injury even without observing negative emotional expressions. This behavior is likely not only based on automatic reflection of others' emotional states but also based on their understandings about the cause of distress. Yet, this has not been examined in nonhuman primates. Chimpanzees (*Pan troglodytes*) are observed to inspect groupmates' injuries and are also known to console those being distressed. In this study, we tested six chimpanzees living in Kumamoto Sanctuary, Kyoto University (one adult male, three adult females, two juvenile females), to examine how they react to others' injury and pain. First, we used eye-tracking to examine if chimpanzees spontaneously attend to injured conspecifics more strongly than non-injured ones. We confirmed that they did so; and also that they did not merely react to conspicuous features of injury (e.g. red color). Then, we used thermal imaging to examine if chimpanzees physiologically respond to others' injury. Previous studies have confirmed that drop in nasal temperature is a signature of arousal, especially that of negative valence. We conducted two experiments presenting to them either the still images of injured conspecifics or movie clips of conspecifics being injected. Chimpanzees did not distinguish images of injured conspecifics (similar to those used in the eye-tracking experiment) from those of uninjured in their thermal signatures. We assumed that the presented stimuli were not realistic or arousing enough for the chimpanzees. We then demonstrated an injury in real-life; a familiar human experimenter used a magic trick showing a damage on the skin and running blood; the control action was washing hands with soaps and water. Chimpanzees, especially adult females, exhibited larger temperature drop in response to the fake injury than to the control stimulus. We then presented a condition that is potentially more demanding to understand; a familiar experimenter stubbed a (fake) thumb with needles without running blood; the control was stubbing a wood piece with needles. Chimpanzees did not distinguish this stimulus from the control as a group. Our conclusion is that chimpanzees do experience negative emotions when observing others' injury without directly observing others' emotional expressions, indicating that they understand the cause of others' distress as well as experiencing an empathy. However, it was also clear that not all chimpanzees showed this tendency; in particular, we found that a male and juveniles did not respond as strongly as adult females did. Such individual differences might reflect modulation of empathy by social and experiential factors, which needs to be examined in future studies.

## **Utilizing The Great Ape Information Network (GAIN) to understand longevity and mortality patterns of chimpanzees in Japan**

Kristin Havercamp<sup>1</sup>

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Nationwide databases containing individual life history details are important for the successful management and monitoring of captive animals, but they are rarely available as open-access. The Great Ape Information Network (GAIN) is a unique example of one such database. Since the arrival of the first chimpanzee estimated to be in 1921, 1,017 chimpanzees have either lived or currently live in Japan and their individual details have been recorded and subsequently collated by GAIN. Using GAIN data and two softwares, PopLink and PMx, I am creating a national chimpanzee studbook and investigating their life history patterns, beginning with the calculation of longevity and mortality rates. Goals of this project are to expand our relatively limited knowledge of captive chimpanzee life expectancy, and more broadly to better understand the life patterns of chimpanzees in Japan and how they compare to findings from other captive studies and the wild. I will also discuss the progress of my upcoming project to monitor captive chimpanzee sleep at Kumamoto Sanctuary.

## Lateral position preference in feral horses

Sota Inoue<sup>1\*</sup>, Monamie Ringhofer<sup>2</sup>, Renata Mendonça<sup>3</sup>, Shinya Yamamoto<sup>2</sup>, Satoshi Hirata<sup>1</sup>

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Lateralization is one of the broadest issue regardless the behavioral types and species. In mother-infant interactions in many mammals, it has been reported that foals show the preference to hold their mother in the left eye view field. However, there are few studies regarding the foals' preference regarding the spatial positioning to nearest neighbor. In addition, the adults' preference has not been reported as well. We made hypothesizes; 1) individuals will show a lateral spatial positioning preference to nearest neighbors, 2) adults have the lateral preference in the cross-resting behavior. Foals showed the preference to hold nearest neighbors in their left eye's view field in the close distance to foals. In the case of adults, it depended the positioning of nearest neighbor. If nearest neighbors were located in the rear area, the standard individual preferred to hold them in the left eye's view field. If they were in the front, preferred to hold them in the right eye's view field. Furthermore, in the population level, adults also showed using the left eyes during cross-resting behavior. The present study showed the laterality regarding positioning of nearest neighbors in feral horses.

## **Modeling Habitat Suitability for Yunnan Snub-nosed Monkeys (*Rhinopithecus bieti*) in Laojun Mountain**

Jie LIU<sup>1\*</sup>, Maegan FITZGERALD<sup>1</sup>, Hahong LIAO<sup>2</sup>, Satoshi HIRATA<sup>1</sup>, Tetsuro MATSUZAWA<sup>3</sup>

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Habitat evaluation procedures are used to quantify the value of land as habitat for a species. In this study, we analyze environmental variables hypothesized to influence habitat suitability for Yunnan Snub nosed monkeys (*Rhinopithecus bieti*) and map the distribution of suitable habitat across the study area and adjacent areas. The study was carried out in three ways for data collection: 1) 72 trap cameras, 2) drone observation and 3) tracking on foot. Spatial analysis combining the GPS data was conducted to investigate home range change of this monkey group. We collected 958 occurrence points from 2010 and 2017 in Laojun mountain. Predictor variables were generated using ArcMap and R software. We prepared 34 environmental variables at 30 m spatial resolution. Maxent software was used to analyze environmental variables contributing to suitability. In general, using satellite remote sensing and GIS, we modeled the distribution of suitable habitat for Yunnan snub-nosed monkeys in the Jinsichang area of the Laojun Mountains of China. The habitat suitability result of synthetic effect of multi-variables. The environmental variables contributing most to habitat suitability, measured by permutation importance, were mean diurnal range, precipitation during the wettest quarter of a year, average annual precipitation, NDVI, wetness and aspect. Habitat suitability model provide important methods and result about potential current species distribution which is essential for the implementation of conservation actions.

## **Assessment of the current impact of mountain gorilla ecotourism in Bwindi National Park, Uganda**

Raquel Costa<sup>1,2\*</sup>, Misato Hayashi<sup>1</sup>, Michael A. Huffman<sup>1</sup>, Gladys Kalema-Zikusoka<sup>3</sup>, Lilly Ajarova<sup>4</sup>, Fred Bercovitch<sup>5,6</sup> and Masaki Tomonaga<sup>1</sup>

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Ecotourism is an emergent and controversial topic in the field of wildlife management. Ecotourism plays a significant role in the conservation of mountain gorillas (*Gorilla beringei beringei*). Despite the growing number of tourists visiting mountain gorillas and an increasing number of habituated groups, very little behavioral data has been collected on the potential impacts of ecotourism on these wild populations. The present study examines how interactions with human tourists influence gorilla behaviour. For this study, we collected behavioural data (focal and scan sampling) before, during and after tourist visits over a 6-month period for (December 2017-August 2018) one habituated group (15 individuals) in Bwindi Impenetrable National Park, Uganda. Kruskal Wallis tests are used to compare pre-contact, contact and post-contact periods. Preliminary analysis shows that “Human directed behaviour” increases 3.5 times during the tourist visit (Kruskal- Wallis=10.029, P=0.027 Bonferroni correction) and is present only when tourist are within 3 meters of the gorillas. Moreover, group social dynamics are affected by close distance to humans - affiliation, agonism and submission behaviours increase within 3 meters from the tourists. Further analysis is necessary, but the present results caution a disturbance in the gorilla’s behaviour related to the visit tourist. The problems are most pronounced when people get too close to the gorillas, in violation of standard rules.

## **Male-male relationships of chimpanzees in Kalinzu forest: Aggressive behavior and party composition**

Shohei Shibata<sup>1\*</sup>, Chie Hashimoto<sup>1</sup>, Takeshi Furuichi<sup>1</sup>

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Chimpanzees and bonobos are known for large differences in male aggression in spite of their highly close phylogenetic relation to each other. While lethal aggressions of male chimpanzees are observed in both intra-group and inter-group relationships, such kind of behavior is not observed in bonobo society. Investigating their aggression could give us important hints to understand human aggression.

Both species have differences in degree of fission-fusion tendencies. While chimpanzees form parties which vary in size and composition, bonobos form a cohesive and stable large party that includes most of the community members. How important is the fission-fusion system for their society and what kind of factors shape the difference in cohesiveness of the party? One possibility is that this difference reflects differences in male aggression. Large parties include many individuals could create social tension conditions that evoke aggressive interaction among individuals, which may be a leading factor in chimpanzees dividing into small parties in order to avoid unnecessary aggressive interactions. In this study, I focus on the relationships between party size, aggressive behavior, and hormonal secretion of male chimpanzees.

From September to October 2017, from February to April and from June to September 2018, I observed male chimpanzees and collected urine and fecal samples in the M group, at Kalinzu Forest Reserve. I conducted focal animal sampling and recorded social and aggressive behaviors of males as well as the party composition in which the focal animal was present. We found that the number of males in a party are larger in the presence of females showing maximum sexual swelling. In both conditions where females showed the absence and presence of maximum sexual swelling, the frequency of male aggressive behaviors increased along with increments of males to the party. In a party which includes a few number of males, aggressive behaviors were rarely observed. These results suggest that male chimpanzees are dispersing to avoid expressing and receiving intense aggression. In the next step of our study, we will conduct hormonal analysis of cortisol and testosterone in order to investigate the focal subject's physiological markers in both conditions of the absence and presence of female showing maximum sexual swelling.

Keywords: chimpanzees, party composition, aggression, stress

## The understanding of body structures in chimpanzees

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The recognition of bodies of conspecifics' and other species' is vital for animals to live. In this study, we investigated the understanding of body structures in chimpanzees, both of chimpanzee bodies, and of bodies of other species. Previous studies have found that chimpanzees show the body inversion effect to intact chimpanzee bodies, but not to other objects, including houses. It suggests that they use configural processing for their own bodies. We used scrambled chimpanzee bodies and other species' bodies with different postures to test whether they use the same way to perceive them as with intact chimpanzee bodies by examining the inversion effect. For their own species, they showed no inversion effect for bodies with abnormal body part arrangement, and showed the inversion effect for bodies with abnormal body part proportion, but the effect was smaller than for intact bodies. It suggests that chimpanzees have the knowledge of their body part arrangement and body proportions. For other species, they showed the inversion effect to bipedal humans (familiar but different postures from chimpanzees) and monkeys (familiar and similar postures as chimpanzees), and to crawling humans (unfamiliar but similar postures) and horses (unfamiliar but similar postures). It suggests that chimpanzees' configural body processing may rely on both visual and embodied expertise.

## **Death Among Primates: A critical review of non-human primate interactions towards their dead and dying**

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For the past two centuries, non-human primates have been reported to inspect, protect, retrieve, carry or drag the dead bodies of their conspecifics and, for nearly the same amount of time, sparse scientific attention has been paid to such behaviours. Given that there exists a considerable gap in the fossil and archaeological record concerning how early hominins might have interacted with their dead, extant primates may provide valuable insight into how and in which contexts thanatological behaviours would have occurred. This review expands and builds upon previous attempts to evaluate the body of knowledge on the subject. First, we outline a comprehensive history of comparative thanatology in non-human primates, from the earliest pre-ethological accounts to the present, bringing to light the interpretations of previous researchers and their contributions to the field of primate thanatology. We also show that many of the typical behavioural patterns towards the dead seen in the past are consistent with the ones observed today. Second, we review the recent evidence of thanatological responses and organise it into distinct terminologies: direct interactions (physical contact with the corpse) and secondary interactions (guarding the corpse, vigils and visitations). We also provide a critical evaluation of the behavioural and emotional aspects of these responses in infants, adults and non-conspecifics, pointing towards its form and function. Third, we provide an integrative perspective of primate thanatology, bringing together different fields of research and their recent advances to clarify how thanatological behaviours would have emerged on the evolutionary, sensory/cognitive, developmental and archaeological spectrum. For that purpose, we not only suggest an evolutionary timeline for thanatological responses typical to primates, but also propose an integrated model of Life-Death Awareness, whereupon neural circuitry dedicated towards detecting life (animate agency, intentional agency, mentalistic agency) works with a matching system that interacts with it on a decision-making level (animate/inanimate distinction, living/dead discrimination, death awareness). Finally, we discuss the importance of detailed reports on primate thanatology and propose different empirical avenues to shed further light on this topic.

## Read my lips: when the red gets redder

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Across human cultures, red is often associated with love and fertility. Men, from different populations, found women wearing or surrounded by red more attractive, and women, subconsciously, are also more likely to wear red ornaments when they are most fertile, i.e., around ovulation. Several studies of non-human primates showed that female skin coloration is influenced by circulating estrogens and thus reflect reproductive status. This suggests that the link between red color and fertility may have roots in human biological heritage and emerged in a shared primate ancestor. The current research project tests the hypothesis that woman lips coloration plays a role into the human sexual communication as a visual modality providing information about the probability of ovulation. I predicted that lips become darker and redder (i.e., stronger signal) during period of high vs. low probability of ovulation. I collected digital photography (woman face) and salivary samples of 14 women (mean =  $25.6 \pm 3.4$  years-old, 1-2 menstrual cycles per participant, 2 participants using hormonal contraceptive -controls) at the Primate Research Institute of Kyoto University between April and July 2018. I collected digital images and saliva samples 3 times across the menstrual cycle, i.e., at Day 5 (follicular phase, low probability of ovulation), Day 14 (high probability of ovulation), and D 23 (luteal phase, probability of ovulation). For each image, I calculated lips luminance (achromatic parameter) and redness (chromatic parameter) under CIE standards. Saliva samples were analyzed for estradiol. I analyzed the relationship between lips coloration (redness and luminance), cycle phase, and estradiol in R by fitting a series of GLMMs. I did not find evidence for a link between lips coloration and salivary estradiol. However, I found that lips redness, but not luminance, significantly varied across cycle phases with lips becoming less red during the luteal phase vs. follicular phase and estimated ovulatory period. Although the sample size of the present study is small, this is the first evidence for a link between woman lips coloration and reproductive status, suggesting that lips coloration may act as a sexual signal. The next step of the study will aim at increasing sample size, resolution (number of data point per menstrual cycle), and men/women perception of lips coloration.

## Images speak louder than numbers? Evaluation of liver function by ultrasound and serum biochemistry in owl monkeys

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Owl monkeys (*Aotus azarai infulatus*) are the only nocturnal anthropoids, and have been recently the focus of field and lab experiments to understand what physiological adaptations are distinguishable from diurnal primates. For this reason, the maintenance of this species in captivity has increased, as well as the need to conduct regular health check-ups to monitor their health. The liver is one of the main organs involved in physiological regulation, due to its functions in biosynthesis, catalysis, detoxification, digestive, and immunologic. Hematological tests combined with analyses of liver enzymes, such as alkaline phosphatase (ALP), alanine (ALT) and aspartate aminotransferase (AST), bilirubin (BIL), and gamma glutamyl-transferase (GGT) are commonly used in biochemistry exams of the serum to screen for hepatic diseases. However, whether these enzymes can accurately detect liver diseases remains unclear. The objective of this study was to use ultrasound to evaluate the liver of captive owl monkeys, and compare with their serum biochemistry exams. The subjects were 69 captive owl monkeys from the National Primate Center (CENP, Brazil) by ultrasound, serum biochemistry and hematological analyses, taking in consideration their age, sex, and health condition, assessed by clinical examination, and parasitological tests. The results showed that 16 individuals had parasites and were excluded from the analyses. Nine individuals had liver disorders and 41 were healthy. The hematological parameters and serum biochemical values were compared between these two groups using Mann-Whitney tests, to determine how those values are affected by the liver appearance, and checked manually with the reference values for the species to verify their ability to detect liver disorders. Among the nine individuals affected, only 2 showed an increase in ALP activity. One of those individuals also showed high count of lymphocytes and monocytes in the hematological exam. Two individuals had elevated count of leukocytes, eosinophils, lymphocytes and monocytes, and 1 individual showed a slight increase in red blood cells count, but no change in other parameters. The statistical tests showed that animals with liver disorders had higher concentration of leukocytes and lymphocytes in comparison with the healthy group, but there were no significant differences on biochemical parameters. Biochemical and hematological exams are useful, but do not accurately detect liver disorders. The combination of imaging diagnostic methods with those exams can aid in a complete understanding of the liver function and may aid in early detection of hepatic diseases in owl monkeys.

## Sensitivity to Bitter Molecule Phenylthiocarbamide (PTC) in Four Species of Sulawesi Macaques

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Bitter perception plays an important role in avoiding ingestion of bitter-related toxins by inducing innate avoidance behaviour in mammals. Bitter tasting is mediated by the G protein-coupled receptor TAS2Rs, which are located in membrane of the sensory cell. One of the best-studied bitter taste molecules is phenylthiocarbamide (PTC) that is recognized by TAS2R38 receptor. In macaque, experimental study of avoidance behaviour of PTC and its in vitro functional assay were done only in *Macaca fuscata*. Most *M. fuscata* individuals are sensitive to PTC, while the non-sensitives are found in restricted area that is interpreted as an adaptation to particular environments. It might be speculated that specific geography allows independent divergence of bitter perception. Seven species of Sulawesi Macaques distribute allopatrically with restricted parapatry therefore they might be hypothesized as evolving different bitter perceptions. In this study, we did experimental behavior and genetic characterization of TAS2R38 of *M. tonkeana*, *M. hecki*, *M. nigrescens* and *M. nigra*. We would like to know if there are variations in bitter tasting and its genetic basis of the four species. We tested avoidance behaviors of 54 individuals of *M. hecki* (N: 16), *M. tonkeana* (N: 12), *M. nigra* (N: 15) and *M. nigrescense* (N: 11). We found all *M. hecki* individuals avoided apple pieces soaked in PTC solution indicating that they are PTC-sensitive, while in other three species not all of them are PTC-sensitive; those are, eight individuals of *M. tonkeana*, 13 individuals of *M. nigra*, and 10 individual of *M. nigrescense* rejected the PTC. These results showed that there are polymorphisms in bitter perceptions of three species. Molecular genetic analyses reveal 20 *TAS2R38* haplotypes with different translated amino acid sequences from all four species. There is one shared PTC-sensitive haplotype among the four species. We confirmed the *TAS2R38* phenotype of this PTC sensitive using functional analysis. The half maximal effective concentration (EC50) of the PTC receptor is 1.93 mM, while that of the PTC non-sensitive cannot be determined. We found that the genetic bases of PTC non-sensitive phenotype are different in each species. In *M. tonkeana*, relative to the PTC-sensitive phenotype, the non-sensitive showed amino acid substitution on position 117, 130, 134. In *M. nigra*, the PTC non-sensitive phenotype showed a premature stop codon at amino acid position 178. We have not yet analyzed the cause of PTC non-sensitive phenotype in *M. nigrescense*. These results indicate that the *TAS2R38* receptors evolved independently in each species, however whether these were the results of adaptation need to be studied.

## How to rejuvenate the super-aged society

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Japanese people are expected to live until about 90 years old, while most of them show gradual increase of needs for assistance in daily living from around 75 years. A major cause of such needs is dementia that more than 40% of the population suffer by age 85. Although Japan is the most advanced country in population aging, global aging is an important issue. My recent research has focused on questions about what lifestyles are appropriate to rejuvenate older adults' brain in normal aging. I will show some of our studies on effects of physical exercise as well as musical instrument practice.

## Working for International Organizations

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Working at an international organization (IO) has both positive and negative aspects. Positive aspects include diversity in terms of nationality and gender, excellent compensation packages, good work life balance, and a multicultural environment. As international organizations promote social justice and equity, in general they provide better career prospects for women than in Japan.

The negative aspects include lack of funds and favoritism such as political appointment. As the organization does not grow in size, it is often difficult to get a promotion. International bureaucracy and internal politics induce frustration and inefficiency. Organizational issues include turf wars because of an overlap of the mandates. For example, collaboration among WHO, UNICEFF, UNPF in the field of medical care, and public health is dysfunctional. This leads to significant criticism concerning the bureaucracy and lack of accountability.

For those who are interested in working at IO, languages skills (English plus one official language) and higher education of at least MA and preferably PhD level are a must. One should be able to write documents fast and need good diplomatic and communication skills. In addition, work experience in related fields are often necessary. As Japanese nationals are under-represented, the Japanese government provides special recruitment opportunities. Internships are a very good way to get a position by proactive networking.

## **Working for an international organization: communication skill**

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Essential skill in working for an international organization is communication skill. Communication skill is not the same as language skill. The presentation will provide key elements for effective communication in an international organisation and will describe practical ways to improve communication skill.

**Filling the gap: an update from the Kyoto City Zoo and an invitation to the ICEE2019**

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Ensuring good health and well-being of animals is an essential part of modern zoo management. However, it is often the case that some charismatic animal species attract more attention than others. As a result, variations in the level of environmental enrichment across different species occur, irrespective of the actual needs. In order to fill in the gap at the Kyoto City Zoo, we attempted gap analysis and environmental enrichment based on the analysis. For the first step, keepers rated animal enclosures of which they are in charge, using welfare assessment sheets developed by a NPO Wild Welfare. After assessing the 51 enclosures, we discussed and decided the target species to pay more attention for the year. The first prioritized species were scarlet macaws and great green macaws. We conducted environmental enrichment and assessed its effect, collaborating with intern students. We will discuss the potential values on this approach from the view of animal welfare and education. In addition to the case study from the zoo, we will also introduce the plan of ICEE 2019.

## **Verification of the effectiveness of environmental enrichment and the influence by visitors in captive tigers**

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Zoo animals are often bred in environments that are significantly different from their original habitats. As a result, abnormal behaviors such as pacing around in the exhibit, shaking the body in front and back, left and right, coprophagy and regurgitation may occur. Among them, pacing is common in large felid species such as tigers. Environmental enrichment is a variety of devices for improving the welfare of zoo animals and is considered important for decreasing pacing. Several factors such as the presence or absence of enrichment and the influence of visitors are involved in the pacing, but such factors were rarely investigated simultaneously. In this study, we investigated the effectiveness of enrichment and the factors influencing the behavior of captive Amur tigers (*Panthera tigris altaica*).

We observed the behavior of 3 amur tigers in the Kyoto city Zoo and examined the effect of types of enrichment, temperature and number of visitors on behavior. The result indicates that there are individual differences in the preference of enrichment. Moreover, as the maximum temperature gets higher, the pacing frequency decreases and the resting frequency tends to increase. The influence of the visitor effect is not clearly seen as much as that of the temperature. It can be said that temperature is more important as a factor influencing the behavior of the tiger. Since there are individual differences in the preference of enrichment, it is considered that performing multiple enrichment is useful for tigers, and is helpful in grasping individual preferences.

**Salivary alpha-amylase enzyme as a non-invasive biomarker of acute stress in Japanese macaques (*Macaca fuscata*)**

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Human studies have revealed salivary alpha-amylase (sAA) enzyme levels are positively correlated with increases of the hormone norepinephrine, allowing sAA to act as a biomarker for sympathetic nervous system (SNS) activity. The SNS is associated with the fight-or-flight response and is a separate but parallel stress response system to the hypothalamic-pituitary-adrenal (HPA) axis. Recent non-human primate studies have begun investigating the potential use of sAA as a stress biomarker in rhesus macaques, gorillas, and other species. Validation of sAA enzyme as an acute stress biomarker in Japanese macaques could provide a useful tool for future research questions as well as practical uses in animal welfare. However, there are currently no published reports of sAA validating its use as an acute stress response marker for Japanese macaques. Saliva collection through non-invasive means from unrestrained monkeys can be a challenge and impede such work. Developing a non-invasive method for cooperative saliva collection between the researcher and monkey is not only necessary for accurate data collection but also ethically sound. This study had a two-fold aim: [1] develop a systematic method for non-invasive saliva collection by creating a cooperative environment with the study subject and [2] validate sAA as a biomarker of acute stress in *M. fuscata*. I will discuss developing a methodology for cooperative saliva collection, results of 22 stress tests, limitations, and future directions.

**“Bar hanging” behavior: a look into a potentially culturally propagated behavior and its relation to stress**

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In recent decades, what was thought to be a unique human trait- culture-, has been challenged and well demonstrated to exist in various non-human primate species. One of the Japanese macaque groups housed at the Primate Research Institute of Kyoto University engages in a unique behavior that is not seen in any of the other captive groups, known as “bar hanging”. The animals are in good health and are kept in identical conditions as many other groups, yet many animals practice this behavior exclusively in this group. Some observers see this as a play behavior while others see it as a stereotypic behavior related to stress or a way of coping with stress. With data collected over the past 15 years in the form of videos, behavioral data, genetic data, physiological data, we attempted to elucidate 1) how this behavior might have spread and learned over time, 2) what is its relation to stress, if any, 3) understand the demographics of individuals who engage in this behavior (age, sex, rank, kinship). Our predictions were that animals that were more closely related to each other would show similar patterns of the behavior and animals who engage more frequently in this behavior had lower levels of faecal glucocorticoids. We believe our work can contribute to the increasing literature on primate traditions and how monitoring these behaviors can be an important tool in behavioral management.

## Studies on ecology and behavior for wildlife conservation

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We study the ecology and behavior of various animals, especially large animals that have not been well studied, because we believe that understanding the ecology and behavior of each animal species is essential for its conservation and the mitigation of its conflicts with humans. We focus on large animals because many of them are endangered species, umbrella species and flagship species, important for the ecosystem-scale conservation of their habitats. For example, Borneo orangutans and Amazon river dolphins can symbolize ecosystem conservation of Asian tropical rainforests and the Amazon River, respectively, and their conservation can contribute to the conservation of many other organisms. We have studied the ecology and behavior of Asian elephants, Malayan tapirs, orangutans, wolves, wild dogs, civets, porcupines, sloths, otters, sea otters, Amazon River dolphins, Ganges River dolphins, and Amazon manatees, as well as various dolphin species, including killer whales and seal species. We study these animals in the wild and/or captive condition. We study wild animals using various advanced methods such as bio-logging, camera trapping and sound/image analysis. Precise analyses of the behaviors observed in captive environments, such as zoos or aquariums, are also important to understand the function and meaning of each behavior. So, we officially collaborate with 11 zoos and 7 aquariums in Japan to promote studies in captivity. We collaborate with these zoos and aquariums to improve the captive condition of the animals and their quality of life, based on the scientific results.

We organize a JSPS core-to-core program “Center of Excellence for Conservation of Tropical Bio-diversity focusing on Large Animal Studies”, which aims to promote international academic exchange for tropical bio-diversity conservation among Japan, India, Brazil, Malaysia, China, Indonesia and the UK. In this program, we promote collaborative studies on various large animals in each member country and conduct international training courses in Japan. We also organize international seminars and workshops to realize the “Field Museum”, a new generation zoo/aquarium/botanical garden in the natural habitat of wildlife, which can contribute to research, conservation, education and ecotourism in each member country. Field Museum is a network of nature reserves and observation facilities in the natural habitats of wildlife, where we can observe various organisms in captive, semi-captive and wild conditions, as well as conduct research and conservation activities. The Field Museum can contribute not only to study, conservation, and environmental education, but also to the local community through ecotourism and as a center for conservation of local ecosystems. To realize a Field museum in the Amazon, we organized a JST/JICA SATREPS Program: Biodiversity Conservation in Amazon, based on the new concept of the “Field Museum” in collaboration with the National Institute for Amazon Research (INPA, Manaus, Brazil).

## **Eavesdropping on elephants: How and what do Asian elephants talk with each other?**

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Communication plays a vital role in the life of all social animals. According to their evolutionary and ecological needs, animals have evolved various communication systems such as acoustic, chemical, visual, tactile etc. These systems have far-reaching effects on social relationships, reproduction and survival of a species which enables us to understand the biological processes from proximate to ultimate level. Even though, animals communicate with each other by using different forms of communication, here we concentrate mainly on acoustic signals by using free-ranging Asian elephants as a model system. Unlike Asian elephants, the vocal communication in African elephants has been well studied. African elephants are known to have complex vocal networking, and well developed referential alarm calls. Therefore, we make an attempt to answer a few fundamental questions such as vocal repertoire, calling rates, communication within a group, use of alarm calls in Asian elephants which live in fission-fusion society. This study was conducted in Bandipur and Mudumalai Tiger Reserve (India) which is a part of Nilgiri Biosphere Reserve and harbours one of largest wild Asian elephants' population in the world. We conducted systematic surveys and followed elephants on foot to record their vocalizations. We quantified vocalizations and associated behaviour of free-ranging Asian elephants during social interactions (intra and intergroup), human disturbance (humans on foot, vehicular disturbances) and hetero-specific species (birds, ungulates, predators) within the protected area. We found that Asian elephants mainly used four call types (trumpets, rumbles, chirps and roars) with slight variants depending on the context. Out of four call types, roars seem to elicit physical interactions whereas chirps had no responses from conspecifics. Similarly, fundamental frequencies (F0) of rumbles produced during disturbance had more modulations compared to social rumbles. Understanding these systems not just provides detailed information on life history traits of a species, it also helps in formulating effective conservation strategies in the Anthropocene epoch.

## Short-term gut microorganism dynamics induced by gumnivorous feeding for lesser slow loris

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Lessor slow lorises (*Nycticebus pygmaeus*) naturally ingest plant gum as a main food. However, it is not popular to feed plant gum for slow lorises in captive environments such as zoos. In this study, we fed plant gum continuously for two lesser slow lorises reared in Japan Monkey Centre, which have rarely eaten plant gum. We assess the effect by analyzing the change of their gut microbiota from the viewpoint of animal welfare and feeding enrichment. Plant gum is composed of low degradable polysaccharide. Therefore, slow lorises may depend on gut microbiota for digestion of plant gum.

We collected their feces before and after feeding gum arabic for one month, respectively. We amplified the V1-V2 region of the bacterial 16S rRNA using universal primers by PCR and massively sequenced by an Illumina Miseq. Sequenced data is analyzed by the Qiime and R platform. We found that the microbiota structure is quite changed drastically after two days from starting feeding gum, which is the same as their detention time. Especially, the most drastic changed happened in Prevotellaceae. Some taxa had decreased or complementarily increased and some had vanished. We will analyze the functional aspect of these taxa by cultivation.

## Marching with Penguins

Lloyd Spencer Davis

*University of Otago, Dunedin, New Zealand*

The documentary *March of the Penguins* (2005) helped perpetuate many misconceptions about the breeding behavior of penguins that Professor Lloyd Spencer Davis has spent his career debunking. In contrast to the tagline of the film, he has shown that in the harshest place on Earth, it is not really love that finds a way. However, it has become apparent recently that Davis has been following in someone else's footsteps: those of George Murray Levick.

Here, Davis reports on the breeding behavior of penguins and his current focus on Levick.

## Just like clockwork? On the significance of periodic penguins

Andrew J. J. MacIntosh<sup>1</sup>, Xavier Meyer<sup>1,2</sup>, Andre Chiaradia<sup>3</sup>, Akiko Kato<sup>4</sup>, Yan Ropert-Coudert<sup>4</sup>

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Understanding what drives variation in behavior across individual animals and habitats is fundamental to ecological research. It is also critical for our ability to predict how threatened species might cope with environmental change. Working with organisms that can act as indicator species for environmental change can teach us a lot about behavior-environment interactions and how they may change over time. In this respect, penguins, upper-level predators in the southern marine ecosystem, are excellent subjects to study. We have been investigating emergent patterns of behavioural organization – in this case fractal time – in penguins and a range of other animal taxa to help us understand the causes and potential consequences of variation in behavioral complexity. Data suggest that complexity in temporal patterns of behavior is biologically adaptive, and that complexity loss, i.e. the greater periodicity or stereotypy often observed in stressed or diseased individuals, may reflect reduced behavioural fitness. In this talk, we explore physiological, ecological and phylogenetic determinants of so-called ‘*complexity signatures*’ and how they can be used to comment on optimality in behavior in a given environment. Our ultimate aim is to develop a behavioural index that will allow us to reliably identify matches and mismatches in animal-environment interactions, and to thereby help us predict the outcomes of a changing planet on animal populations globally.

## **Jelly in the Belly: Why do penguins eat jellyfish?**

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There is growing evidence that gelatinous zooplankton (“jellies”) are a regular prey for a wide array of marine endotherms, including penguins. This interaction has been documented across the world’s oceans and using varied techniques. Consumption of jellies is intriguing in terms of energy reward, given endotherms have relatively high energy demands and jellies would provide little energy as prey. Here we show that many of the intuitive hypotheses commonly raised to explain predation on jellies have already been tested and most of them are unsupported. We emphasize that jellies are generally a non-anomalous prey (i.e., not reflecting an ecosystem perturbation), and propose that they might be beneficial to marine endotherms for non-energetic reasons, such as enhancing physiological processes. Changing the “junk-food” hypothesis for a “green tea” framework may thus allow to better understand the widespread predation on jellies, although further biochemical analyses are needed to clarify this point.

## Solving the mystery of female-biased stranding in Magellanic penguins

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Thousands of Magellanic penguins (*Spheniscus magellanicus*) strand every austral winter along the coast of Brazil; this is more than a thousand kilometers away from their northernmost breeding colony in northern Patagonia. Curiously, females usually outnumber males at stranding sites. Previous studies suggest that penguins move north from their breeding colony to winter off the coasts of northern Argentina, Uruguay, and southern Brazil, and assume that females may remain in areas closer to the coast and/or travel farther north than males during the non-breeding period. However, so far no remarkable differences have been reported in their migratory movements between sexes, although tracking data were very limited for early stages of winter (mostly up to early June), failing to record their at-sea distributions during the peak stranding period (late July–early August); therefore, a mechanism behind the female-biased stranding in wintering penguins has been an unresolved mystery despite the growing importance for their conservation.

To examine the different spatial utilizations adopted by males and females, we recorded the whereabouts of Magellanic penguins throughout the non-breeding period using animal-borne data loggers (geolocators), which record ambient light intensities and elapsed time, providing daily locations (latitudes are derived from day lengths and longitudes from the relative timing of recorded midday or midnight). Penguins initially migrated northwards as previously reported. However, females reached more distant wintering areas than males and did not dive as deep, suggesting that females might avoid vertical competition for food resources (i.e. niche partitioning), which may be a consequence of the avoidance of intraspecific competition due to sexual dimorphism in body size. Alternatively, thermal constraints may drive sexual differences in the spatial extent as lower water temperatures induce greater heat loss, resulting in elevated metabolic rate. Consequently, females are more likely to suffer environmental hazards along the coast of Brazil, one of the most threatened marine environments in South America. Our study highlights the size dimorphism-related differences in spatial usage by males and females during the non-breeding period, which is probably associated with female-biased greater risk of mortality through exposure to a wider range of potential threats, which has the critical implications for effective conservation practices.

## **Is a Bonobo Older Brother or just Meat for Bongando Ethnic Group? -Focusing on Local Perceptions towards Bonobos in DR Congo-**

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Bushmeat hunting is one of the biggest threats to the great apes in Central Africa. The Bongando ethnic group in Democratic Republic of Congo traditionally has a taboo against eating bonobos (*Pan paniscus*). The reason why Bongando avoid eating bonobo is because they believe bonobos are from same ancestors with Bongando. Also bonobos have a no tail, so bonobos are not animals but humans in Bongando's animal taxonomy.

However, researching other villages, the situation revolving around bonobos is dramatically different. This study aims to examine how local perceptions towards bonobos become diversified within and beyond the reserve.

I conducted a survey questionnaire to 797 Bongando people living in 7 villages to inquire their human-bonobo interactions. Two of the villages surveyed are from the reserve and five are from the non-protected areas. Results show that the perception towards the bonobos differed between the people from the reserve and the non-protected areas. In the reserve, bonobo research has been continued over 40 years.

People from the reserve tend to avoid eating bonobo due to their traditional beliefs and benefit from the bonobo research. The support from the bonobo research encourages the preservation of the bonobos in the reserve. Conversely, people from the non-protected areas are inclined to eat bonobo. This can be seen especially in the age group between 20 and 40. Furthermore, the availability of bonobo meat in these areas tends to be high in the villages from the non-protected areas.

According to my interviews, villagers hunt bonobos not for only sale.

This mean is villagers who hunt bonobos, and also consume bonobo meat by themselves.

It is assumed that cultural interchanges have been accelerated after civil wars. Plantations around villages were collapsed, so people go to cities to get work.

The traditional taboo of bonobo is disappearing rapidly and the situation is critical in the non-protected areas.

## **Social and Sexual Development up to Natal Dispersal in Female Bonobos**

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Dispersal from the natal group is of great decision of individuals in their life histories of social animals, because its farewell to familiar local areas and group members is accompanied with fitness risks. Bonobos are one of few animals to form male-philopatry groups, but it has remained room to study biological factors of female dispersal. In my Ph.D. study, I have investigated behavioral and hormonal changes prior and posterior dispersal in female bonobos to examine proximate causes of female dispersal. Subjects of this presentation were 7 natal females of two habituated unit-groups at Wamba, Luo Scientific Reserve, in DR Congo. In total 23 months over 5 years, behavioral observations were collected with ad-libitum and focal animal sampling during the party following for 3,295 hours, and hormonal analyses were conducted by Enzyme Immunometric Assay with urine samples. This study found social and sexual changes in female bonobos up to the timing of dispersal (6.9 years old,  $N = 7$ ). At puberty, female bonobos would become to prefer senior adult females while independent of their mothers.

## Did life in trees drive the adaptive evolution of taste in koala and primates?

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Grasping hands with opposable digit is the most distinguishing feature of arboreal adaptation in primates. Life in trees increased body size in anthropoid primates owing to increased nutritional supply from woody plants, but they encountered high level of plant toxins (plant secondary metabolites, PSMs). The evolutionary struggle with plants' PSMs might have caused the expansion of bitter taste receptor genes (*TAS2Rs*) in anthropoid primates, which avoid ingesting possibly toxic PSMs. Thus, anthropoid primates, including human, became one of the groups with the highest numbers of *TAS2R* genes among mammals. Changing perspective from the northern to southern hemisphere, there are various species of marsupials, which have different history of adaptive radiation to various environments from placental mammals like primates. Fieldwork in Australian forests enable us to find very attractive arboreal marsupial folivore, koala (*Phascolarctos cinereus*). Koalas grasp branches of trees like primates and intake highly toxic eucalyptus leaves as major items of the diet repertoire. Koala Genome Consortium recently determined whole genome sequences of koalas. Koala and other marsupial genomes provided information about the taste receptor gene repertoire. As a result, the koala has the largest number of *TAS2R* genes, 24, among analyzed Australian marsupials, which is also the largest level among all mammals. This is presumably a result of koala-specific gene expansion and evolutionary convergence with plant-eating primates. Closely-related herbivorous species of koala are terrestrial such as wombats and wallabies. More comparative genomics of marsupials and placental mammals will provide insight into relationship between arboreality and taste receptor evolution.

## **Chimpanzees' behaviour in the prosocial choice paradigm depends on the position of the token in the feeder**

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Chimpanzees evince prosocial behaviour in nature, as well as in the laboratory research. In our study we were looking for factors modifying this kind of behaviour using the prosocial choice paradigm. The results show that many individuals tend to help others, share resources, and bring protection. Altruism can be examined in a prosocial choice paradigm. The essence of the research in this paradigm is the ability to provide a benefit to another individual, with little or no effort from the individual under examination. The aim of this study was to verify whether chimpanzees evince a prosocial behavior and whether they use the tit-for-tat strategy during token exchanging. During the prosocial paradigm tasks, each chimpanzee had access to 10 tokens (5 green – prosocial choice - two chimpanzees got a reward; 5 red - selfish choice - only the chimpanzee which made a choice got a reward). Tokens were available during the session each day for 10 days. In the first experimental group tokens were mixed after each choice of the individual. Chimpanzees were exchanging tokens in the one by one system - 20 tokens per day during one session. In the second experimental group they also gave 20 tokens in the system one by one, but the experimenter put all the tokens in two separate piles - red and green =. Red tokens were always on the left side, and green tokens on the right side, and vice versa (Depending on the day of the experiment). In the the control group, one individual chose 20 tokens (mixed) in a row. The dominance of a particular hand in a specific type of social choice task strongly influences the color of token chosen by the individual. Because of the tray structure and body position, chimpanzees chose tokens with the dominant hand on the diagonal. Day by day this effect weakened, but each individual gave tokens which were placed diagonally to the dominant hand. The effect was stronger in males because they had a tendency not to change the position of the body during the session. Females were more active, which resulted in a slightly weaker effect of the impact of motor lateralization. To sum up. In this type of procedure we should have a lot of tokens, and every time before making the choice they should be well mixed.

## Male Reproductive Success in Bornean Orangutans (*Pongo pygmaeus*)

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Among primates, male reproductive success is not always associated with dominance status. Male orangutans exhibit intra-sexual dimorphism, and clear dominance relationships exist among the males. Previous studies reported that both the morphs were able to sire offspring but the information is still limited. The present study aimed to investigate the difference in reproductive success between the two male morphs in Bornean orangutans. We conducted sample collection and behavioral observation in a free-ranging population of Bornean orangutans. We assigned the paternity of eight infants using 12 loci of microsatellite. A flanged male sired most of the offspring born from parous females, and an unflanged male sired a firstborn offspring. This is consistent with behavioral observation: the dominant flanged male showed little interest with nulliparous females, in contrast to the unflanged males, which frequently mated with them. This suggests that the dominant flanged male might be able to monopolize most of the fertilizations of parous females, while unflanged males might seek any mating opportunity available in the absence of the flanged male and copulate with females, including nulliparous ones, even though their conception probability is relatively low. We are conducting a paternity analysis in Danum Valley, targeting on the wild population of Bornean orangutans.

## **Research, Conservation and Management of the Proboscis Monkey Populations in Klias Peninsula, Sabah, Malaysia**

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The proboscis monkey, *Nasalis larvatus*; a Bornean endemic species, is one of the major eco-tourist attractions on the island of Borneo, including in the Malaysian State of Sabah located in northern Borneo. Despite its economic importance, much of the proboscis monkey's key habitats, i.e. riparian and coastal mangrove forests, have been greatly reduced or disturbed and fragmented as a result of logging activities, infrastructural and agricultural development, human settlements expansions, and forest fires. The population size of proboscis monkey in Sabah was estimated to be close to 6,000 individuals, with five major centres of continuous populations and numerous small isolated sub-populations. The Klias proboscis monkey population is one of the strongholds of proboscis monkey populations in Sabah with estimated population size ranging between 400-600 individuals. It is also regarded as the only viable population of this monkey on the west coast of Sabah. Since 2005, the Institute for Tropical Biology and Conservation, and its partners, have conducted several studies on the proboscis monkey in Klias. This paper presents the main findings of the research with the main aim to contribute knowledge that are useful for the conservation management and monitoring of the proboscis monkey population in Klias.

## The way forward of wildlife research

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The Wildlife Research Center of Kyoto University was established as the first university wildlife research institution in Japan in April 2008. In the past decade, we have expanded this network within the country and abroad, conducting research and education. Currently, we collaborate with more than 20 zoos and aquariums to conduct ex-situ conservation. We conduct in-situ conservation research in cooperation with local research institutes at seven overseas research bases. We accept graduate students of the Graduate School of Science to accomplish our education mission. Also, we participate in the leading graduate program, “Primate Wildlife Science (PWS)”. So far more than 60 students have studied more than 38 species of wild animals in 13 countries. Although we are still a small organization, we have created the new discipline, “wildlife science”. At its inception, the center started with six full-time faculty members. Now, 36 professors work on special posts and concurrent posts. This development would not have been accomplished without the dedicated cooperation of the professors and administrative staff of the institute.

In my research field we are applying molecular analysis to learn more about wild animals. We collected DNA samples of over 27,000 individuals representing 200 species of mammals noninvasively from feces and hair. Using this DNA Zoo, we are identifying subspecies/populations/kinships/sex by genotyping polymorphic markers. We are also surveying individual differences in functional genes related to personality traits (e.g. stress susceptibility) and reproduction. As a new approach we are trying to estimate age by epigenome analysis.

We celebrated 10th anniversary in 11th June. In the next decade, we will pursue even greater possibilities in education and research, together with young researchers who have advanced to realize our mission of wildlife conservation. Again, I would like to express my gratitude to all participants for your support, now and in the future.

## **The Arctic Tundra & the African Savannah: Common Conservation Conundrums Confronting Caribou and Giraffes**

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Although giraffes and caribou occupy quite different habitats, they face similar conservation challenges. In this presentation, the life history of both types of animals is summarized, followed by noting the major conservation issues that confront the two species. The IUCN Red List status of giraffes and caribous is presented and compared. Some of the scientific and political problems inherent in listing a species as threatened with extinction are discussed. Finally, the prospects for future conservation are summarized, along with noting a fundamental disagreement among conservation biologists as to what is the most productive tactic to adopt for saving species.

## **Culture, social learning and death in Japanese monkeys**

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In this talk I will give an overview of my research on Japanese macaques. I have carried out a literature survey of potential cultural variants in this species. Transmission studies in socially housed captive Japanese macaques have allowed me to assess ability to socially learn cultural variants. During my research on culture, I took the opportunity to observe responses of Japanese macaque mothers to their dead infants and this led to a paper outlining a framework for future, systematic, quantitative research on this topic.

## **Bats: How to study animals you cannot see**

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More than 1,300 species of bat have been described, which is about 20% of all known extant mammal species. They can be divided into two groups: around 170 species are Old World fruit bats that navigate using vision and find their food by sight and smell; the remaining 1,130 or so species (collectively known as “microbats”) all use ultrasonic echolocation to obtain information about their environment. Microbats are difficult animals to survey and study because they are small-bodied, fast-moving and most active at night. Also, although they are very vocal, most of their vocalisations are ultrasonic, so we cannot hear them. At the same time microbats are an important group to study for various reasons, both ecological and economic.

There are strong indications that bat populations around the world are being lost or severely depleted because of habitat loss and degradation, and other forms of human disturbance. However, because they are difficult animals to survey, it is usually impossible to estimate the scale of the decline. For the vast majority of species there are no historical data on population size, or even usable estimates of current populations.

I will briefly outline the pressures that microbats currently face and some of the methods that have been developed to survey and study them. I will focus on work I have been involved in that uses acoustic lures to significantly improve capture success, and therefore survey capability. I will illustrate the use of this technique with a few examples of recent applications.

**Evolution of the loss of olfaction in whales provides new perspectives  
on conservation of the marine amniotes**

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Transition from land to water is one of the most striking types of the evolutionary events in the history of life. It has been suggested that the olfactory receptor (OR) genes are functionally divided into two groups: OR genes for detecting water-soluble molecules and that for detecting airborne molecules. Thus, the OR gene repertoires will generally be changed profoundly upon aquatic adaptation. Cetaceans are an order of mammals derived from terrestrial artiodactyls, and all extant cetaceans are fully aquatic. In this study, I annotated the OR gene repertoires from genome assemblies of all cetaceans available in public databases and a hippopotamus, and analyzed the evolutionary gain and loss of OR genes during the evolution of cetaceans. Cetaceans migrated from land to water in the Eocene epoch, and the OR gene repertoires of amphibious Eocene whales were also inferred from the cribriform plate size of fossil specimens. Whales are suggested to have lost OR genes required to avoid inedible foods at this point in evolution. Based on these data, I will discuss about the aquatic adaptation and the loss of olfactory capabilities among marine amniotes.

## Seasonal changes in bats occurrence and activity in the Janówek Fort (Masovian District, Central Poland)

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In Central Europe abandoned military objects are often used by bats as winter shelters, especially in the areas where no natural caves are present. When the temperature outside falls several degrees below zero perfect conditions for hibernation are created in forts that are partly under the ground. In the presented study the winter community structure and activity of bats, occurring in an abandoned fort in Janówek were observed. The aim was to find out if the fort is used only in winter or whether it serves some purpose also in other seasons. Number of bats was monitored regularly during the whole year. In the course of control nights nets were installed in front of entrances to catch and count flying individuals. Bats staying inside the fortress were also counted. Eight species of bats were recorded, including relatively numerous occurrence of pond bat *Myotis dasycneme*. There were recorded maximum 142 individuals hibernating at the same time, whereas the total number of bats caught into nets during 20 nights was 341 individuals. The observation of changes in bats' activity near the fort showed that it was used with different intensity but throughout the whole year. The different dynamics of using the fort by the two the most numerous species: Daubenton's bat and Natterer's bat was observed. For Daubenton's bat *Myotis daubentonii* Janówek is the place of autumn swarming.

## Genetic diversity analysis of the Ryukyu flying fox

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There are about 130 mammal species in Japan, and more than 25% of them are bats. The Ryukyu flying fox is one of the bat species in Japan, distributed in Nansei islands. They are quite different from small bats. When they spread their wings, the length will reach 80cm. They mainly eat fruits, and sometimes eat flowers and leaves. It is said that they have an important role in pollination and seed dispersal. They are divided into 5 subspecies, and 2 of them are regarded as Critically Endangered. The purpose of this study is to evaluate genetic diversity and genetic differentiation of the Ryukyu flying fox between each island. There are mitochondrial DNA markers which can be used for the Ryukyu flying fox already. Therefore, we made mitochondrial DNA analysis by using them. Tissue samples and feces samples were collected in Nansei islands, and DNA extraction was conducted. We checked mitochondrial haplotypes to compare them between the islands.

Key words: genetic diversity, Ryukyu flying fox, mtDNA marker, conservation biology

**Do primates yuck?**  
**Pathogen and parasite avoidance behaviors in *Papionini* and *Hominini***

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Parasites and pathogens are ubiquitous in nature and can be costly to animal fitness, so hosts have evolved behavioral counterstrategies to mitigate infection-risk. We conducted feeding-related infection-avoidance experiments with 5 species of *Papionini* and *Hominini*: free-ranging Japanese macaques (*Macaca fuscata fuscata*) of Koshima Island; captive chimpanzees (*Pan troglodytes troglodytes*), semi-free ranging mandrills (*Mandrillus sphinx*), and group-housed long-tailed macaques (*Macaca fascicularis*) at the International Medical Research Centre of Franceville, Gabon; and with semi-free-ranging bonobos (*Pan paniscus*) at Lola ya Bonobo Sanctuary, Kinshasa, Democratic Republic of the Congo. In parallel, we tested whether the behavioral tendencies observed toward these contaminants correlate with parasite infection. We now know that hygienic tendencies in Japanese macaques are good predictors of geohelminth infection (GLMM, all  $p < 0.01$ ). Then, we expanded our experimental protocol to include visual, olfactory and tactile cues of feces, blood, SIV+ semen, rotten meat and rotten fruit. Subjects manifested increased latencies to consumption of food rewards, maintenance of greater distances from contaminants, and/or outright refusals to consume food rewards in contaminated versus control conditions (GLMM, all  $p < 0.1$ ). We are now testing whether individuals with greater tendencies to avoid potential sources of contamination are less prone to infection than less sensitive individuals. The avoidance behaviors observed hint at the origins of hygiene and disgust in humans, and further comparative research is now needed.

## Where do female bonobos migrate? : Implication from mitochondrial DNA analysis

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Understanding patterns of female dispersal in non-human primates can contribute to elucidate social systems in human ancestors. Bonobos (*Pan paniscus*), which is one of the evolutionally closest species to humans, show strong tendency of female dispersal. In this species, affiliative interactions between females of different groups are often observed during intergroup encounters. This suggests that females may migrate into neighboring groups, and mother-daughter dyads might exist between neighboring groups. We investigated dispersal patterns of female bonobos among three neighboring groups at Wamba. By analyzing mitochondrial and autosomal genetic markers, we identified mother-daughter dyads between immigrant females within the three neighboring groups. We found one mother-daughter dyad within the three groups. This suggests that migration into neighboring groups is probable in female bonobos. On the other hands, the observed number of mother-daughter dyad existing within the three groups was not high compared to the expected number of those dyads in total. Moreover, genetic distance between neighboring groups tended to be similar with between different populations in same regional cohorts. These suggest that female immigration into neighboring groups is at least not frequent in bonobos. This dispersal pattern is considered because female transfer occurs only when neighboring groups encounter each other.

## Ordering strategies of three-choice task by free-ranging Japanese macaques

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Behavioral plasticity allows animals to maximize benefits and minimize costs. While foraging, besides the basic costs of time and energy, group-living individuals are further exposed to intergroup competition. We investigated how animals adjust behavior to make optimal decisions in a group-setting foraging task. We conducted a field experiment at a Japanese macaque provisioning site on Awaji island. We designed a three-choice task where participants came voluntarily and had the option to pull weighted boxes baited with food in any order. The three boxes contained identical food rewards but had different costs – each contained a different number of weights (1.5kg/weight). In condition 1, boxes contained either one, two or three weights. In condition 2, boxes contained zero, one and two weights. All boxes needed to be pulled to extract the food. In condition 3, two boxes with one and two weights, needed to be pulled, while the third box could be accessed immediately and contained no weight (i.e. “free food”). Results show that monkeys adjusted their behavior depending on the box’s weight; they prioritized accessing boxes which had the lowest weights. In conditions 1 and 2, the boxes with the least weight were accessed first (38.46% and 37.96% of trials) or second (55.56% and 52.36%), respectively. In condition 3, they prioritized the “free food” as the first (54.38%) or second (69.73%) choice. These results suggest that monkeys may not only take energy expenditure but also other factors such as social conditions into account when ordering their decisions among different options.

## Food transfer occur between closer individuals?

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Food transfer is considered as an important opportunity for juveniles to learn diet choice directly from other group members. Choice of begging target is also important because getting food from others sometimes increases the tension between the individuals. I hypothesized that juveniles choose the begging target along with the “closeness”. I investigated with whom juveniles spend more time, and between whom food transfer events occur in two groups of free-ranging golden-faced saki (*Pithecia chrysocephala*).

I followed each group and recorded the individual’s behavior, food, and the proximate individual’s ID every 10 minutes by scan-sampling methods. Every time I observed the food transfer events, I recorded the individual’s ID and the food. The total observation time was 159 hours and 54 food transfer events were recorded.

Both in Group A and Group B, old juveniles (OJ) and young juveniles (YJ) tended to be with individuals of the same age class when they are not eating. When they are eating, OJ didn’t show any tendency of proximity whereas YJ still tended to be with YJ. Food transfer events were initiated only by juveniles, mainly by YJ (94%). In Group A, the begging from YJ was directed toward the proximate juveniles, whereas in Group B, the begging from YJ was directed toward an adult male in high frequency.

From those results, it was suggested that the tendency of proximity seemed to be determined by the juvenile’s age class. On the other hand, it was suggested that the begging target is not simply chosen by the proximity. In three adult males of Group B, the most begged male spent the longest time with adult females and spent the shortest time alone. Such kind of difference of sociality in individual level possibly affect the juveniles’ choice of begging targets.

## Waiting as Infant Care in Wild Chimpanzees

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In group living mammals, “waiting” or “pausing” in group travel situations has been described in many species (capuchins: Leca et al., 2003; Meunier, 2008; macaques: Sueur & Petit, 2009; cattle: Ramseyer et al., 2009) including chimpanzees (*Pan troglodytes*) (Gruber and Zuberbüler, 2013). Although most literatures that refer to such behavior deal with collective movement, decision-making and coordination, waiting may also be a form of care toward immature individuals that is possibly crucial for their safety and survival. Yet, waiting has never been investigated in the context of care. Previous studies on chimpanzee infant care, both maternal and non-maternal, have focused on behaviors that involve body contact (Van-Lawick Goodall, 1968; Plooi, 1984, 1987; Nishida, 1983; Bădescu et al., 2016), which may have led to a biased outlook on caretaking in chimpanzees. Significance of indirect care has been underestimated across all taxa, which calls for a wider approach to the behavioral aspect of infant care (Rosenbaum & Gettler, 2018b). Chimpanzees live in fission-fusion societies, resulting in sub-groups frequently dissolving when members leave a certain site. Being attended to when travel begins likely carries great importance to immature individuals in moving within the home range safely. Waiting for such individuals is, naturally, a task for those who know they are going to travel with them—mothers, and perhaps the youngest siblings of infants. Maternal siblings are known to be relatively keen on taking care of their younger siblings (Van-Lawick Goodall, 1968, 1986; Pusey, 1990; Hobaiter et al., 2014; Nakamura & Hosaka, 2015), although with no quantitative study, to what degree they are reliable as caregivers remains unknown. The largest focus of this study was to elucidate the little-known pattern of maternal and sibling waiting behavior in chimpanzees, particularly to examine its nature as care. Another was to see if elder offspring (siblings) that continue to travel with their mothers reduce the mother’s effort in waiting, being “helpers” in infant care, provided waiting could be considered care. Using GLMM, I examined multiple factors that possibly affected the occurrence of maternal and sibling waiting behavior including those likely related to the needs of the infant. The results indicated that waiting is indeed care, shown more frequently when infants likely needed it more, primarily by mothers and occasionally by siblings. It also became apparent that mothers and siblings were likely aware of each other’s locations and circumstances, ready to adjust their subsequent behaviors if necessary. Mothers left their infants without waiting when they likely knew that siblings can attend to them, while siblings likely noticed when mothers have preceded and waited in their place. Mothers likely utilized their elder offspring to lighten their own load, while elder offspring responded to situations in which they were needed as caregivers, acting as infants’ “babysitters” (Kleiman and Malcolm, 1981). As mothers with elder offspring spent less effort in waiting than those without, and among the prior, mothers waited least when said offspring were close by, continued association between mother and elder offspring could be said to reduce the mothers’ burden in waiting for infants, elder offspring consequently functioning as “helpers”.

## **Social grooming in rescued chimpanzees: how early social disruption and time of rehabilitation affect sociality?**

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Rescued chimpanzees living in sanctuaries may have their social skills impaired due to their traumatic past. Often these chimpanzees were single-housed, and they came from pet or entertainment industry. Grooming is a complex social activity that plays a crucial role in the maintenance of social relationships. Therefore, the monitorization of this behaviour in sanctuaries could be a good indicator of the welfare and sociality vided in a rehabilitation process. The aim of this study was to analyse how grooming varies according to: origin (wild or captive), past circumstance (pet, entertainment or mixed), previous social housing (single-housed or social-housed) and time of rehabilitation (up to or more than 10 years). For 138.8 hours, we recorded the duration of grooming in 13 adult chimpanzees living at Fundació Mona. Our results indicate that past circumstance and previous housing condition do not affect grooming duration, but chimpanzees born in captivity had a higher duration of grooming than chimpanzees born in the wild. Moreover, chimpanzees experiencing more time of rehabilitation have groomed more than chimpanzees that arrived at Fundació Mona more recently. In conclusion, the higher duration of grooming seems to be a positive consequence of the success of the rehabilitation process. The rehabilitation time may attenuate the differences in grooming duration that may have been caused by the social disruption factors such as past circumstance and previous social housing. Nevertheless, the different environments in which they have been born seems to still influence the duration of grooming in the individuals of Fundació Mona.

## **Reaction of a group of chimpanzees to the death of the oldest female in the City Zoological Garden of Warsaw**

Anna Jakucińska<sup>1</sup>, Maciej Trojan<sup>2\*</sup>, Julia Sikorska<sup>2,3</sup>, Katarzyna Wejhert<sup>1</sup>, Maciej Kapusta<sup>1</sup>,  
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The data presented here refers to the death of the oldest female in a troop of 8 chimpanzees living in a habitat of the City Zoological Garden of Warsaw (Poland). At the time of natural death the female (Judy) was 53 years old. The greatest attention paid to the body, in various ways, was by the youngest member, a 3-year-old male (Frodo). The females in general spent more time with and touched the body more often than the males did. The females included a daughter of the dead female (Mandy, 23 years old), and a granddaughter (Lucy, 14 years old). One of the males, Szymi (the oldest, at 32 years of age), alone avoided all contact with the dead body. Mandy, after the body of her mother was removed, made her bedding that evening in the spot where the dead female had lain the previous night.

## Spatial representation of age in chimpanzees

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Previous studies have shown that humans associate abstract concepts with space, along both vertical and horizontal plane. One example is the fact that we have mental timeline and associate space and time (i.e. earlier is left; later is right). It is also known that certain spatial representation is shared with non-human primates. For example, one study showed that high-ranked individuals are represented in higher positions in chimpanzees too. How about mental timeline, especially individual age in chimpanzees? We investigated whether chimpanzees associate space (top-bottom, or left-right) and age (infant-adult) using matching-to-sample procedure. Six chimpanzees participated the experiment. A picture of either adult or infant chimpanzee face (“sample”) was appeared on the center of the monitor upon their touching the start key. The sample disappeared after 750 ms. Then two choice alternatives were presented on top and bottom (or left and right) positions. The alternatives were from either same age category or different age categories. One of them was the same as the sample picture and chimpanzees were required to touch that. If chimpanzees spontaneously map age category onto space, their response time would be shorter when the position of correct choice was congruent with their mental representation. This study is still on-going and we are presenting the result in this symposium for the first time.

## **Development of Combinatory Manipulation in Great Apes and Humans: Implication for Action Patterns in Tool Use**

Misato Hayashi<sup>1\*</sup> and Hideko Takeshita<sup>2</sup>

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Object manipulation can be used as a comparative scale of cognitive development among primates including humans. Some previous studies focused on object manipulation and/or tool-using behavior as an indicator of cognitive abilities in chimpanzees and human children. Particularly, combinatory manipulation is a precursor of tool-using behavior and starts at around 10 months of age in humans. Mother-reared chimpanzees started combinatory manipulation at 8-11 months of age which was comparable to humans. Inserting action was commonly observed in chimpanzees from an early age. However, stacking action appeared later in captive chimpanzees' development. This pattern may reflect the tool-use repertoire of wild chimpanzees where tool-use behaviors involving the inserting action are wide spread among most of the wild chimpanzee populations. Stacking-block behavior started at around one year of age in humans and at two years and seven months in one out of three chimpanzees. All three chimpanzees started to stack up blocks at three years and one month following trainings by humans. After the acquisition of stacking action, both chimpanzees and human children showed similar performances in tasks using blocks of various shapes which were designed to test their physical understanding. Similarly, both chimpanzees and human children showed trial-and-error strategies in combining cups into a nesting structure. Direct comparison between humans and captive chimpanzees revealed fundamental similarities in the domain of physical intelligence. Apart from chimpanzees, developmental data on object manipulation from other species of great apes remains limited. Through our preliminary investigation, all species of great apes showed two types of combinatory manipulation (insertion and stacking) in captive settings with some variations in the timing and order of development. Among captive great apes, common ages for the emergence of combinatory manipulation was around 2.5 years. Thus, compared to this great-apes' standard age, inserting action in chimpanzees appeared from an exceptionally early age and it was comparable to humans. This early appearance of combinatory manipulation in captive chimpanzees may reflect the tool-use commonality in wild chimpanzees, especially the ones involving the inserting action. Although all four species of great apes possess the fundamental cognitive ability of performing combinatory manipulation in captivity, socio/environmental factors may contribute to the tool-use repertoire and frequency in the wild.

**An ongoing research:  
familiar vs. unfamiliar human face recognition in chimpanzees**

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It is well known that humans extract information about individuals, such as identity, sex, emotional state, etc., from face and use this information for everyday communication. Previous research on primate face perception as well have revealed similar patterns in primates, the ability of individual and emotional recognition and configural processing of conspecific faces. However, studies using an eye-tracker have revealed a major difference in attentional gaze on face between humans and other nonhuman great apes in which humans focus longer time on the eye region contrary to the great apes displaying fast scanning of eyes and mouth regions. These studies suggest that the amount of information being conveyed from each facial component, such as eyes, a nose and a mouth, can differ between humans and nonhuman great apes. Although there have been a considerable amount of research on great ape face perception, no study has yet tested whether the differential attentional preference on facial components found in eye-tracking studies can be further retained to the short- or long-term memories. Furthermore, studies about whether great apes also process familiar and unfamiliar faces differently are lacking. The current study was designed to investigate the relative contribution of facial components (eyes, nose, mouth) to familiar vs. unfamiliar human face recognition in chimpanzees, our closest phylogenetic relative. Eight chimpanzees at PRI have been participating in a full-face to full-face delayed matching-to-sample training with familiar and unfamiliar face stimuli sets. After the training, 1) full-face to components (eyes, nose, mouth) matching and 2) memory retrieval (discrimination task) tests will be introduced.

## **Chimpanzee's categorical classification of the sound: The voice of chimpanzee vs pure tone**

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Primates use vocalization in their habitat. However, there are little studies of their auditory cognitive ability. I conducted the experiment with chimpanzees using sound stimuli. In the experiment, chimpanzees distinguish chimpanzees' voice from pure tone because to communicate with others using vocalization, it is very important to distinguish voice of others from non-vocal sounds and understand their meanings and reply to them. I examined which acoustic features they use when they recognize voice of the other individuals. The chimpanzees were required to push the button on the same side of the speaker which played chimpanzees' voice, ignoring pure tone played simultaneously from the other speaker. Although the chimpanzees are under training, accuracy of one of four chimpanzees already reached nearly 90% in fourteen sessions. In the second experiment, I focused on the effect of vocalization on behavioral response. This experiment will help to understand chimpanzees' auditory cognitive ability.

## **Informing conservation efforts through quantitative assessments of habitat suitability for chimpanzees in the Greater Nimba Landscape, Guinea, Africa**

Maegan Fitzgerald<sup>1\*</sup>, Robert Coulson<sup>2,3</sup>, A. Michelle Lawing<sup>2</sup>, Tetsuro Matsuzawa<sup>4</sup>, and Kathelijne Koops<sup>5</sup>

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In West Africa, the Upper Guinean Forest Ecosystem, is a biodiversity hotspot that has undergone dramatic deforestation and fragmentation. This ecosystem has been a stronghold for many endemic plant and animal species and sustains the livelihoods of millions of people across West Africa. While Guinea holds only 6% of the remaining intact, dense Upper Guinean forest, the country is home to the largest remaining populations of Western chimpanzees (*Pan troglodytes verus*), the only sub-species of chimpanzee listed as Critically Endangered by the IUCN. To effectively address threats to Western chimpanzees, such as habitat loss/degradation, it is important to understand how chimpanzees respond to their environment and identify the environmental factors influencing habitat selection. For this study, species distribution modeling was used to identify areas of suitable chimpanzee habitat and the biophysical variables contributing to habitat suitability within the Greater Nimba Landscape (GNL), Guinea. The model results highlight the importance of dense, healthy vegetation, elevation, topographic exposure, and proximity to rivers for chimpanzees while also emphasizing that suitability is isolated and does not make up a large portion of the GNL. Through this research, quantitative, species-specific information can be used to inform broader conservation and land-use planning initiatives within the GNL.

## Characterization of bitter taste sensitivity of four species of Sulawesi Macaques

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Sulawesi macaques are divergently evolved into 7 species within a relatively short period and live allopatrically on Sulawesi Island, which is isolated for million years long. Thus, it will be interesting to study functional genes which might reveal their specific-species difference. Bitter taste plays an important role in avoiding ingestion of toxins and induces innate avoidance behaviors, which might evolve to reflect species-specific diets during mammalian evolution. In addition, it was recently reported that the receptors are involved in the immuno-system against bacteria and parasites. One of the genes is *TAS2R38*, receptor for bitter compound Phenylthiocarbamide (PTC) and some bacterial secreting compounds. Here, we report characterization of *TAS2R38* in four species of Sulawesi macaque, *M. hecki* (N: 16, *M. tonkeana* (N: 12), *M. nigrescens* (N: 11) and *M. nigra* (N: 15). We conducted behavioral experiment on PTC acceptance and later functional analysis on amino acid residue(s) of *TAS2R38* responsible for low bitter taste sensitivity. Our result shows that both *M. tonkeana* and *M. nigra* were found with “low-sensitive” but exhibited different pattern in genetic aspect. Amino acid changes at position 117, 130, 134 of *M. tonkeana*, whereas one base insertion caused early stop codon at site 178 of *M. nigra*, leading to non-taster phenotype separately. By haplotype network construction, we found that ‘low-sensitive’ haplotypes were independently evolved after speciation. This finding might give a clue for clarifying evolutionary relationship and dietary habits among the four species, as bitter taste may be related to the plants they consume.

## Sedative and Antinociceptive Effects of S(+)-Ketamine and Midazolam or Fentanyl and Droperidol in Black-tufted-ear marmosets

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The cardiorespiratory, sedative and antinociceptive effects of the combination of S(+)-ketamine with midazolam and fentanyl with droperidol in *Callithrix penicillata* were compared in this study. Twenty-six adult black-tufted-ear marmosets, belonging to the Technical Division of Veterinary Medicine and Wildlife Management of the Secretariat for Environment of São Paulo, Brazil, underwent chemical immobilization for physical examination, blood sampling, tattooing and microchipping. Animals were randomly treated with S(+)-ketamine (10 mg/kg) and midazolam (1 mg/kg) (KM; BW = 314.6 ± 617g) or fentanyl (12,5 µg/kg) e droperidol (625 µg/kg) (FD; BW = 278.9 ± 87.7g), given by intramuscular injection. Heart rate and rhythm (lead II ECG) and respiratory rate (chest movement) were recorded. Sedation, antinociception (response to interdigital pinch), muscle relaxation, auditory (a handclap close to the animal's ears), and visual response were evaluated using a modified and previously described scoring system. We also evaluated the sedative onset and effective times, and recovery time and quality. All variables were recorded within 5 minutes of administration and at 10-min intervals. Sedation in KM was achieved faster (KM = 1.95 ± 0.56 min; FD = 6.5 ± 0.66 min; p < 0,0001) and lasted for a shorter period of time (KM = 50.7 ± 16.1 min; FD = 79.2 ± 21.8 min; p = 0,0009), although the animals remained in lateral recumbency longer than in FD. KM was similar to FD in its cardiorespiratory effects, auditory and visual responses but produced ataxia and excitement during the recovery period (5/13), while FD showed vocalization (3/13) and one episode of vomiting. FD combination produced less sedation and muscle relaxation but superior degree of nociception compared to KM. The administration of fentanyl and droperidol resulted in adequate sedation, without clinically important cardiorespiratory effects, and is suitable for short-term procedures that require more intense analgesia in black-tufted-ear marmosets.

## **Inter-group relationships of feral horses (*Equus caballus*) in Serra D'Arga, Portugal:**

Tamao Maeda<sup>1\*</sup>, Sakiho Ochi<sup>1</sup>, Monamie Ringhofer<sup>2</sup>, Satoshi Hirata<sup>1</sup> and Shinya Yamamoto<sup>2</sup>

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Some mammalian species of different taxonomic groups, including humans, have developed social structures with nested levels of organization. This multilevel society is one of the most complex social systems in animals, but their function and evolutionary process are still poorly understood especially for non-primate species because it requires good observation of large numbers of identified individuals. Equine groups are one of the taxa that have nested social structure, and there are some studies on several species such as zebras and Przewalski's horses, but not on domestic horses (*Equus caballus*). Studying the inter-group relationships of feral horses and comparing those of the other equine species may help understanding their origin and their ecological and social meanings. In this study, we aimed to reveal whether domestic horses form multilevel societies. We took aerial photos of feral horse herds in Serra D'Arga Portugal in 30 minutes interval using drones, identified all the individuals and collected their position data. In the field, we observed 21 harems and 2 bachelor groups and we found some patterns in the group positioning. This result strongly indicates the multilevel structures of the feral horse societies.

## **Do female feral horses (*Equus caballus*) choose their herd?**

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The final purpose of this study is to clarify the reason why female feral horses (*Equus caballus*) do secondary transfers. In many species, either or both sex of offspring disperses to other group from their natal group, when they mature, in order to avoid inbreeding (natal disperse). On the other hand, some individuals of those species change their group again after natal disperses (secondary inter-group transfer), but it is still poorly understood. Besides that, it is generally said that female of harem species need not to choose male. In previous study about feral horse, it is reported that the female is more attacked by other females of new group when they transfer to other herds. Therefore, changing her group can be cost to female. However, they do not seem to have good reasons to change their group, we have already observed the secondary transfer 17 examples of 15 individuals of feral horse between 35 herds in Serra D'Arga Portugal 2016-2018. Six examples of that were natal disperses and the other 11 examples were secondary transfers. In this presentation, I will report about preliminary analysis about some factors which is predicted to related to the secondary transfer and females' herd choice, including seasons, size of the group, the number of the males of the herd and the relationship between females.

## A study plan about feeding behavior in captive giraffes

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It is said that ruminating behavior allows many kinds of even toed ungulates to digest food in safe places and spend less time taking it in places where they may be at risk of predation. Some experimental studies on domestic cattle, goats and sheep show that rumination occurs more often at night than in the daytime. Most ruminants do it lying down, while giraffes (*giraffa camelopardalis*), which are the largest ruminants in the world, do not lie so often because it takes them longer to stand up if danger arises. Giraffes chew their cud standing and lying down, but we have little knowledge of the exact details of their postures while ruminating. Previous studies show that ruminating behavior in giraffes could be influenced by food, their feeding behavior, the ambient temperature or their psychological states. The aim of this study is to investigate feeding behavior in giraffes including rumination, focusing on their postures, from the observation of captive giraffes in Japan. In this presentation, I discuss this study plan.

## Using dynamic animal social networks to improve the study of infectious disease transmission

Kenneth Keuk<sup>1\*</sup>, Julie Duboscq<sup>1</sup>, and Andrew J. J. MacIntosh<sup>1</sup>

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People change, so do their relationships. Social animals also build dynamic relationships. Social Network Analysis (SNA), a mathematical tool used to summarize and quantify the relationships in a group at different scales, can be used to study links between social behaviour and infectious disease transmission. For instance, studying Japanese macaques on Kōshima (*Macaca fuscata*) and Yakushima (*M. f. yakui*) has shown positive correlations between an individual's centrality in the social network and its degree of gastro-intestinal parasitism. But since these correlations relied on social networks derived from aggregate data collected over large periods (e.g. whole seasons), there was little room for testing whether social relationships change with time, and how this might affect the relationship between networks and infection. Moreover, current (estimated) levels of parasite infection do not reflect current levels of parasite acquisition, which is really what we aim to link with social networks. Especially for intestinal helminths, a prepatent period defines the time interval between when parasites are acquired and when they can be detected in a host, something previous studies have not considered. The aim of the present study was thus to test whether dynamic social networks, inclusive of a time lag (7-10 weeks prior to infection measurements) to incorporate the prepatent period of a specific intestinal nematode (*Trichuris* sp.), better predict infection phenotypes than static networks derived from aggregate and concurrent data. We use our model on a simulated extreme example before applying it to an empirical data set from Kōshima macaques, and discuss the potential implications and applications of such models for epidemiological research.

The 10<sup>th</sup> International Symposium on Primatology and Wildlife Science

## **Workshop on Science Communication: Mobile Filmmaking**

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**Schedule**  
2:00-3:00 Giraffes: Africa's Gentle Giants  
3:00-3:15 Break  
3:15-3:45 Last of the Longnecks  
3:45-5:30 Discussion





Japanese macaque / Photo by Aru Toyoda

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Meet the animals in Japan Post-congress tour opportunities (27th June -) :

Japan Monkey Centre & Primate Research Institute, Kyoto University (Inuyama, Aichi)

Kumamoto Sanctuary, Kyoto University (Uki, Kumamoto) / Koshima Island (Kushima, Miyazaki) / Yakushima Island (Kumage, Kagoshima)

Correspondence :

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Host organizations



Leading Graduate Program in Primatology and Wildlife Science, Kyoto University

Kyoto City Zoo / Japan Monkey Centre / SHAPE-Japan / International Core of Excellence for Tropical Biodiversity Conservation focusing on Large Animal Studies



# Introduction to the Program

## Leading Graduate Program in Primatology and Wildlife Science (PWS)

The Leading Graduate Program in Primatology and Wildlife Science (PWS) strives to realize global well-being. The program aims to foster individuals with the ability to make quick judgements about environmental issues and to design a future global society, while at the same time nurturing leaders indispensable for global action.

Japanese primatology has played a leading role in this unique academic endeavor. During recent years, the field of “Wildlife Science”, which targets endangered species research, has begun to emerge. **With fieldwork as its foundation, the fundamental aims of this field are a comprehensive understanding of the human mind, body, life and genome, as well as hands-on activities that target the well-being of the world.**

While on the frontlines of academic research, wildlife science in Japan lacks three important careers that already exist in the West: **(1) Conservation specialists with international organization, such as the United Nations and other NGOs; (2) Curators of museums, zoos, aquariums, and similar institutions, particularly those that can develop and/or expand museums or zoos as a “field museums” in a specific habitat; and (3) Dedicated individuals that invest great lengths of time in outreach activities in specific countries and societies, the so-called “boots-on-the-ground” approach.**

While providing a foundation for new research, education and hands-on experience, this program aims to nurture global leaders whose accomplishments grow hand-in-hand with the larger academic field. For further details on the program, please refer to our HP. (<http://www.wildlife-science.org/>)



1

Conservation specialists of international organization(s) such as the United Nations and NGO

Significant international contributions: Produce an individual that acquires expertise, high linguistic skills, and experience in fieldwork



2

Curator (Zoo, Museum, Aquarium, and the like) (Ph.D. level curator)

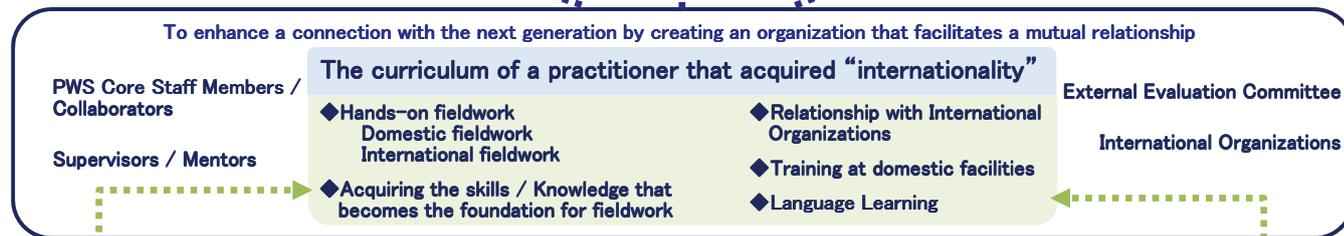
A career path in specialized knowledge, demonstrating one's experiences, and contributing to society



3

Outreach workers investing a great length of time in outreach activities in a specific country and society

Expanding Kyoto University's tradition: Identifying the needs through on-site field of view; a leader who can propose significant contributions to Japan



English achievements received by entrance exam, education, and degree through the “Global 30” Project

- ◆ General admission to the Division of Biological Science, Graduate School of Science, Kyoto University (Entrance exam in August, Enrollment in April)
- ◆ International enrollment from Spring and Fall of 2009: entrance exam for foreign students only

### Facilities for International Collaborations

We have field stations in 3 of the largest tropical rain forest (Amazon, Congo, Borneo)



### Domestic Facilities for Fieldwork Courses



### The enrollment process of the Leading Graduate Program in Primatology and Wildlife Science

The Leading Graduate Program in Primatology and Wildlife Science (PWS) is a 5-year program. Students approved to join the PWS program from their first year of Master's program will progress from L1, L2, L3, L4, L5, and will complete the program in 5 years.

**The PWS program is completed by students parallel to their existing Kyoto University master's and doctoral programs. Therefore, students do not need to change their supervisor or section/laboratory to join PWS.** However, there are two necessary conditions for eligibility:

#### 1. A graduate student of Kyoto University:

It is required to become a graduate student of the Division of Biological Science, Graduate School of Science (Kyoto University). However, we are in the process of adjustment for students of other graduate departments to enroll in our program, so please do not hesitate to inquire.

#### 2. To apply and receive approval to enroll into our program:

The process is the same for both Japanese natives and foreign students. Eligible students: 1<sup>st</sup> year Master's students (will be called L1 student), or a doctoral students (will be called L3 student). Annually, we will disclose the guidelines for applicants in mid-January, and administer the entrance exam in the beginning of March. The schedule for October-enrolled students is different. (<http://www.wildlife-science.org/index-en.html>)



# Curriculum

## Leading Graduate Program in Primatology and Wildlife Science (PWS)

The following contents show the curriculum and schedule that the Leading Graduate Program in Primatology and Wildlife Science offer. Credits obtained through the mandatory courses can also be used as credit for Graduate School of Science, Kyoto University.

NOTE: Course schedules are subject to change. For more information, refer to the following site: <http://www.wildlife-science.org/en/curriculum/>  
Please contact the following e-mail address for any questions about the curriculum of PWS: [info@wildlife-science.org](mailto:info@wildlife-science.org)

### MANDATORY COURSES (corresponds to Master course)



#### ◎Interdepartmental Exchange "Inter-lab"

To obtain a general idea of the diverse areas of study in the Division of Biological Science, Kyoto University. Visit the following facilities in succession: Kyoto City Zoo, Center for Ecological Research (KU), Research Reactor Institute (KU), Seto Marine Biological Laboratory (KU), Primate Research Institute (KU), Japan Monkey Centre

Apr. 3<sup>rd</sup>-8<sup>th</sup>, 2018



#### ◎KOSHIMA Field Science Course

To learn the basis of wildlife research. Conduct observation on wild Japanese macaques (protected species) in Koshima, the birthplace of Japanese primatology. Required to develop independent research topic (e.g., Identification of food items in feces)

PRI: Apr. 22<sup>th</sup>-28<sup>th</sup>, 2018  
WRC: May 6<sup>th</sup>-12<sup>th</sup>, 2018



#### ◎YAKUSHIMA Field Science Course

To learn the basis of wildlife research. Conduct fieldwork on animals/plants in Yakushima, a UNESCO World Heritage Site. English is the official language in this course to facilitate exchange of ideas with international participants, e.g. from Tanzania, India, Malaysia and elsewhere. Samples collected during the course will be used in the following Genome Science Course.

Spring: May 19<sup>th</sup>-26<sup>th</sup>, 2018  
Fall: Nov. 3<sup>rd</sup>-9<sup>th</sup>, 2018



#### ◎Genome Science Course

Complementary to the Yakushima Field Science Course. Designed for participants who expect to engage in both laboratory work and fieldwork. Beginner (direct sequencing) and advanced (next generation sequencing) courses are available. English is the official language as in the previous course. The samples from Yakushima will be used to perform various experiments and analyses. Students give a poster presentation at the international symposium scheduled on the last day of this course.

Spring: May 28<sup>th</sup>-June 1<sup>st</sup>, 2018  
Fall: Nov. 12<sup>th</sup>-16<sup>th</sup>, 2018



#### ◎Zoo/Museum Course

To obtain practical experience in environmental education in the field of primatology/wildlife science as well as to learn to work as a curator, one of the three exit points of the PWS program. This course provides lectures by zoo technicians and practical training as zookeepers.

Place: Japan Monkey Centre

Spring: Jul. 7<sup>th</sup>-9<sup>th</sup>, 2018  
Fall: TBD(Feb. 8<sup>th</sup>-10<sup>th</sup>, 2018)



#### ◎Comparative Cognitive Science Course / Animal Welfare Course

To learn the basis of comparative cognitive science. Understand the procedures in cognitive experimentation and behavioral observation. Work with:

- Chimpanzees & Horses (Primate Research Institute): Comparative Cognitive Science Course
- Bonobos (Kumamoto Sanctuary): Animal Welfare Course

Comparative Cognitive Course: Sep. 10<sup>th</sup>-12<sup>th</sup>, 2018  
Animal Welfare Course: Oct. 23<sup>rd</sup>-26<sup>th</sup>, 2018



#### ◎ SASAGAMINE Field Science Course

(Non-snow season / Snow Season)

To learn survival skills as the basis for future fieldwork. Activities include:

- Wildlife observation
- Climbing Hiuchi Mountain (2,420m)
- Night-time bivouac practicum (improvised encampment)

Place: Kyoto University Sasagamine Hütte (cabin) in Myoko-kogen (plateau at 1,300m elevation), Niigata Prefecture

Non-snow Season: Jul. 17<sup>th</sup>-20<sup>th</sup>, 2018  
Snow Season: Mar. 16<sup>th</sup>-20<sup>th</sup>, 2019



#### ◎Fieldwork (designed by each PWS student)

To develop skills in planning projects aimed at one or more of the three exit points (goals) of the PWS program (i.e., conservation specialization, curation, outreach). Required to design/conduct individual overseas training projects.

Many group fieldworks are designed by Students.

- JIGOKUDANI/TAKASAKIYAMA
- Kids Jamboree@ TOKYO
- SHODOSHIMA
- SHIRETOKO (Killer Whale)
- San Francisco

#### EXAMPLES (Academic Year 2017):

Aug. 1<sup>st</sup>-Oct. 1<sup>st</sup>, 2017 (L1@UGANDA): Monitoring the lifestyle of African elephants in the Kibale National Park, Uganda  
Feb. 1<sup>st</sup>-Jul. 21<sup>st</sup>, 2017 (L4@DRCONGO): A sex difference of mother offspring relationships in bonobo patrilineal societies  
Feb. 16<sup>th</sup>-June 21<sup>st</sup>, 2017 (L4@INDIA): Vocal communication in Asian elephants  
May 8<sup>th</sup>-Sep. 11<sup>th</sup>, 2017 (L5@Tanzania): Social structure and behavior of giraffe (*giraffe camelopardalis*) in Katavi National Park

### LONG-TERM INTERNSHIP TRAININGS (corresponds to Doctoral course)



#### ◎Conservation Biology Internship Training

UN-related organizations and NGOs



#### ◎Animal Welfare Internship Training

Museums, Zoos and Aquariums



#### ◎Social Outreach Internship Training

Outreach activities in specific countries and societies

### LIBERAL ARTS SUBJECTS



#### ◎Buddha Seminar

- Lectures from WWF officers, ambassadors, governors, etc.  
- Official language: not specified



#### ◎Asura International Seminar

- Lectures from researchers, government officials from the United Kingdom, Congo, Brazil, Bhutan, etc.  
- Official language: English

### LANGUAGE LEARNING

"Self-Study Paradigm"  
"Hands-on Experience through Fieldwork"



Students are required to become proficient in at least one foreign language in addition to their native language. English is required for all students whose native language is not English. International students whose native language is English are required to master another language of their choice. Students are also strongly recommended to learn a second foreign language.

### The International Symposia on Primatology and Wildlife Science



- The 1<sup>st</sup>: Mar. 06-08, 2014  
- The 2<sup>nd</sup>: Aug. 29-30, 2014  
- The 3<sup>rd</sup>: Mar. 05-08, 2015  
- The 4<sup>th</sup>: Jul. 21-22, 2015  
- The 5<sup>th</sup>: Mar. 03-06, 2016  
- The 6<sup>th</sup>: Sep. 12-15, 2016  
- The 7<sup>th</sup>: Mar. 02-05, 2017  
- The 8<sup>th</sup>: Sep. 26-28, 2017  
- The 9<sup>th</sup>: Mar. 03-05, 2018  
- The 10<sup>th</sup>: Sep. 22-24, 2018  
- The 11<sup>th</sup>: Mar. 01-03, 2019