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DAY 1: 13 May 2024

Panel Discussion

Using Species Victim Impact Statements to deter wildlife crime

Presenter: *Amanda Whitfort (the University of Hong Kong (HKU), Hong Kong)*

The Species Victim Impact Statement (SVIS) Initiative is a research project used to educate prosecutors and judges globally about the impacts of illegal wildlife trade. Legal professionals may find it hard access the necessary scientific information to assess the harms done by wildlife crime. The initiative, founded in 2016 by Associate Professor Amanda Whitfort at the University of Hong Kong, gives animals and ecosystems a voice in court. Partnering with the Kadoorie Biological Farm and Botanical Garden and the HKU Conservation Forensics Laboratory, law and ecology experts initially developed 33 victim impact statements for Asia's most endangered species. Expanding to 150 victim impact statements in 2024, the SVIS now include not only charismatic megafauna but also species that are less well known but heavily exploited in illegal wildlife trade. The statements are regularly updated to take account of the latest scientific research, and SVIS dealing with additional species are being developed as needed. Use in presenting the SVIS at court has been provided to Hong Kong government's Agriculture Fisheries and Conservation Department, Customs and Excise Department and Department of Justice. A series of training videos to explain how the species victim impact statements can inform sentencing has been developed for the Hong Kong judiciary. Since the development of SVIS, sentences for wildlife crime in Hong Kong have increased by over 2,000%. SVIS have been adapted for use in Mainland China by the Wildlife Conservation Society, by the EIA for use in Nigeria and for investigators and prosecutors in Lao PDR and Thailand in collaboration with WWF Greater Mekong and the Wildlife Justice Commission. They have been featured in training programmes for judges, prosecutors and investigators organised across Southeast Asia by the US Department of Justice, Panthera, Freeland and Planet Indonesia and, in South Africa, by the Endangered Wildlife Trust.

Overview of Kadoorie Farm and Botanic Garden

Presenter: *Wander Meijer (Kadoorie Farm and Botanic Garden (KFBG), Hong Kong)*

In 1956, the Kadoorie Agricultural Aid Association (KAAA) was established, a foundation to help poor immigrants build a new livelihood in Hong Kong. In four decades, more than 300,000 small farmers have been provided livestock, loans, and technical support. Hong Kong transformed over those decades into a service economy and in the nineties, KAAA repurposed itself as Kadoorie Farm & Botanic Garden (KFBG), a nature conservation and education centre. This included the establishment of the Wild Animal Rescue Centre (WARC). Through veterinary care and rehabilitation, wild animals are nurtured back to health, ensuring their successful release back to their natural habitats. Our close partnership with the Society for the Prevention of Cruelty to Animals (SPCA) ensures that rescued wild animals are transferred quickly to the centre. KFBG's WARC is the only non-government wildlife rescue centre operating in the Hong Kong SAR under a special licence from the Agriculture, Fisheries & Conservation Department. Our facilities include a veterinary hospital, quarantine facilities, and animal holding enclosures. This year, the WARC celebrates its 30th anniversary and in May 2024, we received the 70,000th rescued animal. Over this period, diverse birds, mammals, snakes, and reptiles (often seized turtles from Illegal Wildlife Trade) have found a (temporary) sanctuary at the WARC. Unfortunately, Hong Kong has become a global centre for Illegal Wildlife Trade (IWT). Exotic animals were in the past mostly traded for food, nowadays more for pets, but the result is the same: suffering of animals, some which die slowly during transport, and the depletion of nature. When the authorities seize the victims of the IWT, many are transferred to the WARC for life giving care, and the provision of a temporary home. Eventually we repatriate them to their countries of origin for wild release or rehome into accredited conservation programmes.

Understanding the magnitude of legal wildlife trade

Presenter: *Alice Hughes (HKU, Hong Kong)*

Overexploitation of wildlife has been demonstrated as one of the greatest threats to the survival of species. Yet whilst many people appreciate the threat posed by illegal wildlife trade, the threat posed by legal trade is often underappreciated, and legal trade is often conflated with sustainable trade, despite the lack of evidence in the majority of cases that it is in fact sustainable. Few countries both database and publicly release their data on wildlife trade, however the Fish and Wildlife Service of the United States is one of the few that does through the Law Enforcement Management Information System (LEMIS). We explore 22 years of data (2000-2022) collated through LEMIS, quantify what is in trade across all major taxa. LEMIS included 21,097 species traded across this time, which increases to 29,445 when CITES is included. Gauging sustainability also requires understanding the origins of wildlife, as animals collected

from the wild or bred in captivity, yet for many taxa at least half individuals come from the wild, and over 2.85 billion whole individuals were traded over this period. These volumes of trade pose not only a potential risk to wild species, but also a risk of spread of pests and pathogens, and this trade included the import of species regarded as "injurious invasive" species. Finally, we discuss the implications of this trade, and highlight the need for better data to monitor trade more widely. Despite many issues associated with the use of LEMIS, few Nations collate and release data on wildlife trade, undermining any attempt to understand the true dimensions of trade, or to regulate it to ensure sustainability. We highlight the urgent need for better, more standardised data collection, especially in major import regions such as the European Union to bolster our ability to mitigate the risks posed by trade to the survival of traded species.

Wildlife trade in the wider context of global development

Presenter: *Dirk Pfeiffer (City University of Hong Kong (CityU, Hong Kong), Hong Kong, and Royal Veterinary College, London)*

As one of the benefits of global economic development, it has been predicted that two-thirds of the global middle class will live in Asia by 2030. This will be associated with an increased demand for a range of commodities. However, there is also a high likelihood that this will include commodities related to legal and illegal wildlife trade. The existing trade networks for food and other commodities have been used in the past for such trade, but increasingly new ones, including online trade platforms, have also become important. The background to these developments is the underlying interdependence of social, economic, cultural and ecological systems. An essential characteristic of this complex global eco-social system is that it will reconfigure its structure in response to changes in demand, regulations or other factors. It can also give rise to so-called emergent effects, which are difficult to predict based on linear and reductionistic analytical thinking, which most scientific research is based on. An essential factor in this context is the ever-increasing disconnect between humans and nature, where nature is seen as external and independent from the human sphere. To be able to transform this complex global eco-social system, which leads to climate change, destruction of biodiversity and pandemic emergence via many different mechanisms, including wildlife trade, it will be essential to shift the attitude of humanity from considering itself as being the owner of the ecosystem to it accepting that we are part of it. In that context, it is, for example, not helpful to use the spill-over narrative to support the argument to stop wildlife trade since that emphasises a perceived need to separate humans from the ecosystem. Indeed, a holistic approach is required, such as expressed in the 17 sustainable development goals adopted by all United Nations Member States in 2015, where goal 15 is phrased as follows: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Sustainability of medicinal animal products: Tokay geckos and pangolin scales as traditional Chinese medicine

Presenter: *Yifu Wang (The Chinese University of Hong Kong (CUHK), Shenzhen)*

Co-authors: *Yifu Wang, Pauline C. Dufour, Kit Yi Yeung, Sum Yi Lo, Cherry Cheuk Yiu Cheung, Caroline Dingle, Timothy C. Bonebrake, Hannah S. Mumby (HKU, Hong Kong)*

Traditional Chinese Medicine (TCM) utilizes animal products derived from hundreds of species. For some species, such as the pangolins (family Manidae), demand from the medicinal trade has been recognized as a major threat and is under strict regulations to conserve declining endangered populations. In parallel, species such as the tokay gecko (*Gekko gecko* and *Gekko reevesii*) have only recently attracted conservation attention due to the high volumes in trade despite an apparently still abundant wild population. In this study, we collected market data to assess the trade in pangolin (illegal trade) and tokay gecko (legal trade) medicinal products. We also collect general public's attitude toward the trade and their understanding on the medicinal use of high-profile endangered species (pangolins) and less well-known species (tokay gecko) in Hong Kong. We interviewed a total of 169 shops/clinics and 153 members of the public. We found that tokay gecko was sold in 59% of the surveyed outlets. We estimate that trade volume may reach as many as 0.2 million individuals per year in Hong Kong. The substantial demand for tokay gecko products estimated in this study underscores the urgent need for a thorough assessment of trade sustainability and continuous monitoring of the wild population status of gecko species. In contrast, pangolin scale products were rarely reported, and there was a high level of awareness among sellers regarding the illegality of such products. Our public survey revealed that awareness of the legal status of these products was the most influential factor shaping public choice to support the trade and consequently consume the products. Therefore, setting up legal protection status and enhancing public awareness about the legality of wildlife trade are essential steps toward responsible consumption and conservation. Furthermore, support for the use of alternatives among TCM practitioners presents a promising avenue. This highlights the opportunity to transiting trade toward sustainably sourced alternatives while respecting the traditions associated with TCM.

Forensic session

Wildlife Rescue Enforcement Support & the role of KFBG's Wild Animal Rescue Centre (WARC) in the battle against IWT

Presenter: *Gary Ades (KFBG, Hong Kong)*

Wildlife rescue centres can play an important enforcement support role not only through the urgent captive care of seized exotic animals from the IWT, animals which then become legal evidence, but also by ensuring the seized animals many of which are endangered, reach a positive outcome following the end of the legal case. Additionally, the centres can raise awareness through capacity building exercises for judicial officers and prosecutor teams, providing essential information that can be used when building cases. Information can include impacts on animal populations, ecological stress on ecosystems, cruelty and harm to indigenous communities that have been exploited by the criminal activities. Rescue centres can provide information not the judiciary regarding the "hidden costs" (financial and human resources) of post seizure activities. These are costs directly resulting from the criminal trafficking of species and are not so apparent to the courts. Provision of reliable, scientific data can aid informed sentencing related to wildlife offences. Rescue centres also have the role of identifying traded species and communicating with international species conservation networks. This can allow repatriations and rehoming to be undertaken following the IUCN Guidelines on Reintroductions. There is concern that wildlife rescue work in Hong Kong has seen species traded as pets that are data deficient in the wild and even new to science. This suggests that the criminal networks are infiltrating wilderness areas that have yet to receive scientific exploration. The concern is that some species may become extinct before they are described.

Development of DNA protocols for efficient identification of CITES listed wood and shark samples

Presenter: *Pang-Chui Shaw, School of Life Sciences, Institute of Chinese Medicine and Li Dak Sum Yip Yio Chin R & D Centre for Chinese Medicine (CUHK, Hong Kong)*

Co-authors: *Pang-Chui Shaw and Grace Wing-Chiu But (CUHK, Hong Kong)*

As people in Asia become more affluent, there is an increasing demand of exotic plant and animal products. Hong Kong is a trading centre and entrepot and a hotspot of trafficking. To provide a proper tool for the monitoring of these activities, our team has compared and found an efficient method for extracting the DNA from rosewood and agarwood timber logs and commercial products. We also developed an efficient DNA extraction procedure for shark fin DNA extraction and adopted Loop-mediated isothermal amplification (LAMP) for rapid identification of a number of selected species. Our work has contributed to the conservation and regulation for the trading of the high demand and endangered plant and animal materials.

Preserving Peninsular Malaysia's Wildlife: the role of National Wildlife Forensic Laboratory (NWFL), PERHILITAN

Presenter: *Noor Azleen Binti Mohd Kulaimi, Department of Wildlife and National Parks Peninsular Malaysia (National Wildlife Forensic Laboratory (NWFL), Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN), Malaysia)*

Co-authors: *Noor Azleen Mohd Kulaimi, Jeffrine Rovie Ryan Japning, Frankie Thomas Sitam, Millawati Gani, Norsyamimi Rosli, Kayal Vizi Jaruppannan, Mohd Lutfi Abdullah, Hartini Ithnin (NWFL, PERHILITAN, Malaysia)*

Wildlife forensics plays a crucial role in the conservation and preservation of wildlife species. Pertaining to this importance, the Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN) established the Wildlife DNA Forensic Unit in 2009 with the purpose to enhance enforcement and prosecution of wildlife-related offences, as well as conducting wildlife genetic research. In 2012, a new laboratory facility named the National Wildlife Forensic Laboratory (NWFL) was built to expand on the success of this small unit. The new structure, with a more organised workflow and equipped with machines and equipment, enabled the lab to attain ISO/IEC 17025:2017 accreditation in July 2021. To date, the NWFL has received more than 500 wildlife enforcement cases from local and international authorities. The NWFL has also successfully catalogued 18,820 biomaterial samples comprising 418 wildlife species, serving as a forensic reference, and supporting research in wildlife genetics and zoonotic diseases.

Challenges on establishing a wildlife forensic laboratory in Sarawak Forestry Corporation (SFC)

Presenter: *Azroie Bin Denel (Sarawak Forestry Corporation (SFC), Malaysia)*

Co-authors: *Azroie Bin Denel, Nur Afiqah Aqilah Binti Azhar, Sepawi Bin Saie, Ahmad Adli Hakimi Bin Ali, Abang Arabi Abang Aimran (Sarawak Forestry Corporation, Malaysia)*

Establishing a Wildlife Forensic Laboratory in Sarawak Forestry Corporation involves securing funding, acquiring advanced equipment, hiring specialized personnel, and collaborating with relevant authorities to ensure effective wildlife crime investigation and conservation efforts. Engage with stakeholders, develop a comprehensive plan, and navigate regulatory requirements for a successful implementation.

Wildlife forensics work in Vietnam: a brief introduction

Presenter: *Truong Quang Nguyen (Institute of Ecology and Biological Resources, VAST, Vietnam)*

The Institute of Ecology and Biological Resources (IEBR) is the official CITES Scientific Authority of Viet Nam. In order to support law enforcement, experts of the Forensics Working Group of IEBR conducts taxonomic identification for animal species. The working group closely works with CITES Management Authority and other enforcement agencies. For technical advice, the working group has collaborated with overseas scientific institutions, TRACE Wildlife Forensics Network (UK), and other non-governmental organizations. The IEBR Wildlife Forensics Laboratory (WFL) specializes in species identification of illegal wildlife items using DNA and forensic techniques, focusing on pangolin, rhinos, tigers, and elephant items. With an updated quality-controlled facility, and new standardized protocols, IEBR WFL is equipped to process over a 100 cases per year submitted by law enforcement and can handle even the largest of seizures.

Wildlife Forensics at the Australian Centre for Wildlife Genomics at the Australian Museum Australian Forensics Lab

Presenter: *Greta Frankham (Australian Museum Research Institute; Centre for Forensic Science, University of Technology, Sydney, Australia)*

The Australian Museum (AM) is Australia's first museum and is the largest collection in the Southern Hemisphere with more than 22 million objects and specimens. The Australian Museum Research Institute (AMRI) which houses the AM's scientific staff oversees collections from nine -ologies and uses these collections to underpin research into areas essential for understanding earths biodiversity. The Australian Centre for Wildlife Genomics (ACWG), is key research infrastructure providing not only molecular research capacity to AMRI staff, but also diagnostic services to a range of external stakeholders. Despite the raft of environment and biosecurity laws enforced by Australian governments at both a State and Federal level, there was no federally mandated or resourced wildlife forensic capacity in Australia. Therefore in 2013 the ACWG achieved ISO/IEC: 17025 accreditation for wildlife forensics provision to fill this gap and has been providing expert DNA evidence to Federal and State based agencies enforcing Australia's environment and biosecurity laws since then. This talk will provide an overview of the ACWG and the Australian Museum, the case work commonly encountered by the ACWG and touch on the research carried out by the ACWG to improve wildlife forensic methods available to the community as a whole.

DAY 2: 14 May 2024

Panel Discussion

Using wildlife forensics to tackle illegal turtle trade

Presenter: *Yik-Hei Sung (the University of Suffolk, UK)*

Turtles are one of the most endangered groups of organisms. Many species are severely harvested to fulfil the insatiable demand of the pet and food markets. Hong Kong is one of the most active markets for turtle trade, with over one-third of all species available for sale. Furthermore, while there are a few remnant populations of native species, illegal hunting has been rampant, and most populations are no longer viable. A major shortcoming of enforcement against illegal trade and hunting is the inability to distinguish between wild and captive turtles. To overcome this, we have tested and applied various methods in Hong Kong. We evaluated the usefulness of stable isotope analysis, faecal analysis, individual recognition using shell notching and microchips in distinguishing wild and captive turtles. Additionally, a study testing the prevalence of blood parasites in wild and captive turtles is ongoing. In the long term, we hope to standardise the protocol for collecting samples from seized turtles to determine their sources and extend these wildlife forensics methods to other turtle species and regions.

Genomics-based forensics for tracing illegally harvested incense trees (*Aquilaria sinensis*)

Presenter: *Kerry Reid (HKU, Hong Kong)*

Co-authors: *Kerry Reid, Uva Y.Y. Fung (HKU, Hong Kong), Weixuan Ning (HKU, Hong Kong), Arthur F. Sands (HKU, Hong Kong), Astrid A. Andersson (HKU, Hong Kong), Ryan Ho Leung Tsang the Agriculture, Fisheries, and Conservation Department (AFCD) of Hong Kong SAR government, Hong Kong), Eric Ka Yip Liu (AFCD, Hong Kong), Juha Merilä (HKU, Hong Kong)*

The illegal harvest of endangered tree species poses a significant threat to their long-term viability. Genomics approaches are emerging as a valuable tool for identifying the origin of plant material that has been illegally harvested. Incense trees (Aquilaria sinensis) are illegally harvested across Asia due to their high market value for naturally produced agarwood. This problem is particularly prevalent in Hong Kong and the Agricultural, Fisheries and Conservation Department is developing a molecular database of existing trees to enable tracing of illegally harvested agarwood, with the goal of prosecuting offenders. Here we present an analytical framework based on a police case study using Sanger and next-generation sequencing approaches to match plant particulates found on personal items to illegally harvested source

trees in Hong Kong. In March 2023 suspects were arrested and their personal items were confiscated. Plant material found on these personal items were catalogued before being processed in a molecular lab. Sanger sequenced DNA was used to identify plant species and samples identified as incense trees were sent for Illumina whole genome sequencing. With the aid of molecular analyses, we were able to match DNA from plant particles from confiscated items to the source trees as well as identify kin relationships among potential source trees within each other's close proximity. Our results show that small plant particulates can provide enough genomic DNA to match it with potential source trees in the genomic database. As such, the analytical framework presented here should be useful for tracing the origin of illegally harvested endangered incense trees, and support efforts to prosecute individuals involved with illegal harvest and mitigate wildlife crime in Hong Kong.

The Journey So Far - a machine learning system to isolate potential illegal wildlife trade products from online marketplaces.

Presenter: *Shaun Martin (WWF Asia-Pacific Counter Illegal Wildlife Trade Hub)*

Co-authors: *Shaun Martin, Jayasri Srikantan (WWF Singapore)*

The Illegal wildlife trade (IWT) is the second largest driver of biodiversity loss after deforestation. Given the extensive use of online marketplaces, IWT operates through the online medium also. Sieving out illegal wildlife trade listings from the vast range of products available online is not an easy task. Previously, monitoring of this trade included manually searching online marketplaces and social media community groups to find and propose IWT posts and advertisements for delisting. However, given the vastness of the numbers of posts and sites in cyberspace, this method proved laborious and time-consuming. Given the urgency of Illegal Wildlife Trade, we needed a solution to reduce the turnaround time from identifying the listing to reporting for actions by platforms and authorities. Originally, volunteers under the WWF-Singapore's Cyber Spotters Programme manually 'scraped' online platforms to record and report these listings. Large numbers of listings collected is manually verified before submitting to the e-commerce platforms and law enforcement authorities. Since the beginning of 2023, WWF Singapore (WWF-SG) and WWF Asia-Pacific Counter-Illegal Wildlife Trade Hub (WWF-HUB) have been working to develop an ML solution that can isolate potential listings of illegal wildlife trade products from online marketplaces. Currently, the system is being deployed to run inferences on new data from Cyber Spotters Programme and constantly retrained to keep up with the new online trends for IWT sales. We are currently developing a complementary dashboard to visualise data analysed by the AI model. In time, the AI model and dashboard will be integrated into WWF-SG's Cyberspotters program and will incorporate data from various monitoring programs in the region. Though this initiative is still in its infancy, we wish to share our work, lessons learned and intentions for future development.

Trading in Extinction: the importance of HKSAR to global biodiversity

Presenter: *Sam Inglis (ADM Capital Foundation, Hong Kong)*

Co-authors: *Sam Inglis, Sophie le Clue, Christie Wong (ADM Capital Foundation, Hong Kong)*

The Hong Kong Special Administrative Region (HKSAR) is a vast and underappreciated hub in the global wildlife trade. The city has grown to dominate the trade in many CITES-regulated species (both alive and dead). Between 2015 and 2021, the HKSAR imported 24,500 tonnes of wildlife products and millions of live animals from over 130 jurisdictions. The city led global CITES imports of live reptiles, shark fins, American ginseng roots, crocodilian meats, and mammal-based medicines, often importing more than global superpowers. Where there is legal trade, illegal trade is inevitable. Analysis by ADMCF shows that, since 2010, authorities in the HKSAR have intercepted around 5,170 trafficking attempts involving 2,840 tonnes of wildlife from over 100 species, conservatively valued at HKD1.4 billion. In recent years, we have observed declines in seizures of iconic species (e.g., elephant ivory, pangolin scales, rhino horn) as controls have tightened. In their wake, however, an increasing number of species and products have been confiscated, with the rise in seizures of red sandalwood, American ginseng, European eels, shark fins as well as non-CITES regulated species. In this presentation, we will shed light on the scale and diversity of the HKSAR's trade, its impacts, the criminals facilitating these crimes and provide reflections on where enhancements could be made to improve counter-IWT efforts.

Anti-Money Laundering efforts by TRAFFIC China

Presenter: *Linda Chou (TRAFFIC China, China)*

Using financial approach to combat illegal wildlife trade is an innovative way to tackle wildlife crime. Disrupting the commodity flow of IWT has been the major law enforcement efforts which indeed made significant contributions to many major wildlife seizures. However, in most of the wildlife seizures, the commodity flow is interrupted and low-level criminals, such poachers, mules who directly carry out smuggling activities, are captured and prosecuted. The senior or key members actually operating the criminal group and receive the illicit proceeds are usually unaffected. As long as the mastermind of criminal group remain in large, they could keep continuing all kinds of illicit activities, like bribery, corruption, etc. When anti-money laundering measures are applied, a wider array of individuals and high-level actors within the crime network could be tracked down. Recovery of criminal proceeds and property would effectively remove or disrupt the financial support and the infrastructure that allows the criminal groups to operate. Additionally, offences included in anti-money laundering legislation carry stronger penalties, thereby increasing the deterrent effect. TRAFFIC China started Anti-Money laundering Project started in September with the generous support from the Bureau of International Narcotics and

Law Enforcement Affairs (INL), the U.S. Department of State. This project aims improving China's will and capacity to investigate, arrest, prosecute, convict, and sentence to the fullest extent of the law the perpetrators of wildlife crime, with a focus on AML approaches. To reach the goal, TRAFFIC China has improved financial sectors and law enforcement's awareness and capacity in using AML measures by producing reports/training materials and delivering training workshop; facilitated the communication and information sharing between public and private sectors, as well as the mutual understanding between anti-money laundering regulatory and wildlife management authorities.

Individual Talks

Preservation through Partnerships - the case of the two songbirds

Presenter: *Jessica Lee (Mandai Nature, Singapore)*

Co-authors: *Jessica Lee, Serene Chng (TRAFFIC Southeast Asia, Malaysia)*

Songbird-keeping is considered part of Southeast Asian culture and tradition. This region is an enormous hub for not only the domestic, but also the international songbird trade that involves hundreds of species and hundreds of thousands of birds. Poaching for the trade, along with habitat loss, are recognised as the greatest threats to an ever-growing list of bird species in Southeast Asia, with many perilously close to extinction, and this has been dubbed the Asian Songbird Trade Crisis. There is an urgent need for enhanced regulation, monitoring, and enforcement efforts to tackle this illicit trade in live songbirds, as well as a more coordinated conservation approach. In response to this crisis, an alliance of organisations and individuals from various fields came together to form an interdisciplinary IUCN-SCC Specialist Group dedicated to tackling the songbird trade, and the production of the Asian Songbird Conservation Strategy. This presentation illustrates our progress as the IUCN-SSC Asian Songbird Trade Specialist Group thus far and how effective partnerships led to the recent listing and up-listing of two songbird species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Saving Beluga: the role of non-state actors in China and Korea

Presenter: *Annie Young Song (Yonsei University, South Korea)*

Co-authors: *Annie Young Song, Hubert Cheung (Sapienza University of Rome, Italy)*

We explore how non-state actors play a role in facilitating the release of beluga whales (*Delphinapterus leucas*) in China and South Korea. While beluga whales are protected under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and by domestic regulations in various countries, such as the US and Russia, some individuals spend their entire lives in captivity around the world. In China and Korea, beluga whales have been held in private aquariums, drawing criticism for the detrimental effects on their well-being. In 2020, two beluga whales in China were relocated to a sanctuary in Iceland. Similarly, a Korean aquarium pledged to release beluga whales in 2019, but as of 2024, this commitment remains unfulfilled. Despite the long-lasting international pressure, why did private actors in China and Korea decide to release Beluga only recently? We highlight the critical role of non-state actors in pressuring private actors in their handling of wildlife. Our study sheds light on how non-state actors influence decisions regarding the release of beluga whales within different regulatory frameworks.

Organised Crime and Wildlife

Presenter: *Rebecca Wong (CityU, Hong Kong)*

When one thinks of organized crime, concepts such as violence, extortion and contempt for law and justice automatically come to mind. Organised crime groups threaten businesses and individuals and undermine the well-being of societies. To some, it is difficult to see the connection between organized crime and animal suffering, but they are not unrelated. It would be premature to conclude that victims of organized crime are limited to human beings when there is documented empirical evidence to suggest that organized crime groups are now profiting from the exploitation of non-human beings. In my talk, I will outline for the audience the connections between organized crime and animals with a specific focus on the illegal wildlife trade.

Genomics Advances: from COVID-19 to wildlife conservation

Presenter: *Agostinho Antunes (CIIMAR, University of Porto, Portugal)*

The World Health Organization proposed the One Health goal as an integrated, unifying approach that aims to sustainably balance and enhance the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems), overall, closely linked and inter-dependent. Such considerations are particularly important to prevent, forecast, identify, and answer global health threats such as the COVID-19 pandemic. Recently, genomics advances have been fundamental to understand health, genetic disease, biodiversity, and conservation, and much assisted our understanding of species evolution, including the rapid diversification of COVID-19. The interpretation of whole genome sequencing data generated across multiple organisms, from microorganisms to higher vertebrates, is elucidating their genetic uniqueness, evolutionary histories, and patterns of genetic diversity, which are highly valuable for managing species conservation effectively in-situ and ex-situ. Recent advances in next-generation genomics for conservation of biodiversity will be discussed (including forensic genomics of wildlife trade and zoonotic diseases, such as the COVID-19), with emphasis on charismatic case studies comprehending several endangered species.

ShellBank: A global DNA database and forensic toolkit to trace the illegal marine turtle trade

Presenter: *Greta Frankham (Australian Museum Research Institute; Centre for Forensic Science, University of Technology, Sydney, Australia)*

Co-authors: *Greta Frankham, Michael Jensen (WWF-Australia, Australia), Kelly Morgan (TRACE Wildlife Forensics Network, UK), Erin LaCasella (Southwest Fisheries Science Centre, NOAA Fisheries, USA), Christine Madden (WWF-Australia, Australia).*

Between 1844 and 1992 an estimated 9 million hawksbill turtles were harvested for the tortoiseshell trade. The illegal trade in hawksbills and other species of marine turtles continues, despite being listed on CITES Appendix I, which prohibits all international trade in these species. Marine turtles are globally distributed, and poaching occurs on nesting beaches, as well as in national and in international waters. Policing this trade is therefore highly complex and requires coordinated transnational efforts to combat it. Here we present 'ShellBank', a World Wide Fund for Nature (WWF) led initiative, aiming to enable scientists, conservationists and policy makers to track the illegal trade of marine turtle products ("from sale back to source"). ShellBank's main aims are to 1) Build and advance traceability knowledge and technologies for illegal wildlife trade, 2) Coordinate access to and expand genetic data for conservation and wildlife forensic purposes and 3) Train wildlife law enforcers/forensic scientists in-country and embed action against the illegal marine turtle trade as common practice. In late 2022, the 'ShellBank' website (https://shellbankproject.org/) was launched, a central point for researchers, wildlife agencies and wildlife forensic practitioners to submit and access scientific and genetic resources needed to fight this trade. The website hosts three mtDNA reference databases being compiled through an international network of ShellBank collaborators. These are 1) the Rookery Baseline Database; mtDNA from nesting turtles to define population boundaries on land; 2) the In-Water Database; mtDNA from foraging, stranded and by-catch animals to define the population boundaries in the ocean; and 3) the Confiscation Database; mtDNA from poached animals and seized turtle products, to identify which populations are in the illegal trade. Together, these databases will provide a powerful tool to track marine turtle trade and be vital to the ongoing conservation and protection of these important marine species.

Geographic hotspots and priority species in the illegal timber trade network of China

Presenter: *Even Y.M. Leung (HKU, Hong Kong)*

Co-authors: *Even Y.M. Leung, Caroline Dingle, Timothy C. Bonebrake (HKU, Hong Kong)*

The ever-rising demand for, and harvesting pressure on precious wood, such as rosewoods or "Hongmu" (redwood), has placed threatened hardwood species into protection by local and

international laws. However, illegal (and often unsustainable) timber trade still exists in alarming numbers, directly or indirectly driving these tropical timber species to extinction, and potentially leading to ecosystem impacts. To target enforcement and conservation actions, trade quantification and characterization of the illegal sector is required. We collected and analysed media-sourced seizure data from the world's major illegal timber market, China, from 2012 to 2022. We recorded a total of 218 timber seizure incidents and more than 16,000 metric tons of seized wood, involving 45 Chinese cities and 36 countries. Out of the 17 illegally traded species, *Pterocarpus santalinus* (red sandalwood) had the highest seizure number (n=70, 325 metric tons) and *Pterocarpus erinaceus* (barwood) had the highest seizure volume (616 metric tons, n=9). Social network analyses revealed that port cities including Hong Kong and Shenzhen were major transit points, Fujian and Shanghai were major destinations, while India and United Arab Emirates were the major sources of illegal timber. These findings will be useful for cost-effective policy-decisions, targeted enforcement, conservation, and behavioural change efforts at key trade hubs.

Conservation of Helmeted Hornbills in Hong Kong

Presenter: *Ming-chuan Woo (Hong Kong Bird Watching Society, Hong Kong)*

Co-authors: *Ming-chuan Woo, Chloe Hatten (CityU, Hong Kong), Jack Lam (Independent Researcher)*

Helmeted Hornbill (*Rhinoplax vigil*) is a distinct and special looking hornbill native to the rainforests of Southeast Asia. Its population has declined dramatically in recent decade due to severe poaching and habitat loss, with its global conservation status now classified as critically endangered. Hong Kong is not within the home range of this species, yet the city is confirmed as one of the key import hubs for the transfer of the hornbill casques by a trade hotspot map study in 2017. As an environmental NGO with a mission to protect wild birds and their habitats through education, research, habitat management and conservation advocacy, the Hong Kong Bird Watching Society (HKBWS) together with some members of the Helmeted hornbill demand reduction subgroup under the Helmeted Hornbill Working Group initiated a research project looking at the demand for Helmeted Hornbills in Hong Kong and Mainland China. The findings are still under analysis and will be shared with relevant Government departments for follow-up actions. Besides, HKBWS make good use of its strength in education and community engagement, and helped translate different education materials to promote the conservation of Helmeted Hornbill in the past few years. In 2023, there was an opportunity to work with ecologist and conservationists Jacqueline Weir and illustrator Lilian Fu to publish a children storybook about the adventure of two endangered animals – pangolin and helmeted hornbill – in the tropical rainforest. Combining storytelling and interactive games, HKBWS successfully organized several talks for families and school children. Through drawing the attention of young children and

leveraging their influence in the family, HKBWS hopes to continue to educate the younger generation and hopefully bring the demand for helmeted hornbill to a stop.

Acceptability of substitutes for CITES-listed species in Traditional Chinese Medicine amongst the Hong Kong public

Presenter: *Jessica Rizzolo (Oregon State University, USA)*

Co-authors: *Jessica Rizzolo, Hubert Cheung (Sapienza University of Rome, Italy), Jovy Chan (WWF-Hong Kong, Hong Kong)*

While many medicinal ingredients used in Traditional Chinese Medicine (TCM) are products of plants, the use of animal-based medicines derived from threatened and endangered species poses a risk to biodiversity and has garnered significant conservation concerns. The substitution of such products with alternatives that are synthetic, plant-based, or derived from non-endangered or domesticated animal species can be a conservation solution in some cases, but this process is complex. This presentation discusses the results of a quantitative survey conducted in 2023 with members of the general public (n=1556) in Hong Kong. For five species/products (tiger bone, bear bile, tokay gecko, seahorse, and saiga horn), we composed vignettes based on each possible combination of five variables: affordability, legality, accessibility of the substitute, the type of substitute, and conservation status of the species. Respondents were then asked if such a substitute would be acceptable, and acceptability was modeled with the use of logistic regression. 44.6% of respondents somewhat or strongly agreed that consumption of wildlife for TCM in particular is acceptable. While consumption of substitutes for the species examined was high, particularly for seahorse, beliefs about the difference between wild-caught and captive-bred wildlife products affected substitutability. Further, the factors that affected the acceptability of substitutes differed by species. Factors that led to increased acceptability of substitutes was conservation status for tiger bone, ease of obtaining a substitute for bear bile and tokay gecko, having an animal-based substitute for saiga horn, legal status for tokay gecko, and price for saiga horn and seahorse. We discuss the implications of this research for efforts to protect CITES-listed species in Hong Kong.

Assessing the integration of social marketing benchmarks in ivory demand management

Presenter: *Molly Brown (University of York, UK)*

Co-authors: *Molly Brown, Victoria Wells, Colin M. Beale (University of York, UK)*

Demand for wildlife products drives illegal wildlife trade. Ivory accounts for around 33% of wildlife trafficking seizures, indicating a significant demand for ivory still exists today. This demand stems primarily from China and Southeast Asian markets, where social, cultural,

investment, aesthetic and spiritual values are still attached to ivory consumption. Since the late 1980s, approaches to tackling wildlife demand have mainly focused on reducing supply through law enforcement and trade bans. This has led to only 6% of global funding committed to tackling illegal wildlife trade relating to consumer demand. For African elephants, this has not been sufficient in curbing demand for ivory to stop ivory poaching. To support supply-side efforts, behavioural science-led interventions are now recognised for their importance in effective wildlife demand management strategies. However, evidence suggests poor design and implementation have limited their effectiveness globally. We question here how the design and implementation of interventions tackling demand for ivory align with best practices from the transdisciplinary behavioural science practice of social marketing. We analysed 55 interventions from 2008 to 2022 that aimed to influence ivory consumers in China and neighbouring Southeast Asian countries. We used two social marketing evaluative frameworks to assess each intervention's capacity to influence ivory consumer behaviour. We interrogate where, when, and how principles in social marketing are applied (even when done unknowingly) to better understand if behaviour change from these interventions may result in reduced demand for ivory. We found limited integration of social marketing principles in earlier years of intervention roll out (2008 to 2017). Since 2018, we found an uptake in social marketing principles integrated into interventions. However, this uptake is stagnated by our finding of a low quality in the application of the principles. We found interventions designed using strategies from Social Behaviour Change Communications, provide insight into the high quality of behavioural science led interventions. To contribute to the long-term conservation of Africa's elephants, demand management strategies must improve the quality of their interventions by embedding behavioural science theory into their design, conduct systematic monitoring, and carry out meaningful evaluation of behaviour change outcomes.

Speed Talks

Does CITES need to be reformed to be more collaborative and inclusive? Food for thought from Japan's IWC exit

Presenter: *Hubert Cheung (Sapienza University of Rome, Italy)*

Co-authors: *Hubert Cheung, Michelle Anagnostou (University of Waterloo, Canada), Alexander R. Braczkowski (Griffith University, Australia), Daniel W.S. Challender (University of Oxford, UK), Moreno Di Marco (Sapienza University of Rome, Italy), Amy Hinsley (University of Oxford, UK), Takahiro Kubo (National Institute for Environmental Studies, Japan), Hugh P. Possingham (University of Queensland, Australia), Annie Young Song (Yonsei University, South Korea), Nao Takashina (The University of Tokyo), Yifu Wang (CUHK, Shenzhen), Duan Biggs (Northern Arizona University)*

CITES is the primary mechanism for regulating international wildlife trade, and its effective implementation can be a matter of life and death for many traded species. However, polarization over the use of wildlife – especially charismatic megafauna – threatens to tear CITES apart. At CoP18 in 2019, ten Southern African Development Community (SADC) countries announced that they are reconsidering their memberships. Central to this dispute is whether trade in elephant ivory and rhino horn should – and under what conditions – be permissible. Withdrawal by such an ecologically significant bloc would weaken wildlife trade governance and complicate conservation efforts. Threats of withdrawal must be taken seriously – Japan's withdrawal from the International Whaling Commission (IWC) in 2019 set a contemporary precedent for countries to withdraw from major global environmental treaties because of polarized perspectives on wildlife use. There are worrying commonalities between events that led to Japan's IWC withdrawal and how events have been unfolding with CITES and the ten SADC countries. Are there lessons to be learned from Japan's IWC withdrawal that, if applied, could prevent polarization from similarly damaging the integrity of CITES?

Population genomics, structure, and illegal trade of the Sunda pangolin (*Manis javanica*)

Presenter: *Portia Wong (The University of Hong Kong, Hong Kong)*

Co-authors: *Portia Wong, Liz Rose-Jeffreys (KFBG, Hong Kong), Gary Ades (KFBG, Hong Kong), Paolo Momigliano (HKU, Hong Kong), Timothy C. Bonebrake (HKU, Hong Kong)*

Delineating genetic populations of endangered species is an important first step to informing effective conservation decisions, as it serves as a basis for understanding the species' genetic diversity, demography, and defining appropriate conservation units. In the context of wildlife trade, a clear understanding of population structure also helps answer trade-related questions, such as tracing seizure origins and revealing trafficking networks. Pangolins (Order Pholidota) are the most trafficked wild mammals in the world, with the Sunda pangolin (*Manis javanica*) in

particular considered to be one of the most exploited and threatened species in the clade. While there have been genomic investigations into the species' population structure, much of the existing inferences are likely to be incomplete due to gaps in geographic sampling across the species' range. Additionally, the associated trafficking networks and dynamics of the species remains lacking, despite the recent boom in Sunda pangolin genomics literature. By broadly sampling seizure materials in Hong Kong and combining them with available information from other investigations, we used conservation genomics methods to show a comprehensive picture of the Sunda pangolin population structure and identify distinct trafficking routes in Southeast Asia. Using genomes from 125 Sunda pangolin individuals, we identified four distinct genetic populations within the Sunda pangolin species, one of which was previously not recognised. This was also corroborated by a combined dataset of 300 individuals, which included ddRADseq and whole genome data. Additionally, we found that population origin is likely correlated with seizure location, which suggests a sea route and a land route in Sunda pangolin trafficking in Southeast Asia. These results highlight the utility of seizure materials and conservation genomics in answering eco-evolutionary and conservation questions, as well as reveal important ecological and trade information of the Sunda pangolins that will aid in conservation efforts of the Critically Endangered animal.

TrailGuard AI: transforming protection efforts to combat illegal wildlife trade

Presenter: *Andy T. L. Lee (RESOLVE, USA/Hong Kong)*

Co-authors: *Andy T. L. Lee, Eric Dinerstein (RESOLVE, USA), Steve C. Gulick (RESOLVE, USA), Piyush Yadav (Nightjar, USA), Himmat S. Negi (Nightjar, USA), Sankarshan Rastogi (Nightjar, USA)*

Protecting endangered wildlife from poaching is vital in combating illegal wildlife trade. The TrailGuard AI real-time alert system offers an innovative and cost-effective solution to enhance protection efforts in protected areas worldwide. By integrating high-resolution camera traps, AI algorithms, and remote communication capabilities, this technology enables park authorities to quickly detect and respond to potential poaching activity. This intervention not only disrupts the illegal wildlife trade chain but also provides valuable insights into poaching patterns and wildlife behavior, benefiting local communities. Deployed successfully in numerous parks across Africa and Asia, TrailGuard AI has facilitated the prosecution and arrest of multiple poacher gangs since 2017. Through interdisciplinary collaborations between biologists, engineers, field conservation authorities, and local communities, TrailGuard AI serves as a frontline defense against wildlife crime, ultimately reducing the availability of illicit wildlife products.

Innovating digital campaigns in combating illegal wildlife trade and promoting sustainable travel

Presenter: *Zhuoluo Lyu (WWF-China, China)*

Co-authors: *WWF China*

WWF China's combating illegal wildlife trade programme has implemented innovative approaches in combating illegal wildlife trade and promoting sustainable travel, through impactful partnerships with the travel industry such as the Sustainable Travel Alliance launched by WWF China, and precise social marketing to reduce demand for illegal wildlife products in target consumer groups, specifically outbound travellers. Through sharing our best practices and learning from global counterparts, we demonstrate how industrial and public engagement can foster a sustainable future for travel and conservation, while aspiring to inspire further action and collaboration.

A Short Documentary about Pangolin Trafficking in Laos

Presenter: *Sylvia Wu (Global Citizen Action)*

Pangolin is highly endangered right now. However, in certain areas of the world, such as Laos, rampant pangolin trade is still ongoing. In order to expose and combat such trade, a team of Chinese undercover investigators took an in-depth mission and plan to expose the trafficking by producing a short film. In this talk, representing the investigation team who has to remain anonymous, Sylvia explained the situation of pangolin trafficking in Laos, how the black market operates, and ways to stop the trade.

Poster Presentations

Sampling large seizure of pangolin scales: Peninsular Malaysia context

Presenter: *Norsyamimi Rosli (National Wildlife Forensic Laboratory (NWFL), Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN), Malaysia)*

Co-authors: *Norsyamimi Rosli, Noor Azleen Mohd Kulaimi, Nuraina Azmira Azemi, Norfaziatun Diana Rusni, Norhidayah Munasir & Pazil Abdul Patah (NWFL, PERHILITAN, Malaysia)*

Illegal wildlife trade is a lucrative crime that is rampant worldwide and Malaysia has a reputation as a source country and transit hub for wildlife trafficking. Almost every year, large seizures involving wildlife parts such as pangolin scales, elephant ivories, and rhino horns get confiscated in Malaysia. Last year, nearly 2 tonnes of pangolin scales in 97 sacks were seized. PERHILITAN was tasked to carry out species identification and three species of African pangolin were identified. The content on this seizure is dominated by *Smutsia gigantea* (76.3%), followed by *Smutsia temminckii* (22.7%), and just 1% of *Phataginus tetradactyla*.

Turtle microchipping workshops enhance traceability and empower enforcement

Presenter: *Astrid A. Andersson (HKU, Hong Kong)*

Co-authors: *Astrid A. Andersson, KM Reyes (Centre for Sustainability, PH, National Geographic Explorer), Molly Ferrill (National Geographic Explorer)*

Microchipping can help safeguard wild turtles at risk of trafficking by increasing the traceability of turtles in trade. This technology enables authorities to scan individual turtles seized in smuggling operations for a microchip and cross check the unique microchip ID number to a centralized Global Turtle Microchipping Database. This provides a reliable tool to detect poached turtles in trade, their geographic provenance, as well as evidence to prosecute traffickers and a deterrent for would-be poachers. Turtle microchipping is commonly applied in ecological research, and the function is solely for reliable ID – the microchips do not transmit data on movements. Despite the applicability of this technique to actively prevent poaching of turtle populations, there have been few dedicated efforts to leverage turtle microchipping methods for this purpose and empower enforcement with this tool. In 2022, I conducted a pilot Turtle Microchipping Workshop in Palawan, the Philippines, funded by National Geographic to upskill its 40 attendees – including 10 indigenous rangers – to microchip turtles they encounter or release in protected areas. This is intended as the start of an ongoing, continual effort to empower and collaborate with transdisciplinary frontline turtle protectors and equip them with the scientific tools and capacity to effectively safeguard turtle populations at risk of illegal trade.

A mammoth task: creating a reliable and cheap test to distinguish mammoth and elephant ivories to prevent trafficking and laundering of elephant ivory

Presenter: *Maria Santos (HKU, Hong Kong)*

Co-authors: *Maria Santos, Pavel Toropov, Hannah B. Tilley, David M. Baker (HKU, Hong Kong)*

There are less than half a million wild elephants left in the wild and every year 20,000 are killed for their ivory. Mainland China banned ivory sales in 2017 and Hong Kong in 2021, but a loophole exists that can enable traffickers to continue with their trade. Mammoth ivory, mined in large quantities in Siberia, is legal to sell and import, and trade in it is unregulated. Conservationists are raising the alarm that elephant ivory is becoming laundered under the guise of legal mammoth ivory. To non-experts, mammoth and elephant ivories are indistinguishable, and even specialists are often unable to tell the two apart. There is now an urgent need for a reliable, fast and cheap scientific test to distinguish between the two ivories. Using stable isotope analysis, the Conservation Forensics Laboratory at the University of Hong Kong is on track to create such a test for Hong Kong's law enforcement. Hong Kong is one of the world's main trade hubs for both illegal elephant ivory and mammoth ivory, and such a test will allow to close a loophole that threatens the survival of one of the planet's most iconic species.

Ecological and biodiversity assessments of ticks from pangolin scale seizures

Presenter: *Taneisha Barrett (HKU, Hong Kong)*

Co-authors: *Taneisha Barrett, Mathew S. Seymour, Timothy C. Bonebrake (HKU, Hong Kong)*

Pangolin species are heavily trafficked globally via the illegal wildlife trade. In addition to conservation concerns due to illegal trading, pangolins are known to host ticks, parasitic arachnids that transmit the greatest variety of pathogens among arthropods. While pangolins are known to harbour ticks, there is limited knowledge on pangolin tick ecology and genetic diversity, as well as diversity of tick - associated pathogens. For successful conservation of pangolins, all factors contributing to their mortality, including effects of parasites, should be considered. We utilized ticks from pangolin scale seizures from several shipment countries in Africa and Asia to determine ecology and genetic diversity of pangolin ticks. We removed and cleaned ticks from scale seizure sample bags, then identified, and imaged ticks using a stereomicroscope. After morphological identification, we extracted DNA, performed PCR followed by Sanger sequencing on purified PCR products. Species identification was achieved using the BLAST search tool and haplotype networks were constructed to determine genetic diversity within and among scale seizure samples. Both morphological and barcoding results indicate that only pangolin specialist ticks, *Amblyomma javanense* and *Amblyomma compressum*, were associated with Asian and African pangolins, respectively. Shared and unique haplotypes were identified for each tick species and genetic clustering was observed in African ticks. Our findings provide key insights

into the ticks associated with pangolins. While only one species was identified from each region, genetic diversity results indicate that there is some level of intraspecific variation. Understanding community assembly and genetic diversity of tick populations from different pangolin regions is crucial for conservation strategies to be effective.

Current trends in Hong Kong's live bird market

Presenter: *Hannah B. Tilley (HKU, Hong Kong)*

Authors: *Hannah B. Tilley, John Allcock (HKU, Hong Kong), Aaron Ng (HKU, Hong Kong), Karen Tong, James Eaton, Boyd Leupen, Chris Shepherd (MONITOR), Caroline Dingle (HKU, Hong Kong)*

The trade of wild birds for pets, food, and other uses represents a major threat to biodiversity as well as to public health. Hong Kong SAR has a long tradition of trading birds for various purposes including pet keeping and religious release. Historical surveys of trade in the region dating back to the mid-nineteenth century reveal a shift in traded species over time, from birds of prey to songbirds and parrots. Over the last several decades, there has been a decline in the number of birds observed for sale in the market, most recently due to the decline in numbers of species sold for merit release ceremonies. However, the bird trade continues in Hong Kong. To document current trends and volume of songbird trade in Hong Kong SAR, we conducted monthly surveys in the Yuen Po Street bird market in northern Kowloon. In each survey, we documented the number and abundance of species sold in the market on that day. We later determined the potential geographic origin of each species and the conservation status of each species (based on CITES appendices and IUCN Red List data). Over a year of surveys, we observed 227 species for sale in the bird market, with an average of 1300 individuals for sale per visit. The composition of species observed in the market was not entirely consistent with the list of species reported as imported into the Hong Kong over the same period based on government data. The top 10 most abundant species in the market have remained fairly consistent over time, with a few notable new species having risen in popularity since the early 2000s. We found that 65% of the total species recorded occur in the wild in China and 28% in Hong Kong. While most of the species in the market are listed as "Least Concern" on the IUCN Red List, 17 species listed as 'Near Threatened' or above, including one currently listed as 'Critically Endangered.' 25 species are listed on CITES appendices I and II (mostly parrots). These results suggest that Hong Kong's bird trade warrants further monitoring and enhanced controls to prevent the trade of wild-caught individuals from other countries being sold in Hong Kong to prevent further population declines and spread of zoonotic disease.

Detecting emerging threats: a study of wildlife pathogens and zoonotic/epizootic viruses in Cameroonian bushmeat markets, focusing on African pangolins

Presenter: *Brian M. Worthington (HKU, Centre for Immunology & Infection Ltd. (C2i))*

Authors: *Brian M. Worthington, Michel A.K. Dongmo (HKU), Franklin T. Simo (University of Yaoundé I), Sévilor Kekeunou (University of Yaoundé I), Taneisha Barrett (HKU), William Y.-M. Cheung (HKU), Yi Guan (HKU, C2i), Huachen Zhu (HKU), Timothy C. Bonebrake (HKU), Tommy T.-Y. Lam (HKU, C2i)*

SARS-related coronaviruses (SARSr-CoVs) have been found in Asian pangolins, suggesting their potential role, along with other wildlife species, in the COVID-19 pandemic. Given this discovery and the presence of diverse coronaviruses in bat populations across regions inhabited by pangolins in Africa and Asia, we aimed to investigate the possibility of coronavirus infections in African pangolins and assess associated risks in the bushmeat trade. Between March and June 2022, we conducted pathogen surveillance in bushmeat markets in Yaoundé, Cameroon, observing the sale of various wildlife species from different provinces in south and eastern Cameroon, including white-bellied pangolins, Mona monkeys, duikers, porcupines, and cane rats. Our objective was to assess the prevalence and diversity of pathogens in animals sold at these markets, potentially endangering consumers of bushmeat products. Utilizing a range of molecular detection methods, we tested samples for various viruses with zoonotic and epizootic potential. No evidence was found for infection with arenaviruses, coronaviruses, filoviruses, orthomyxoviruses, or paramyxoviruses, though these findings are limited by a small sample size of individuals.

Conservation of the vulnerable incense tree, *Aquilaria sinensis*, using genomic tools

Presenter: *Uva Y.Y. Fung (HKU, Hong Kong)*

Authors: *Uva Y.Y. Fung, Kerry Reid (HKU, Hong Kong), Arthur F. Sands (HKU, Hong Kong), Astrid A. Andersson (HKU, Hong Kong), Ryan Ho Leung Tsang (AFCD, Hong Kong), Eric Ka Yip Liu (AFCD, Hong Kong), Juha Merilä (HKU, Hong Kong)*

The Chinese incense tree (*Aquilaria sinensis*) is native to southern China and is one of the most heavily exploited tree species in the country. The wounds of incense trees can produce fragrant resin, which is sought after to produce products with high market value traded as agarwood. Due to their high value and demand, wild populations of incense trees have been felled and exploited across southern China. They are now listed as Vulnerable by the IUCN and international trading of wild produce is regulated by CITES. Hong Kong was historically a major source and trading hub for agarwood, and now has one of the last remaining healthy wild populations in China. However, the depletion of incense trees in mainland China has driven mainland loggers to cross the border

in efforts to exploit and illegally harvest wild incense trees in Hong Kong. To aid the investigation of incense tree forensic and smuggling cases, we used whole-genome sequence data to develop (i) a database of incense trees from Hong Kong and tropical southeast Asia regions, and (ii) a genetic pipeline for individual identification based on identity by descent. The pipeline and database will enable prosecutors to match confiscated items to trees originating from different geographic regions and even, in many cases, to individual incense trees contained in the database based on DNA, which can serve as evidence in the prosecution of illegal wildlife crimes.

Strengthening wildlife enforcement in Sabah with wildlife forensics

Presenter: *Nur Alwanie Maruji (Sabah Wildlife Department, Malaysia)*

The most violated provision under Sabah's Wildlife Conservation Enactment 1997 is the possession of wildlife and wildlife products without license or permit. As the authority of managing wildlife within the state, the Sabah Wildlife Department (SWD) responded to these crimes and to wildlife trafficking cases with the creation of the SWD's Forensic Unit (FU). The SWD FU is based at the Wildlife Health, Genetic and Forensic Laboratory (WHGFL), a facility co-managed by the SWD, Conservation Medicine, and Danau Girang Field Centre. The WHGFL has been certified as a Biosafety Level 2 Laboratory for ten consecutive years and is finalizing the ISO/IEC17025:2007 accreditation. Originally screening samples for diseases and population genetics research, the WHGFL broaden its scope of work in 2021 with the establishment of FU. Applying wildlife DNA forensic techniques, the most frequently observed species have been pangolins, green turtles, banteng, various deer species, and songbirds. Their sequences were reposited in the ForCyt wildlife forensic database. The forensic unit not only assists with molecular identification of exhibits but also in evidence management from the raiding operation to the investigation, ensuring that the chain of custody is maintained, and the case is ready for court.

Challenges on illegal wildlife trade in Sarawak

Presenter: *Leonard Anak Baring (Sarawak Forestry Corporation, Malaysia)*

Authors: *Leonard Anak Baring, Abang Arabi Abang Aimran, Madhan Bin Kiflie, Azroie Bin Denel, Jenny Ngeian Machau (Sarawak Forestry Corporation, Malaysia)*

Sarawak, a region in Malaysia, renowned for its rich and diverse flora and fauna are often targeted for illegal wildlife trade. The illegal wildlife trade involves poaching, smuggling, sale of protected species and their products, are threatening the region's biodiversity and the demand contributes to challenges in controlling cross-border trafficking as Sarawak shared borders with other countries. The transboundary nature of this trade also poses significant challenges for law enforcement, conservation efforts, and the protection of biodiversity. The rise of online platforms

also facilitated to illegal wildlife trade by allowing traffickers to operate in virtual spaces which is hard for the authorities to track and apprehend them. Endangered species such as pangolins and various species of birds often traded illegally through online platform and demand for these species drives poaching and trafficking activities. Wildlife trafficking can have negative consequences for local communities that depend on natural resources for their livelihoods. As poaching reduces wildlife populations, animals may venture closer to human settlements in search of food. This result in increased human-wildlife conflict, with animals damaging crops or posing threats to human safety. Local communities also play crucial roles in combating illegal wildlife trade, and their involvement is essential for the success of conservation efforts as they can act as the eyes and ears on the ground, reporting suspicious activities related to wildlife trade to local authorities. In term of legal framework, Sarawak, has its own wildlife protection law and the primary legislation in this regard is the Wildlife Protection Ordinance,1998. The Ordinance is a state-level law that governs the protection, conservation, and management of wildlife in Sarawak. To conclude, the challenges associated with illegal wildlife trade are multifaceted and require comprehensive and collaborative efforts to address.