ZOOS SEA
Southeast Asian Zoos & Aquariums Association (SEAZA)

Mandai
WILDLIFE RESERVE

33rd Southeast Asian Zoos and Aquariums Association Conference

Building Capacity for the Future
Protecting Wildlife Together

16-20 November 2025
Mandai Wildlife Reserve, Singapore

In partnership with:

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Communiqué

The 33rd Conference of the Southeast Asian Zoos and Aquariums Association was held from 16-20 November 2025 at the Mandai Wildlife Reserve in Singapore. Hosted by the Mandai Wildlife Group, the SEAZA Conference had a record turnout of over 460 delegates.

With the theme, "Building Capacity for the Future, Protecting Wildlife Together," the 33rd SEAZA Conference brought together the zoo and aquarium community from Southeast Asia and beyond to exchange ideas on our community's invaluable role in biodiversity conservation, population management, and sustainability.

The Conference was formally opened on 17 November 2026 with opening addresses delivered by outgoing SEAZA President Dr. Cheng Wen-Haur and Mandai Wildlife Group CEO Mr. Bennett Neo, and speeches by Prof. Leo Tan of the National University of Singapore and World Association of Zoos and Aquariums (WAZA) President Mr. David Field. We also welcomed keynote speeches from Dr. Kira Mileham of the International Union for Conservation of Nature-Species Survival Commission (IUCN-SSC), and Ms. Rohaya Binte Saharom of the Roundtable for Sustainable Palm Oil (RSPO).

Throughout the Conference, we delivered an exceptional line-up of keynote speeches, scientific presentations, and workshops covering a wide array of topics all with the aim of capacity building for the zoo and aquarium community as we seek to take on more active roles in the preservation of wildlife.

SEAZA Committee Updates

1. *Animal Welfare & Ethics (AWEC)*: Reported 25 evaluations completed and 16 certifications granted, with seven new certifications endorsed for 2025, alongside continued regional training and standards refinement.
2. *Aquarium Working Group (AWG)*: Advanced its regional survey, identifying major capacity gaps and emphasising the need for stronger country-level representation.
3. *Conservation Committee (CC)*: Presented results from 23 submissions covering over 150 conservation projects, noting the need for clearer reporting aligned with WAZA 2030 requirements.
4. *SEAZA Nutrition Network (SNN)*: Delivered multiple workshops, advanced ongoing research, and completed leadership transition, with Board approval for a rotating online national training programme.
5. *Conservation Education Committee (CEC)*: Strengthened training on messaging, outreach, and impact evaluation, and will support institutions in preparing WAZA 2030-aligned education reporting.
6. *Species Management Committee (SMC)*: Reported 36 species programmes and continued progress toward WAZA PMG2027, including the launch of a new Bird TAG.

2025 Annual General Meeting

The Annual General Meeting was held on 19 November 2026 at the Green Canvas Exhibition Hall, Mandai Wildlife Reserve, Singapore. Dr. Cheng Wen-Haur, outgoing SEAZA President, delivered his final President's Report. We also welcomed several new Institutional, Affiliate, and Corporate Members.

The following motions were approved:

1. The formal acceptance of the audited financial statements of SEAZA as of the end date of Fiscal Year 2024-2025 (31 August 2025)
2. The acceptance of the composition of the 2025-2028 SEAZA Executive Board, Honorary Board, and SEAZA Secretariat

SEAZA Executive Board

President: Dr. H. Rahmat Shah
First Vice President & Secretary: Dr. Kevin Lazarus
Second Vice President & Treasurer: Mr. Yok Lin Gaw
Board Members: Dr. Hsienshao Tsao Mr. Luu Chi Hieu
Mr. Ya Zar Htwe Dr. Wanchai Tunwattana

SEAZA Honorary Board

Dr. Phan Viet Lam Mr. Bernard Harrison
Drs. Jansen Manansang Prof. Richard Tenaza

SEAZA Secretariat

Executive Director: Mr. Kumar Pillai
Chief Communications Officer: Mr. Daniel Albert E. Castillo
Technical Officer: Ms. Kyla Mariz S. Anasario

The Conference was formally closed with the Executive Board expressing its gratitude to the host institution for organizing a successful Conference and outgoing SEAZA President Dr. Cheng Wen-Haur handing over the presidency to Dr. H. Rahmat Shah of Indonesia.

2026 SEAZA Conference

The 2026 Conference will be SEAZA's 34th, and will be held from 15-20 November 2026 in Cebu, Philippines to be hosted by SEAZA Institutional Member Cebu Safari and Adventure Park.

Post-conference workshops

Post-conference workshops on biobanking, creative enrichment, and species planning were held on 20 November 2026. These were led by our partners from Mandai Nature, Mandai Wildlife Group, Wild Welfare, and Elephant Welfare International.

33rd Southeast Asian Zoos and Aquariums Association Conference

16-20 November 2025
Mandai Wildlife Reserve, Singapore

Programme

16 November 2025 (Sunday) – Pre-conference Workshops

Mandai Wildlife Reserve, Singapore

09:00 - 17:00	***Ex Situ* Population Management Workshop for SEAZA** SEAZA Species Management Committee *Zoo Learning Centre, Frog & Crocodile Rooms*
09:00 - 17:00	**Animal Training Workshop** SEAZA Animal Welfare Committee *Green Canvas, Tembusu Room*
12:30 - 17:00	**From Strategy to Synergy: Strengthening SEAZA's Conservation Network** SEAZA Conservation Committee *Green Canvas, Hopea Room*
13:00 - 17:00	**SEAZA Aquarium Working Group Workshop** Aquarium Working Group *Green Canvas, Shorea Room*
13:00 - 17:00	**Animal Food Safety: Best Practices for Hygiene & Quality (with nutrition centre tour)** SEAZA Nutrition Network *Green Canvas, Areca Room*
13:00 - 18:00	**Registration** *Green Canvas*
14:00 - 17:00	**Creative Facilitation - Apply a multi-disciplinary approach to zoo education programmes** SEAZA Conservation Education Committee *Zoo Learning Centre, Hornbill Room*
15:00 - 18:00	**SEAZA Board Meeting** *Corporate Office Boardroom*
18:00 - 21:00	**Icebreaker** *Green Canvas*

17 November 2025 (Monday) – Day 1

Green Canvas Exhibition Hall

08:00 - 08:30	**Registration**
08:30 - 08:50	**Opening Ceremony Performance**
08:50 - 09:00	**Welcome Speech** Mr. Bennett Neo *Mandai Wildlife Group CEO*
09:00 - 09:10	**Speech by Guest of Honour** Professor Leo Tan
09:10 - 09:30	**Address** Dr. Cheng Wen-Haur *President, Southeast Asian Zoos and Aquariums Association (SEAZA)*
09:30 - 10:00	**Keynote Speech: WAZA 27 Population Management Goal – a key to our mission** Mr. David Field *President, World Association of Zoos and Aquariums (WAZA)*
10:00 - 10:20	**Group Photo**
10:20 - 10:40	**Coffee Break**
10:40 - 11:10	**Keynote Speech: Driving wildlife protection together through planning, action and global frameworks** Dr. Kira Mileham *Director, Strategic Partnerships, IUCN Species Survival Commission*
11:10 - 11:40	**Keynote Speech: From crisis to connection: the role of zoos & aquariums in building biodiversity resilience** Mr. James Biggs *Director, Conservation and Population Management, Zoo and Aquarium Association Australasia (ZAA)*
11:40 - 12:10	**Keynote Speech: Beyond Conservation: Leading the charge for a sustainable future** Ms. Rohaya Saharom *Vice President for Sustainable Solutions, Mandai Wildlife Group; Roundtable on Sustainable Palm Oil (RSPO)*
12:10 - 12:40	**Communicating Conservation Through Great Primate Exhibits in Southeast Asian Zoos** Bernard Harrison *Principal Partner, Bernard Harrison and Friends Ltd.*
12:40 - 13:00	**Poster Session**

13:00 - 14:00	**Lunch**	
	Animal Welfare - Nutrition Moderator: Dr. Shangzhe Xie, Mandai Wildlife Group *Green Canvas Exhibition Hall*	**Conservation Social Science (Engaging the Public)** Moderator: Ms. Vera Yang, Mandai Wildlife Group *Green Canvas Auditorium*
14:00 - 14:20	**They are What They Eat: The Importance of Zoo Nutrition** Michelle Shaw, *Taronga Zoo*	**Inspiring Species Conservation through an Engaging Collectible Trading Card Game** Dennis Nagel, *FasciNature Pte. Ltd.*
14:20 - 14:40	**Using Lean Management to Improve Workflow and Efficiency in an Animal Kitchen** Nur 'Afini Binte Halim, *Mandai Wildlife Group*	**Claws and Effect: What Happens When We Work Together — and When We Don't** Tanya Erzinclioglu, *For Tigers*
14:40 - 15:00	**More Than Just Food - Engaging Minds and Bodies** Melody Chu, *Kadoorie Farm & Botanic Garden*	**Through Managing Conservation, Education, Marketing Campaigns to Saving Rhinos from Extinction** Chun-Ju Lin, *Chuang Foo Foundation (Leofoo Safari Park); Taiwan Aquarium & Zoo Association (TAZA)*
15:00 - 15:20	**Non-Invasive Gut Health Monitoring in Avian Species: A Tool for Enhancing Long-Term Welfare and Dietary Management** Zack Ng Jia Hao, *AB Vista Asia Pte Ltd*	**Breeding Success and Public Engagement: Advancing Zoo Education in Myanmar** Naw Lay Lay Wah, *Htoo Zoos & Gardens Business Unit*
13:00 - 14:00	**Coffee Break**	
	Animal Welfare - Behaviour Moderator: Ms. Gail Laule, Mandai Wildlife Group *Green Canvas Exhibition Hall*	**Conservation Social Science (Engaging the Public)** Moderator: Ms. Vera Yang, Mandai Wildlife Group *Green Canvas Auditorium*
15:40 - 16:00	**Rainforest Wild Asia: From Vision to Reality** Julette Tay, Vernice Ng, Pearline Low, Yuen Ryan Bradley, Joey Song Xinru, Adam Chan, and Nursyaza Badrulhisham, *Mandai Wildlife Group*	**Taman Safari Indonesia: Long-term Commitment of Conservation and Education of Endemic Species in Indonesia** Allysa Khanza Artuti, *Taman Safari Indonesia*
16:00 - 16:20		**Enhancing Public Engagement for Bleeding Toad (*Leptophryne cruentata*)**

		Conservation Through Creative Educational Media at Indonesian Outdoor Festival (INDOFEST) 2025 Rina Rajagukguk, *TSI Bogor*
16:20 - 16:40	**Effects of Modified Feeding Schedules and Training on Elasmobranch Behaviour in a Mixed-Species Aquarium Exhibit** Claudia Tay Pei Pei, *Singapore Oceanarium (RWS)*	**Educating the Educators: Understanding the Challenges and Capacity-Building Needs of Zoo Educators in Malaysia** Eve Foong Yee Wei, *Farm in the City*
16:40 - 17:00	**From Observation to Action: Implementing Evidence-Based Welfare Assessments for Aquatic Animals** Leong Kai Le, *Singapore Oceanarium (RWS)*	**Facilitating Conservation Behavioural Changes in Schools through Ocean Park Conservation Alliance, an Education Campaign in Ocean Park Hong Kong** Chan Hui Yan, *Ocean Park Hong Kong*
17:00 - 17:20	**Managing Stereotypic Behavior of Asian Elephants at Night Safari, Singapore** Nur Farahdilla Binte Juraimi, *Mandai Wildlife Group*	**Cultivating a Purpose-Led Community of Volunteers at Mandai** Illi Suraya, *Mandai Wildlife Group*
17:20 - 19:00	**Free & Easy**	
19:00 - 22:00	**Welcome Dinner** *Green Canvas Exhibition Hall*	

18 November 2025 (Tuesday) – Day 2

Green Canvas Exhibition Hall

08:30 - 09:00	**Keynote Speech: Qualitative Behavioural Assessment: Evaluating the Fifth Domain in Animal Welfare** Dr. Lisa Yon *Associate Professor, Zoo and Wildlife Medicine, Medicine University of Nottingham*	
	Animal Welfare - Environment Moderator: Mr. Grant Kother, Mandai Wildlife Group *Green Canvas Exhibition Hall*	**Conservation** Moderator: Mr. Mark Rusli, Mandai Wildlife Group *Green Canvas Auditorium*
09:00 - 09:20	**Is Empathy Necessary? Exploring the Role of Empathy in Animal Welfare** Dave Morgan, *Wild Welfare*	**Use of Social Media at Zoos** Hiroki Kanazawa, *Ueno Zoological Gardens*
09:20 - 09:40	**From Model to Measurable: Mind the**	**Conservation Through Education: A Case**

	Gap Jason Watters, *University of California Davis*	**Study from Taipei Zoo's "Right Where Lives Belong" Special Exhibition** Ming-Chun Cheng, *Taipei Zoo*
09:40 - 10:00	**Improving the Conditions of Captive Philippine Spotted Deer (*Rusa alfredi*) through Animal Enrichment and Visual Barriers** Leandro S. Cabrera, *Silliman University – Center for Tropical Conservation Studies*	**Exploration of Aquarium Education Materials: A Case Study Of "Reborn: The Blue Whale's Journey" at NMMBA** Wang Yang-Sheng, *Hi-Scene World Enterprise Co., Ltd.*
10:00 - 10:20	**Animal Transport Operations and Animal Welfare: Transporting a Large Crocodile** Mark Baker, *Wanpi World Safari Zoo*	**A Preliminary Study of Public Attitudes toward Cetacean Exhibitions and Interpretation: A Case Study of the Beluga Whale at NMMBA** Yu-Hui Lai, *National Museum of Marine Biology and Aquarium (NMMBA), Hi-Scene World Enterprise Co., Ltd.*
10:20 - 10:40	**Coffee Break**	
	Animal Welfare - Behaviour Moderator: Dr. Andie Ang, Mandai Nature *Green Canvas Exhibition Hall*	**Conservation** Moderator: Ms. Xiao Jun Chew, Mandai Wildlife Group *Green Canvas Auditorium*
10:40 - 11:00	**Revamping An Enrichment Program: A Bottom-Up Approach** Jane Neo Jey Lyn, *Singapore Oceanarium (RWS)*	**Advancing Engagement with Volunteers to Drive Research and Conservation Efforts** Cynthia Wong Yee Man, *Singapore Oceanarium (RWS)*
11:00 - 11:20	**Two Paths, One Goal: Advancing Chimpanzee Welfare through Tailored Sedation Conditioning** Jackson Raj & Kevin Chandran, *Mandai Wildlife Group*	**TESDA and Avilon Zoo: A Public-Private Partnership for Zoo Personnel Professionalization** Daniel Albert E. Castillo, *SEAZA Secretariat; Avilon Wildlife Conservation Foundation and School of Practical Veterinary Management, Inc.; Department of Biological Sciences, College of Science, University of Santo Tomas*
11:20 - 11:40	**Cross-Taxa Evaluation of the WildThink Enrichment Framework: Assessing Effectiveness and Comparing Behavioral Responses Using a Standardized Scoring Method** Abdul Fattah, *Taman Safari Bali*	**Conservation and Research Program of Sunda Pangolin in A'Famosa Safari Wonderland** Heni Paramita Indraswari, *A'Famosa Safari Wonderland*

11:40 - 12:00	**Olfactory Strategies for Asiatic Black Bear Conflict Mitigation: Investigating Behavioral Responses to Different Odours** Whitney Loh Shu Ping, *Wageningen University & Research*	**Building Standards, Sharing Strength: The Role of Zoo Association Membership** Anna Fourage, *Oxford Brookes University*
12:00 - 12:20	**Free-Flight Training for Blue-and-Gold Macaws in an Urban Aquarium** Tu-kai Huang, *Xpark Aquarium*	**Linking the Life History of Wild Chinese Pangolins to Improve *Ex Situ* Conservation Approaches: A Case Study in Taiwan** Nick Ching-Min Sun, *Institute of Wildlife Conservation, National Pingtung University of Science and Technology*
12:20 - 12:40	**From Fear to Familiarity: Predictable Patterns Supporting Behavioural Change** Melanie Tan, *Mandai Wildlife Group*	**Negros Forest Park: Paradigm for *Ex-Situ* Conservation Initiatives in the West Visayas of Philippines** Flavio Aguirre Nava, *Talarak Foundation, Inc.*
12:40 - 13:00	**When the Vet Walks In: Tackling Contextual Fear Through Training** Lai Goon Yin, *Mandai Wildlife Group*	**Re-wilding of Europe. Successes and failures. What can we learn from it?** Radoslaw Ratajszczak, *Poznan Zoo, Poland*
13:00 - 14:00	**Lunch**	
	Animal Welfare - Environment Moderator: Mr. Grant Kother, Mandai Wildlife Group *Green Canvas Exhibition Hall*	**Conservation** Moderator: Ms. Xiao Jun Chew, Mandai Wildlife Group *Green Canvas Auditorium*
14:00 - 14:20	**Designing Habitats with Sustainable Collection** Ken Kwan, *Taman Safari Indonesia; Marine Safari Bali*	**The Development of Knowledge Communication in a Zoo-based Museum to Promote Participatory Conservation Learning** Vannisa Yala, *Zoological Park Organization of Thailand*
14:20 - 14:40	**Reptile Enrichment: It's not EXTRA, It's Just Good ol' Husbandry** Debbie Ng, *Kadoorie Farm & Botanic Garden*	**Beyond the Animals Posts: What Content Captivates Zoo Audiences Online? A Study on Instagram Content Engagement at Gembira Loka Zoo** Muhammad Devan Dewanto, S. I. Kom, *Gembira Loka Zoo*
14:40 - 15:00	**Building a Buzz; Facilities that Inspire Invertebrate Awareness and Conservation** Delvinder Kaur & Loh Krystofer Charles,	**From Planning to Measuring Impact: Applying CSPTC to Guide and Evaluate Mandai Education Programmes and Campaigns**

	Mandai Wildlife Group	June Chen & Vera Yang, *Mandai Wildlife Group*
15:00 - 15:20	**Development of the Philippine Endemic Species Exhibit in Cebu Safari and Adventure Park: Rescue, Rehabilitation and Exhibition of the Philippine Long-tailed Macaque (*Macaca fascicularis philippensis*) for Preservation and Visitor Education** Mary Clarenz W. Tupaz, *Cebu Safari and Adventure Park*	**Innovative Pathways to Conservation: Cross-Curricular Programmes at Ocean Park** Alan Wong Wing Lun, *Ocean Park Hong Kong*
15:20 - 15:40	**Coffee Break**	
	Animal Welfare - Behaviour Moderator: Ms. Gail Laule, Mandai Wildlife Group *Green Canvas Exhibition Hall*	**Conservation** Moderator: Ms. Xiao Jun Chew, Mandai Wildlife Group *Green Canvas Auditorium*
15:40 - 16:00	**Stereotypic or Anticipatory? Case study of head swinging behaviour in captive 0.1 Indian Rhinoceros** Donald Cheok & Hannah Bristow, *Mandai Wildlife Group*	**Saving Scales: Integrating Veterinary Care and Post-release Monitoring for Rescued Pangolins at Taipei Zoo** Pin Yu Chang, Carol Hsieh, & Yuli Tsai, *Taipei Zoo*
16:00 - 16:20	**Training Basic and Advanced Respiratory Behaviors On *Tursiops aduncus*** Nabillah Hannani Binte Abas & Jerson Vitug, *Singapore Oceanarium (RWS)*	**Assisted Parental Rearing of Javan Hawk-Eagle (*Nisaetus bartelsi*) Chicks: A Case of Complementary Keeper Intervention** Sumanang Yusuf Rosiadi, *Taman Safari Indonesia Bogor*
16:20 - 16:40	**Tactile Hoof Conditioning in Zebras: A Welfare-Driven Approach to Voluntary Hoof Care** Wong Sze Min & Nur Rifqah, *Mandai Wildlife Group*	**Multisectoral Collaboration for Komodo Dragon (*Varanus komodoensis*) Reintroduction: A Pioneering Conservation Milestone in Indonesia** Yessy Amaeda Dachi, *Taman Safari Indonesia Bogor*
16:40 - 17:00	**Study on the defecation frequency of Sloths using a real-time urination monitoring sensor system** Kanako Tomisawa, *Omuta City Zoo*	**The Initial Census Findings of Eastern Sarus Cranes in Thailand: Establishing Population Baselines and Promoting Conservation Collaboration** Piyapong Chindate, *Zoological Park Organization of Thailand*
17:00 - 17:20	**The Importance of Early Medical**	**Back from the Brink, the Recovery Efforts for**

	Training for Geriatric California Sea Lions (*Zalophus californianus*) Hakim Jaafar, *Mandai Wildlife Group*	**Maratua Shama at TSI-PCBA** Jochen Menner, *Taman Safari Prigen*
17:20 - 17:40	**Captive Confidence: A Behavioural Blueprint for Sri Lankan Leopard Desensitisation** Vernice Ng & Xuan Ying, *Mandai Wildlife Group*	**Reintroducing the Javan Banteng (*Bos javanicus*) in Pananjung Pangandaran Nature Reserve: A Model for *In-Situ* Wildlife Conservation** Eko Windarto, *Taman Safari Indonesia*
17:40 - 18:00	**Laying Foundations for Lifelong Care - Cooperative Health Management in Ageing Jaguars** Muhammad Rusydi Bin Mohd Suwandi & Mohd Hafizuddin Bin Abdul Razak, *Mandai Wildlife Group*	**Ethical Assessment of Genome Resource Banking (GRB) in the Singapore Zoo** Barbara de Mori, *University of Padua*
18:00 - 22:00	**Free & Easy**	

19 November 2025 (Wednesday) – Day 3

Green Canvas Exhibition Hall

08:30 - 09:00	**Keynote Speech: How communication can help to secure the future of zoos and aquariums** Dr. Judy Mann-Lang *Chair | Executive for Strategic Projects, IZE | Two Oceans Aquarium Foundation*	
09:00 - 09:30	**Keynote Speech: Zoological institution's role in saving biodiversity: the applications of biobanking for species conservation** Dr. Boripat Siriaroonrat *Co-Chair, IUCN Animal Biobanking for Conservation SG*	
	Conservation Moderator: Ms. Delaney Eng, Mandai Nature *Green Canvas Exhibition Hall*	**Animal Welfare - Physical Health** Moderator: Dr. Guillaume Douay, Mandai Wildlife Group *Green Canvas Auditorium*
09:30 - 09:50	**Inspiring Young Minds: Immersive Conservation Education through Roleplay, Fun Games and Cultural Connection at Gembira Loka Zoo** Tri Wahyu Priyatiningsih, S. Si, *Gembira Loka Zoo*	**Rethinking Preventive Medicine: Prioritising Resources to Optimise Animal Healthcare for Animals under Managed Care** Dr. Heng Yirui, Mandai Wildlife Group
09:50 - 10:10	**Awareness Building through Experiential Youth Camp for Eastern Sarus Crane Conservation in Thailand**	**Surveillance Trends of Infectious Diseases in Zoos: Insights from Longitudinal Monitoring Programs in Thailand (2018–2024)**

	Kritchaphorn Chunlaklinsrisakun, *Zoological Park Organization of Thailand*	Waleemas Jairak, *Zoological Park Organization of Thailand*
10:10 - 10:30	**Rewilding Negros: The Talarak Foundation's Conservation Journey** Yobert Marc Juanillo, *Talarak Foundation, Inc.*	**Captive Umbrella Cockatoo (*Cacatua alba*) Breeding Success in the Grand Taman Safari Prigen** Mahfud Ihwantoro, *Taman Safari Indonesia*
10:30 - 10:50	**Coffee Break**	
	Conservation Moderator: Ms. Delaney Eng, Mandai Nature *Green Canvas Exhibition Hall*	**Animal Welfare - Physical Health** Moderator: Dr. Guillaume Douay, Mandai Wildlife Group *Green Canvas Auditorium*
10:50 - 11:10	**Where Did Sulawesi Babirusa Go? African Swine Fever as Extinction-Level Threat to Sulawesi's Endemic Wild Pig** Dini Rahmanita, *Bogani Nani Wartabone National Park*	**A Golden Breakthrough: First Ever Natural Hatching of Wreathed Hornbills (*Rhyticeros undulatus*) at Taman Safari Bali** Kadek Kesuma Atmaja, *Taman Safari Indonesia*
11:10 - 11:30	**Saving the Critically Endangered White-bellied Heron: Harnessing Expertise from the Japanese Association of Zoos and Aquariums** Ami Nakajima, *Japanese Association of Zoos and Aquariums (JAZA)*	**Cross-Matching for Blood Transfusion in Zoo: The Case Study in Thailand** Pannarai Mahadthai, *Zoological Park Organization of Thailand*
11:30 - 11:50	**Approach to Wild Long-Tailed Macaque Management in Mandai Wildlife Reserve** Carmen Choong Jiawen, *Mandai Wildlife Group*	**Singapore Oceanarium, excellence in aquatic veterinary healthcare** Alfonso Lopez Aguilar, *Singapore Oceanarium (RWS)*
11:50 - 12:10	**Advancing Zoo and Aquarium Science: Publishing Opportunities with Zoo Biology** Bethany Krebs, *Zoo Biology*	**Health Management of Aquatic Collection, Ocean Park's Perspective** Lee Foo Khong, *Ocean Park Hong Kong*
12:10 - 12:30	**How Aquariums Can Play a Part to Counter the Illegal Trade of Marine Species?** Tang Yong Jen, *Singapore Oceanarium (RWS)*	**Field Biosafety at the Human-Animal Interface: Strengthening Zoonotic Disease Prevention in Zoos** Rodel Jonathan S. Vitor II, *University of the Philippines Manila*
12:30 - 13:30	**Lunch**	

	Conservation Moderator: Dr. Andie Ang, Mandai Nature *Green Canvas Exhibition Hall*	Workshops (Breakout Rooms)
13:30 - 13:50	**The Role and Potential of Aquariums in Aquatic Species Recovery** Riley Pollom, *Singapore Oceanarium (RWS)*	**Strategic Needs Assessment: Shaping the Future of Animal Welfare and Behaviour in SEAZA** Animal Welfare *Green Canvas, Tembusu Room* **SEAZA Aquarium Working Group Workshop** Aquarium Working Group *Green Canvas, Shorea Room* **Nutrition Across Feeding Groups: Feeding Strategies and Nutritional Considerations in Mammals** Nutrition Network *Green Canvas, Areca Room* **Best Animal Records Practices for Zoos & Aquariums** Species Management *Green Canvas, Hopea Room* **Crossroads of Conservation: Innovation, Collaboration, and Capacity Building** Mandai Innovation Forum 2025 SEAZA Edition *Green Canvas Auditorium* **SEAZA Board Meeting (Closed)** *Corporate Boardroom*
13:50 - 14:10	**Empowering Marine Wildlife Conservation: The Role of The Yas SeaWorld Research & Rescue Center (YSWRRC) in Building Regional Capacity** Komsin Sahatrakul, *SeaWorld Yas Island, Abu Dhabi, United Arab Emirates*	
14:10 - 14:30	**The Master of Disguise in the Ocean: The Zebra Shark** Lung Yuen Ling, *Ocean Park Hong Kong*	
14:30 - 14:50	**How Genomics is Revolutionizing the Future of Wildlife Conservation?** Agostinho Antunes, *University of Porto*	
14:50 - 15:10	**Planning for the Glide: Landscape Strategies and Habitat Connectivity for Colugos at Singapore Zoo** Chong Siew Jaun (Jayne), *Mandai Wildlife Group*	
15:10 - 15:30	**Learnings from Staff Visits to *In-Situ* Conservation Projects – Team Bonding and Participation** Ten Swee Kien, Donald Cheok, Berni Chen, & Moh Ai Wei, *Mandai Wildlife Group*	
15:30 - 15:50	**Coffee Break**	
16:50 - 17:00	**General Assembly**	
17:00 - 19:00	**Back-of-House Tours / Free & Easy**	
19:00 - 22:00	**Farewell Dinner**	

20 November 2025 (Thursday) – Day 4

Mandai Wildlife Reserve, Singapore

09:00 - 17:00

SEAZA Biobanking Workshop
Dr. Oz Pomp & Mrs. Hui Li Yeo, *Mandai Nature*
Zoo Learning Centre Auditorium

Creative and Practical Fire Hose Use in Enrichment Design
Mr. Grant Kother, *Mandai Wildlife Group*
Zoo Learning Centre, Hornbill & Orangutan Rooms

Building Capacity for Welfare-Centred Species Planning in Zoos and Aquariums
Mr. Simon Marsh & Mr. Dave Morgan, *Wild Welfare*
Dr. Lisa Yon, *Elephant Welfare International*
Zoo Learning Centre, Crocodile & Frog Rooms

Abstracts

Oral Presentations

Using Lean Management to Improve Workflow and Efficiency in an Animal Kitchen

Nur 'Afini Binte Halim and Prakash Sudandiran
Mandai Wildlife Group | afini.halim@mandai.com

Preparing food in an animal kitchen or wildlife nutrition centre can be a complex and fast-paced process, involving a wide range of food items such as fresh produce, meat, fish, dry rations, and boiled foods. Activities like sorting, chopping, lifting, moving, and storing often take place simultaneously, creating a busy environment where overlapping tasks can lead to inefficiencies if not well managed. To improve workflow and operational efficiency, the nutrition team collaborated with lean management professionals to review all kitchen activities at the Wildlife Nutrition Centre in Mandai Wildlife Reserve. Three key improvements were proposed and implemented: redirecting supplier unloading locations to avoid clashes with the nutrition team during deliveries, reorganising sorting and preparation areas to reduce unnecessary staff movement, and introducing a container stacking guideline to minimise time spent sorting and cleaning returned containers. These changes resulted in an average reduction of 13 minutes daily for food preparation and container handling, with no major impact on loading and unloading processes. Overall, the kitchen workflow became smoother, and communication among staff improved.

Keywords: lean management, efficiency, wildlife nutrition centre, food preparation

Nur 'Afini Binte Halim

'Afini is an Animal Feed Assistant at the Wildlife Nutrition Centre, Mandai Wildlife Group. She prepares food for animals based on diet sheets and assesses food quality to ensure it meets the required standards.

More Than Just Food - Engaging Minds and Bodies

Melody Chu
Kadoorie Farm and Botanic Garden (KFBG) | melody.chu@kfbg.org

At KFBG, animal welfare goes beyond simply providing enough food and adequate care. We strive to promote physical fitness and natural behaviours through daily feeding and husbandry practices. Guided by the 5 Domains Animal Welfare Model, this presentation highlights the feeding strategies that we use to enhance the well-being of our long-term rescued residents.

Applying three main strategies:

1. Offering daily diets in feeders that encourage avian, mammal, or reptile species to spend time and expend energy foraging, thereby encouraging cognitive engagement and promoting physical movement.
2. Species-specific designs based on natural behaviours, individual abilities, and problem-solving strategies in the wild.
3. Whole enclosure foraging by dispersing food throughout the enclosure, stimulating natural foraging patterns, and encouraging locomotion and exploration.

By embedding these strategies into routine husbandry, we shift enrichment from an 'extra' duty to a core component of daily welfare management.

Keywords: feed foraging, natural behaviour, welfare

Melody Chu

Melody is a Senior Animal Keeper at Kadoorie Farm & Botanic Garden, where her daily work includes the care of diverse rescued native and exotic wildlife, observing animal behaviour and planning feeding strategies that align with their natural needs and promotes natural behaviours.

Non-Invasive Gut Health Monitoring in Avian Species: A Tool for Enhancing Long-Term Welfare and Dietary Management

Zack Ng[1] and Tommi Timoharju[2]

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Gut health is closely linked to immune function and overall well-being in birds, yet non-invasive assessment and maintaining faecal sample integrity during transport remain challenging in zoological settings. A biomarker-based approach to a routine long-term monitoring can provide valuable insights into how birds respond to dietary changes, environmental stress, and aging, supporting sustained health and welfare.

Alimetrics Research Ltd. (Finland), with over 20 years of experience in poultry gut health, offers validated biomarker panels which are technically available for other avian species. Their BioFreeze™ kit allows easy faecal sampling (including caecal droppings) and preserves DNA, RNA, and inflammatory markers at room temperature (~23°C) for up to six weeks, making it ideal for field use and overseas transport.

Monitoring selected parameters for gut health status every three months can track birds' adaptation to changing conditions. Key indicators include inflammatory and stress markers (calprotectin, IgA, corticosterone) and microbial markers such as *Clostridium perfringens*, *Escherichia coli*, *Salmonella enterica*, and *Lachnospiraceae* spp.

This non-invasive service aligns with welfare goals and is especially useful for large, diverse collections such as Mandai Bird Paradise. There is potential for early detection of dysbiosis and chronic gut issues, facilitating proactive long-term care in zoological birds.

Keywords: Gut health, Avian welfare, Non-invasive monitoring, Biomarkers, Faecal sampling

Zack Ng

Zack Ng is a scientist in the animal nutrition industry with a focus on quality control, laboratory diagnostics and gut health. He is particularly interested in non-invasive tools and biomarkers that offer insights into intestinal health, immune function, and microbial balance in both production and zoological bird species.

From Skittish to Steady - Deer Behavioural Management in a Free-roaming Habitat at Rainforest Wild (Asia)

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Rainforest Wild (Asia) features a walk-through rainforest environment that includes the Forest Floor habitat, where visitors encounter three species of deer: Axis deer (*Axis axis*), Hog deer (*Axis porcinus*), and Lesser mousedeer (*Tragulus kanchil*). This case study explores the behavioural conditioning and habitat integration of individuals translocated from varied management zones, none of which previously supported walk-through setups. Preparatory steps prior to release included strategic integration at a den facility to promote social cohesion and herd mobility. Back-of-house (BoH) setups and antecedent arrangements were tailored to support behavioural goals, facilitate balance of reinforcement, and ease transition into the public-access space. The introduction strategies—both intra-species (hog deer to hog deer) and inter-species (hog deer to axis deer)—were implemented alongside complex challenges, including the difficulty in confining the mousedeer and managing animal visitor interactions. Hand-reared hog deer played a pivotal role in the conditioning process, with individuals from the KidzWorld supporting those from the Night Safari group in overcoming fear-based responses towards keeping staff. A systematic behavioural management plan involving operant conditioning and progressive desensitisation was applied, enabling consistent daily checks and feeding routines adjusted to guest proximity. This study demonstrates the potential for successful conditioning in a mixed-species, minimally confined walkthrough setting and highlights applied strategies for managing skittish ungulates through observation-based training and reinforcement. The project also contributes to regional capacity building by providing practical insights into conditioning and habitat management that can be applied across Southeast Asian zoos navigating similar challenges.

Keywords: deer training, behaviour management, positive reinforcement, free-ranging habitat, desensitisation

Nursyaza Bazilah

Nursyaza is Junior Keeper at Rainforest Wild (Asia), Singapore. With background of animal resources science and management, she is passionate about understanding animal behaviour and welfare. She hopes to grow her skills by learning through hands on experience with a variety of species in dynamic and immersive environment.

The Primate Habitats of Rainforest Wild Asia

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Rainforest Wild Asia's Canopy habitat showcases three primate species—Red-shanked Doucs (*Pygathrix nemaeus*), Javan Langurs (*Trachypithecus auratus*), and Siamangs (*Symphalangus syndactylus*), within an emergent rainforest walk-through setting. In alignment with the 2025 Southeast Asian Zoo Conference theme, "Building Capacity for the Future, Protecting Wildlife Together," this case study highlights how behavioural conditioning and integration techniques are being refined to improve welfare and strengthen regional expertise.

Initial assessments revealed low canopy engagement and high elevated walkway use, prompting mitigations like trimming a buffer of the surrounding vegetation, increasing vertical feeding placements and elevated enrichment, as well as increasing connectivity. Aversives were also used to further reduce the time spent on the elevated walkway, such as using a bamboo pole to deter the primates from resting on the railing.

Notably, introducing Javan Langurs and Doucs into a shared space surfaced substantial integration challenges. Early phases saw both inter- and intra-species aggression. The Doucs' and the Langurs' shifting social dynamics necessitated spatial zoning, altered enrichment routines, and temporary separation trials. Some techniques yielded positive behaviour changes, while others exposed stress indicators and behavioural suppression, guiding refinements in conditioning plans.

Intern-led observational data was collated and helped in shaping management decisions, and identifying the need for further mitigations. These learnings not only enhanced individual welfare, but also advanced regional capacity building—offering Southeast Asian zoos a replicable framework for integrating socially complex primates in immersive, multi-species environments.

Keywords: primate conditioning, habitat design, Karst, Canopy

Pearline Low

Pearline is a Senior Keeper working with the primates at Rainforest Wild ASIA, Mandai Wildlife Reserve. She has spent her career working with many species of small primates and is passionate about furthering her knowledge of animal behaviour and welfare.

Moving Dangerous Carnivores Safely: Malayan Tiger and Dhole

Julette Tay and Vernice Ng

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Malayan Tigers (*Panthera tigris jacksoni*), and Dholes (*Cuon alpinus*) are two of the many threatened species found within the Asian continent. Both species of animals can be found in the Rock Cascade area in the Rainforest Wild (Asia), a new park which opened in 2025. The journey of these animals from the existing parks in Mandai to their current home was meticulously planned and executed with the process starting months prior to the move. Positive reinforcement training employed by the animal care staff played a key role in the success of the translocation and introduction of these animals into their new habitats. One challenging aspect of this transfer is conditioning the two young tiger males to their crates as they had no prior experience being crated and they exhibit aggressive behaviour during initial training sessions. With the implementation of a behavioural management plan that focuses on reinforcing calm behaviour and gradual exposure to the crates, this approach contributed to the success of translocating without any medical intervention. As both the Malayan Tiger and the Dhole are classified as dangerous animals at Mandai, this paper also outlines the safety preparations undertaken by the team, from crate design to ensuring staff are trained to the standard operating procedure (SOP) of working with these species. One of the unique features of the park includes the option of rotational access to different habitats by the predator species at different time periods of the day as a form of olfactory enrichment to encourage activity—a new concept that has worked out well. This acclimatisation and conditioning process of both species to their new homes and habitats at the park is also documented in this paper.

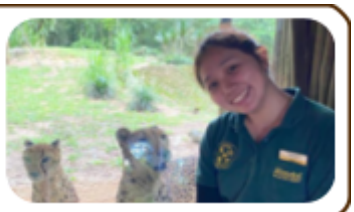
Keywords: Malayan tiger, dhole, animal conditioning, dangerous carnivore, rotation, olfactory enrichment

Julette Tay

Julette is a keeper who works with the Tigers and Dholes at Rainforest Wild (Asia). She has experience working with various large carnivore species throughout her career in Mandai. She is keen in expanding her knowledge in training and conditioning of animals.

Vernice Ng

Vernice is currently working with the Carnivores and Small Mammals at the Singapore Zoo. She has worked with 2 subspecies of Tigers - the Malayan and Bengal Tigers. As different animals showcases different traits and personalities, she is determined to explore various ways towards PRT for each animal.



Monumental Move – Translocating a Five-metre-long Saltwater Crocodile

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The saltwater crocodile (*Crocodylus porosus*) is renowned for its power, size and adaptability, presenting a unique set of challenges in zoological management. Moving a large male such as Mandai Wildlife Group's 32-year-old, 5-metre, approximately 750-kilogram Panjang from the Singapore Zoo to Rainforest Wild Asia was not just a logistical exercise; it served as a blueprint for capacity building through advanced husbandry.

Unlike conventional rope-and-restraint practices commonly used in institutions, MWG prioritised a conditioning-based methodology. Panjang was subject to call-over cues, target training and voluntary crate entry—methods rarely employed with reptiles of this size. Phase I of the transfer focused on foundational practices and luring, due to crate and logistical limitations. Phase II involved modifying the crate design with reinforced bars to allow targeting, a higher vertical dimension and large caster wheels to enable full behavioural conditioning.

Back-of-House (BoH) confinement sessions were conducted as part of acclimatisation, paired with regular training touchpoints to reduce novelty and fear responses. These behind-the-scenes management steps are frequently underemphasised in large reptile care but are critical for long-term welfare.

Panjang's new habitat offers expanded water depth, basking platforms, and a dynamic enrichment programme, including elevated food placement to encourage jumping behaviour—a strong indicator of both mental stimulation and physical fitness. His care underscores a paradigm shift from reactive handling to proactive welfare strategies, supported by staff development and training.

Keywords: Estuarine crocodile, saltwater crocodile, animal training, feeding

Ryan Bradley Yuen

Ryan is an Animal Keeper working with reptiles at Rainforest Wild Asia, Singapore. His main interests include the handling, restraint, training and enrichment of crocodilians, lizards and snakes.

Advancing Animal Care Through Technology – Animal Activity Devices

Joey Song and Adam Chan
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As part of the Mandai Rejuvenation Plan, two immersive parks—Rainforest Wild (Asia) and Rainforest Wild (Africa)—were created to simulate the experience of exploring a living rainforest. Unlike conventional zoos with designated viewpoints, Rainforest Wild encourages spontaneous animal encounters through expansive habitats that offer animals greater spatial choices.

Central to this concept is the use of Animal Activity Devices (AADs), particularly those that integrate naturalistic audio cues to condition animal responses while minimising staff presence. This low-intervention strategy supports both animal autonomy and visitor engagement by guiding interactions in subtle, organic ways. The sound cue device, designed to train animals with specific auditory stimuli, stands out as a core innovation, offering a distinctive, underexplored avenue for enhancing behavioural management and visitor experience.

Complementary AADs include pellet, hay, and fresh food dispensers tailored to various species and feeding needs. These devices help promote animal movement, reduce anticipatory or stereotypic behaviours, and decouple feeding times from human presence. Altogether, this system represents a holistic, non-intrusive approach to harmonising welfare, habitat authenticity, and experiential design.

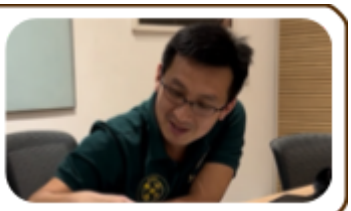
Keywords: animal activity, technology, device, training, sound cue, remote

Julette Tay

Joey is a Deputy Head Keeper that has worked with a variety of animals from aquatic to terrestrial species at various parks at Mandai Wildlife Reserves who has a keen interest in conservation of threatened species, of which many are cared for and spotlighted in Rainforest Wild (Asia) where she is currently based.

Vernice Ng

Adam is an Animal Care Officer that works with large animals like the Malayan Tapir, Sun Bear and Saltwater Crocodile at Rainforest Wild Asia. He has combined his interest of tinkering with gadgets and his passion for the animals' well-being into creation of devices that has improved the way we care for our animals.



Effects of Modified Feeding Schedules and Training on Elasmobranch Behaviour in a Mixed-Species Aquarium Exhibit

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Managing elasmobranchs in mixed-species aquarium exhibits presents unique welfare challenges. With many species facing conservation threats, optimising behaviour in managed care is critical. This study investigated the effects of modified feeding schedules and positive reinforcement training on sharks, rays, and bony fish at the Singapore Oceanarium's Open Ocean Habitat. Experiment 1 employed an ABAB design, transitioning from single daily feeding (1600 h) to multiple feedings (0900 h, 1300 h, 1600 h). Sharks showed a significant reduction in undesirable behaviours (18.60 vs. 10.25, $p<0.001$). However, rays exhibited increased undesirable behaviours (64.55 vs. 98.80, $p = 0.020$), primarily Javanese cownose rays (*Rhinoptera javanica*) and spotted eagle rays (*Aetobatus narinari*). Bony fish showed minimal interactions. Experiment 2 targeted undesirable ray behaviours through species-specific interventions. Cownose rays received positive reinforcement training using stretcher conditioning, while eagle rays received fixed location feeding. Training significantly reduced cownose ray undesirable behaviours (42.25 vs. 23.10, $p<0.001$). Eagle rays showed improvements, though not statistically significant. Results demonstrate that modifications to the feeding schedule effectively reduce problematic behaviours in sharks but require species-specific interventions for rays. Positive reinforcement training successfully addressed welfare challenges, providing practical management tools for aquarium professionals working with diverse elasmobranch collections.

Keywords: feeding management, positive reinforcement training, aquarium welfare, elasmobranchs

Claudia Tay
Claudia is the Manager of Animal Welfare and Behaviour Science at the Singapore Oceanarium, where she oversees welfare protocols, training programs, and enrichment initiatives for a diverse range of aquatic species. She is currently pursuing her PhD at the University of Adelaide, focusing on the anthropogenic effects on the welfare of zoo and aquarium animals.

From Observation to Action: Implementing Evidence-Based Welfare Assessments for Aquatic Animals

Leong Kai Le

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While animal welfare assessment protocols are well-established for terrestrial species, aquatic animals remain underexplored, despite thousands of species being housed in aquariums and zoos worldwide. The unique underwater environment necessitates specialised frameworks to ensure optimal welfare standards. Singapore Oceanarium has developed systematic, evidence-based welfare assessment protocols applicable across diverse aquatic taxa.

Singapore Oceanarium's comprehensive framework utilises the Five Domains model (Nutrition, Environment, Health, Behaviour, Mental State) and is adapted for aquatic species. Key metrics include species-appropriate dietary analysis, water quality parameters, and behavioural observations. Each assessment generates welfare scores enabling data-driven care decisions and targeted interventions. Implementation across all species revealed critical welfare indicators often overlooked in traditional husbandry. This systematic approach provides a reproducible methodology that addresses the knowledge gap between terrestrial and aquatic welfare science. The framework offers practical tools for aquarium professionals to evaluate and enhance animal welfare through evidence-based decision-making. By standardising protocols, institutions can establish benchmarks, share best practices, and advance collective understanding of the needs of aquatic animals in managed care.

Keywords: animal welfare, assessment, aquatic animals

Leong Kai Le

Kai Le is an Animal Welfare and Behaviour Science Executive at Singapore Oceanarium, implementing welfare assessment protocols across diverse aquatic species and translating welfare science into practical husbandry applications. He also conducts behavioural observations to monitor animal welfare and inform evidence-based care decisions.

Managing Stereotypic Behaviour of Asian Elephants at Night Safari, Singapore

***Nur Farahdilla Binte Juraimi*, Novendran Suppiah, Arumugam Lachmana, Rahimi Rashid, Jasbir Anil, Clement Bayang, Nursyafiqah Yusof, Aiman Anwar, Anandhan Jeevanantham, Albert Lee, Adil Hakim, and Ahmad Mustaffa**

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Stereotypic behaviours in animals are considered abnormal and can be used as an indicator of an animal's well-being. The Asian elephants in Singapore Night Safari display certain stereotypic behaviours periodically. Changes in our elephant management and facility upgrades have been observed to influence stereotypic behaviours greatly. Some of the elephants in our care suffer from chronic foot lesions therefore undesirable repetitive movements may worsen their condition in the long run. Additionally, due to friction within the female herd, one female had to be segregated and housed alone. Herd dynamics were also observed to influence stereotypic behaviour.

Therefore, this study was conducted at Singapore Night Safari elephant facility to: (I) Investigate how keeper daily workflow and long-term work that disrupts the elephants' daily routine and space usage can affect their stereotypic activity (ST). From our findings, the elephants exhibit high ST during periods when they are kept in a smaller area and when keepers are busy with husbandry. We were able to reduce their ST by varying their space usage whenever possible and by the usage of automated feeders to keep them occupied during these periods. (II) Identify specific stereotypic behaviour triggers for each individual elephant. Our lone female showed a significant reduction in ST when paired with a compatible partner. Our findings provided a better understanding of how to resolve stereotypic behaviour for the elephants in our care. And (III) compare ST displayed in our old elephant stable with the new elephant facility. We observed that ST was significantly reduced by half in the new facility. This study allowed us to evaluate how the new space and upgraded amenities provide better welfare for the long-term management of our elephants.

Keywords: Asian elephant, stereotypic behaviour, stereotypy

Nur Farahdilla Binte Juraimi

Presenting Author, Nur Farahdilla Binte Juraimi. Farah is a Senior Keeper of the Elephant team at Night Safari, Singapore. She's unbiased with animals and have worked with a variety of animals from the smallest insects to one of the biggest land mammals.

Inspiring Species Conservation Through an Engaging Collectible Trading Card Game

Amira Garcia and Dennis Nagel

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How can we inspire zoo visitors to care deeply about biodiversity and spark intrinsic motivation to engage in species conservation—beyond a single visit? FasciNature offers an innovative answer: a conservation-themed collectible trading card game that gamifies education and transforms casual zoo visitors into lifelong conservation advocates. Designed as a mission-driven impulse item for zoo gift shops, the game combines captivating biodiversity facts with transformational experiences that spark emotional engagement and curiosity. Each sustainable 15-card pack not only delivers educational value but also plants a real tree in Palawan, Philippines—supporting the reforestation of critical breeding grounds for the Critically Endangered red-vented cockatoo (*Cacatua haematuropygia*) through a partnership with the Katala Foundation. The game's scalable difficulty levels enables an inclusive, meaningful play among educators and students, visitors and interpreters, or team members and leaders—enhancing both guest engagement and staff development. This interactive session presents FasciNature as a case study in how conservation messaging, visitor education, and sustainable retail can converge to build long-term capacity and real-world impact. With its crowdfunding campaign launching in September and a presence at the upcoming SEAZA conference, FasciNature invites the SEAZA community to explore how curiosity, positive energy, and play can become powerful tools for protecting wildlife—together.

Keywords: Conservation Education, Visitor Engagement, Gamification, Zoo Retail Strategy

Amira Garcia

Amira is the General Manager of FasciNature and a passionate conservationist from the Philippines. She will be supported by Dennis, the creator and founder of FasciNature.

Claws and Effect: What Happens When We Work Together — and When We Don't

Tanya Erzinclioglu
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The success of wildlife welfare initiatives depends on the strength of relationships between key stakeholders—zoos, government agencies, and NGOs often determine whether animals benefit from lasting improvements or suffer the consequences of communication breakdown and distrust. Collaboration is vital for capacity building to achieve long-term welfare outcomes. Case studies from nearly a decade of For Tigers' work in Thailand examine how collaborative versus adversarial approaches impact long-term welfare outcomes for captive tigers.

The 2016 closure of the Tiger Temple is a high-profile example of what can go wrong when stakeholders fail to collaborate effectively. Despite concern for animal welfare, the lack of coordinated planning, cultural sensitivity, and trust-building between stakeholders led to preventable tiger deaths and a missed opportunity for improved welfare. Built upon these failings, For Tigers' collaborative partnerships with Thailand's Department of National Parks (DNP) and various facilities housing captive tigers demonstrate the transformative potential of relationship-based approaches. These examples reveal how shared goals, and incremental improvements have led to measurable, sustained welfare gains, from enrichment implementation to infrastructure upgrades and staff training.

This presentation highlights that improving animal welfare is not just about what is done, but how it is done. The future of captive tiger welfare in Southeast Asia depends not only on technical expertise and resources, but on the capacity to build and maintain collaborative relationships grounded in mutual respect, cultural understanding, and long-term commitment to shared outcomes.

Keywords: animal welfare, tigers, collaboration, capacity-building

Tanya Erzinclioglu

Tanya is the director of For Tigers, UK. She worked for six years at Thailand's Tiger Temple, implementing a comprehensive tiger enrichment program. Since then, her work with For Tigers has seen various initiative to improve tiger welfare in facilities around Thailand including designing enclosures and the provision of tiger enrichment workshops.

Through Managing Conservation, Education, Marketing Campaigns to Saving Rhinos from Extinction

Chun-Ju Lin
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For decades, rhinoceroses (*Ceratotherium simum*) have been targeted by crime syndicates for their horns, which are then sold on the black market. Today, these animals are among the most endangered species on the planet. Currently, there are about 18,000 southern white rhinos (*C. s. simum*) worldwide, with roughly 17,464 individuals living in the wild as of the end of 2023. Leofoo Safari Park participates in *ex situ* conservation efforts and currently manages 19 southern white rhinos. Leofoo also emphasises education, guest experience, and marketing campaigns to raise public awareness about the threats to rhinos. For a closer encounter, Leofoo offers a custom "rhino bus" tour that takes visitors into the exhibit. We also provide a variety of programs, including guided visits to the rhino breeding station, where guests learn about rhino behaviour, habitat, threats, and conservation actions.

Every year, Leofoo organises a "Saving Rhinos" event in public venues to engage the community. We also publish a book that introduces rhinos and connects them with Taiwan's native wildlife, helping people understand and appreciate animal conservation. Additionally, the education team travels to rural schools annually to share rhino conservation efforts with students.

Keywords: rhino, education, marketing campaigns

Chun-Ju Lin

Chun-Ju Lin is the deputy manager of animal management department of Leofoo Safari Park. She is in charge of animal management and education. She is also a senior environmental educator.

Breeding Success and Public Engagement: Advancing Zoo Education in Myanmar

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Most people in Myanmar think zoos are only a recreational place. As a result, there has been limited understanding of the deeper roles zoos play in animal care, education, and conservation. The zoo education program in Myanmar was established in 2014. At that time, public understanding of zoo education was very limited, and there was little interest or awareness among the general population. On Facebook, posts received mostly negative comments and critical responses. Despite this, we continued to share educational content, including posts related to animal awareness days, and actively promoted our zoo education program to the public. We are making continuous efforts to help the public better understand the importance of animal conservation. In 2025, our zoos achieved successful breeding outcomes, which captured public attention and helped change perceptions, showing how zoos actively contribute to preserving endangered animals. Through continued education programs and social media engagement, the public's attitude shifted toward greater respect and care for animals. This combination of real conservation achievements and education has proven powerful in encouraging community involvement, such as participation in animal adoption programs. Therefore, successful breeding outcomes are much more effective in helping the audience understand the conservation role of zoos, emphasising the need to raise awareness and encourage participation through education programs.

Keywords: zoo education, public perception, social media engagement, breeding success

Naw Lay Lay Wah

Naw Lay Lay Wah is the Manager of Education at Htoo Zoos & Gardens Business in Myanmar. She has been actively involved in animal welfare, conservation education, and species management programs.

Taman Safari Indonesia: Long-term Commitment of Conservation and Education of Endemic Species in Indonesia

***Allysa Khanza Artuti*[1], *Nur Hidayat Fitriandi*[1], *Saifullah*[1], *Eko Windarto*[1], *Sharmy Prastiti*[2], *Bongot Huaso Mulia*[2], *Jansen Manansang*[2], *and Tony Sumampau*[2]**

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Taman Safari Indonesia (TSI), as the largest conservation establishment in Indonesia, is strongly committed to long-term wildlife conservation and education through both *in situ* and *ex situ* approaches, with a primary focus on Indonesia's endemic species. This commitment is demonstrated through a series of endemic wildlife release programs that have been ongoing since 2022, involving species such as the Javan Pied Myna (*Gracupica jalla*), Javan Hawk-Eagle (*Nisaetus bartelsi*), Komodo Dragon (*Varanus komodoensis*), Javan Banteng (*Bos javanicus*), and Togian Babirusa (*Babyrousa togeanensis*). Each release activity is designed not only as a conservation effort but also as a comprehensive educational platform with the main goal of community-based conservation sustainability. The conservation education program targets diverse groups, including students, college students, and the public, but is tailored to the participants' ages and characteristics. Overall, this program represents a collaborative effort that combines effective wildlife conservation management with interactive learning media and contextual academic materials. Multiple delivery platforms—including offline, online, and hybrid modalities—are utilised to ensure that the educational objectives are achieved. This accomplishment, achieved by TSI, is expected to provide recommendations for the further development of conservation education programs and their implementation in other conservation areas across Indonesia.

Keywords: release programs, conservation education, community-based conservation

Allysa Khanza Artuti

Allysa is an Educator at Taman Safari Indonesia Prigen, with primary focus on research and designing conservation educational materials on various platforms. She also involves actively in numerous conservation educational programs conducted by Taman Safari Indonesia.

Enhancing Public Engagement for Bleeding Toad (*Leptophryne cruentata*) Conservation Through Creative Educational Media at Indonesian Outdoor Festival (INDOFEST) 2025

***Rina Rajagukguk*[1], *Bongot Huaso Mulia*[1], *Ika Citay Lestari*[1], *Imam Purwadi*[1], *Sharmy Prastiti* [1], *Yohana Tri H*[1], *Ardyta Widianti*[1], *Arief Mutargan*[1], *and Jansen Manansang*[2]**

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The Bleeding Toad (*Leptophryne cruentata*), a critically endangered amphibian endemic to West Java, remains largely unknown to the wider public. To bridge this awareness gap, Taman Safari Indonesia Bogor participated in Indonesia Outdoor Festival (INDOFEST) 2025, Southeast Asia's largest outdoor and adventure exhibition, to introduce this threatened species to a broader audience. Over four days, the conservation education booth attracted 480 visitors, including families, youth, outdoor enthusiasts, and conservation-minded communities. The booth featured multi-sensory learning tools such as video highlighting TSI's successful breeding program, wooden instruments replicating toad calls, and an interactive "Fact or Myth" digital quiz accessible via iPad. Visitors also explored photo panels illustrating the toad's metamorphosis, browsed the Amphibians of Java book, and received themed merchandise such as metamorphosis rulers and folders with conservation messages. On the third day, a live Keeper Talk provided further insights into TSI's *in-situ* and *ex-situ* conservation efforts. Visitors were also encouraged to participate in a pledge wall, "Our Voice for Bleeding Toad", leaving messages of hope and commitment for amphibian conservation. This initiative demonstrates that interactive and informal education in non-traditional venues can effectively raise public awareness about lesser-known, threatened species. Integrating tactile media and personal engagement in non-traditional settings such as outdoor festivals offers a replicable model for conservation education.

Keywords: Amphibian Conservation, Public Engagement, Interactive Education, Bleeding Toad

Rina Rajagukguk

Rina is the Education Manager at Taman Safari Indonesia – Bogor, where she leads visitor education programs, animal presentations, and conservation awareness campaigns. Her main interests include environmental education, human-wildlife coexistence, and creative public engagement in zoological settings. She is currently developing integrated programs that connect ex-situ education with in-situ conservation efforts.

Educating the Educators: Understanding the Challenges and Capacity-Building Needs of Zoo Educators in Malaysia

Eve Foong Y.W.
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Education is considered as one of the main pillars of a modern zoo or aquarium's role. To better educate the public, we must first have zoo educators with a strong and knowledgeable foundation. This survey was conducted to better understand the challenges faced by zoo education teams among the members of the Malaysian Association of Zoological Parks and Aquaria (MAZPA), so that a targeted training programme to cater those needs could be developed. A total of 13 representatives from the 23 members of MAZPA responded to our online questionnaire. Some of the main challenges highlighted were limited resources, language barriers, the inability to monitor public impact, the need for staff development, and the difficulty of engaging diverse visitor demographics. All participants were eager to acquire skills in conservation education, public speaking, utilisation of modern technology to enhance educational outreach, multilingual and multicultural engagement strategies, impactful communication, and effective signage design. In conclusion, the zoo educators in Malaysia are highly motivated to enhance their capacity, highlighting the opportunity to create relevant and meaningful capacity-building programmes.

Keywords: Zoo educators, challenges, training programmes

Eve Foong Y.W.
Eve is the General Manager and Head Veterinarian at Farm in the City, Malaysia. She started off her career as an educational presenter & zookeeper. She is a board member in the Malaysian Association of Zoological Parks and Aquaria (MAZPA), and is currently the Education sub-committee Chairperson, in charge of education within MAZPA.

Facilitating Conservation Behavioural Changes in Schools Through Ocean Park Conservation Alliance, an Education Campaign in Ocean Park Hong Kong

Stephanie Chan Hui Yan
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Aspiring to engage schools and nurture student leaders in conservation and education, Ocean Park Conservation Alliance (the Alliance) was established in 2023 as one of the conservation advocacy initiatives of Ocean Park Hong Kong. Over 500 member schools and around 10,600 Seahorse Rangers (the Rangers) have actively participated in the Alliance since the launch.

Conservation has been promoted in schools for quite some years. Different green facilities have been established in schools, yet do the users make use of the facilities in schools to achieve conservation goals? Not only are infrastructures required in driving behavioural change. Related knowledge and motivation are the key.

With conservation facilities in schools, Ocean Park Hong Kong provides incentives to member schools through three flagship activities—SGREEN, Farming at School and City Nature Challenge—and the accreditation system. A variety of conservation workshops have been provided to the Rangers to enrich their conservation knowledge. The Rangers then promote concepts of recycling, low-carbon lifestyle, and local biodiversity to their families, schools, and communities through the three flagship activities, thereby facilitating behavioural changes. A few key milestones achieved through the Alliance in the 2024/25 school year, including collecting close to 80 tonnes of recyclables through the "SGREEN" activity, contributed to approximately 30% of the total observers in the city in the City Nature Challenge 2025, and raised close to 70k to support Ocean Park's giant panda conservation efforts. Member schools will be awarded the title of "Outstanding School" upon completion of the three flagship activities.

Keywords: education campaigns, conservation advocacy, behavioural change

Stephanie Chan Hui Yan
Stephanie is a Discovery & Education Manger at Ocean Park Hong Kong, leading the Ocean Park Conservation Alliance, a conservation advocacy campaign. Her main interests include conservation advocacy, stakeholders' engagement and education psychology. She has been to various countries to communicate and exchange ideas in conservation and education with the local educators.

Cultivating a Purpose-led Community of Volunteers at Mandai

Illi Suraya
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The 500-strong volunteer community at Mandai Wildlife Group plays an integral role in supporting our mission to protect wildlife. Coming from diverse backgrounds, these passionate individuals contribute meaningfully to the various areas of our work.

This presentation shares how we build and sustain a strong volunteer community through a strategic approach—from aligning opportunities with volunteer interests to reinforcing the impact of their contributions. We will explore how strategic recruitment, training, and engagement deepen motivation, strengthen retention, and foster a strong sense of purpose.

By curating volunteer opportunities that reflect shared values and embedding transparent processes, we cultivate a community that grows with us. In this session, we will share strategies and lessons that are useful to support wildlife organisations in developing volunteer programmes with long-term impact.

Keywords: *volunteer community, strategic approach, motivation, purpose, recruitment, training engagement, long-term impact*

Illi Suraya
Illi is a Senior Executive at Volunteer Engagement Unit, Education Department. With close to nine years of experience in volunteer engagement, she believes in connecting like-minded individuals to meaningful causes and fostering collective impact through volunteerism. She is inspired by the passion of others and the ongoing opportunities to contributing to protecting wildlife.

Is Empathy Necessary? Exploring the Role of Empathy in Animal Welfare

Dave Morgan
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This paper investigates the necessity and function of empathy within animal welfare, emphasising its relevance in professional care environments such as zoos and sanctuaries. Empathy is examined through the dual lens of cognitive and emotional domains, delineating the distinction between understanding and sharing an animal's emotional state.

The research highlights how empathy contributes to improved attention to animal needs, ethical decision-making, and personalised care approaches. Reference is made to key empirical findings, notably the work of Hemsworth and Coleman, which demonstrate the measurable impact of human-animal interactions on the welfare and productivity of managed species.

Potential drawbacks are critically assessed, including the risks of anthropomorphism, emotional fatigue among caregivers, and the inadvertent undermining of objective protocols. The paper suggests that these limitations can be mitigated by integrating empathic responses with scientific methodology, behavioural observation, and technological advancements.

The discussion extends to the origins of empathy, exploring both innate and learned aspects, and underscores the importance of structured empathy training for animal care professionals. The paper concludes that while empathy alone is insufficient, its combination with evidence-based practices forms an essential foundation for effective animal welfare management.

From Model to Measurable: Mind the Gap

Jason Watters, Cheryl Meehan, and Bethany Krebs
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Animal welfare science often advances in short bursts when new conceptual models emerge, followed by extended periods of slower progress when limitations in application become apparent. In the widely used Five Domains model, for example, the mental domain is frequently considered immeasurable, leading some practitioners to focus primarily on physical domains and infer emotional states indirectly. Yet core, evolutionary old emotions function as both mechanisms and outcomes of behaviour, making observed behaviour a critical indicator of mental state. The Three Needs model addresses this challenge by offering a behaviour-based framework, positing that animals require opportunities to investigate, acquire rewards, and manage their own processes to achieve positive welfare. Meeting these Needs produces positive affect, and the behaviours associated with doing so are observable, allowing for systematic assessment of long-term, mood-like states.

The Enriched Experience Project (EEP) applies these principles within a progressive, outcome-based care model that emphasises animal agency—empowering animals to actively engage with their surroundings in ways that meet their Three Needs. Outcome-based care shifts the focus from simply providing enrichment to creating experiences that enable animals to adapt to challenges and make meaningful choices. This initiative builds capacity within zoological teams to design environments and opportunities that support an animal's ability to manage their own processes, while yielding measurable positive welfare outcomes and enhanced guest engagement.

We will share case studies from AZA-accredited institutions where animal care staff participated in EEP training and implementation. We will share outcomes on animal behaviour, guest survey results on empathy and conservation intent, and staff reflections on transitioning to outcome-based care. Findings demonstrate that integrating behavioural science with enrichment practice not only makes the mental domain measurable but also bridges the gap between conceptual welfare models and practical animal care, ultimately enhancing welfare outcomes for animals, guests, and staff alike.

Improving the Conditions of Captive Philippine Spotted Deer (*Rusa alfredi*) through Animal Enrichment and Visual Barriers

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The Philippine Spotted Deer (*Rusa alfredi*) is a critically endangered species endemic to the Negros-Panay region of the Philippines, now restricted to approximately 5% of its historical range due to habitat loss and fragmentation. Silliman University's Center for Tropical Conservation Studies (SU-CenTrop), established in 1990 as a captive breeding facility for Philippine endemic species, currently manages 47 individuals. Due to spatial and resource constraints, breeding efforts have been temporarily suspended to prioritise animal welfare. In this context, habitat enhancements and regular animal enrichment were introduced to assess their impact on captive behaviour. Findings indicate that the integration of visual barriers and regular enrichment activities promotes increased physical activity that contributes to an ideal body condition score and reduces aggressive interactions among dominant individuals sharing enclosures, highlighting their importance in the welfare management of this species in captivity. Based on these findings, it is recommended that the utilization of visual barriers and regular animal enrichment be incorporated as part of the standard husbandry operations. In addition, future studies should examine the long-term effects of these interventions on social dynamics and stress reduction to improve animal welfare in *ex-situ* conservation.

Keywords: Philippine Spotted deer, animal enrichment, visual barriers, population management

Leandro Cabrera

Leandro is an Assistant Professor in the biology department of Silliman University. He teaches field courses in terrestrial fauna to undergraduate students. He is also the current coordinator of Center for Tropical Conservation Studies, the research arm of their department that manages the captive breeding center of endemic wildlife in the Negros region.

Animal Transport Operations and Animal Welfare: Transporting a Large Crocodile

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The false gharial (*Tomistoma schlegelii*) is a large crocodilian species endemic to Asia, with adults reaching lengths of 4 to 5 meters. Due to limited space, the lack of isolation areas, and the absence of safe handling routes in the original exhibit, the enclosure could not accommodate the animal's growing needs and posed increased risks to staff safety. To improve both animal welfare and operational safety, the team planned the relocation of an individual that had grown from a 1-meter juvenile to a 5-meter adult to a newly constructed, larger exhibit.

The relocation faced several challenges, including narrow passageways, outdated enclosures, and the inability to use heavy machinery. By utilizing the crocodile's preference for water, along with minor environmental adjustments and guided strategies, the team successfully encouraged the animal to voluntarily enter a transport crate. A temporary pulley system was installed and operated manually to facilitate the move.

This case demonstrates that even under constraints of space and equipment, a deep understanding of species-specific behaviour and careful planning can enable the safe relocation of large, dangerous animals, offering practical insights for similar future operations.

Keywords: Reptile, Crocodile, Animal Transport, Animal Welfare

Revamping An Enrichment Program: A Bottom-Up Approach

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Revamping an enrichment program for a facility involves a comprehensive reassessment of existing practices to identify areas for improvement, particularly in terms of variety, complexity, and effectiveness. As part of a broader initiative, it also involves ensuring that trainers are continually equipped with the necessary knowledge and are fully aligned with the facility's goals to support the successful implementation of enrichment strategies. Instead of enforcing change from a top-down approach, we took the opportunity to foster a collaborative environment by involving all trainers in the process. This approach ensured that each trainer was invested in the success of the enrichment initiatives. We implemented a step-by-step approach for trainers, focusing on achieving consistency before introducing new objectives. Throughout this process, we facilitated seminars, discussions, and enrichment-building workshops to foster trainer engagement. However, advancing evidence-based management is challenging without quantifiable data to show that the proposed enrichment program is indeed improving animal welfare. To address this, we have involved all trainers in conducting weekly enrichment observations for their animals using ZooMonitor. The data we collected provided evidence-based insights into how the animals were interacting with enrichment devices, enabling us to develop targeted training plans to increase enrichment engagement.

Keywords: enrichment program, evidence-based management, animal welfare

Jane Neo
Jane is a Senior Marine Mammal Specialist & Enrichment Program Coordinator, working with Indo-Pacific Bottlenose Dolphins (*Tursiops aduncus*), at Singapore Oceanarium. She is passionate about enhancing animal welfare through innovative enrichment activities and using data-driven insights to inform and implement meaningful changes.

Two Paths, One Goal: Advancing Chimpanzee Welfare through Tailored Sedation Conditioning

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Ensuring the welfare of chimpanzees during medical procedures is a core focus in modern zoological care. At the Singapore Zoo, voluntary hand injection is the preferred method for sedating great apes, offering animals greater control and minimizing stress. However, individual behavioural histories may require alternative strategies, as shown in two distinct case studies involving male chimpanzees Natty and Togo.

Natty, a 19-year-old male, was successfully conditioned to present his arm through protected contact for injection. Strategic use of hand targets supported body positioning, while gradual desensitization to alcohol gauze, blunt 20G and 23G needles, and simulated pressure-built tolerance to the procedure. The next step is simulated sedation using diluted B12 injection, with the long-term aim of restraint-free veterinary care.

Togo, a geriatric male with a strong aversion to needles, required a different approach. Standard injection training proved difficult, prompting a shift to voluntary oral sedation. His initial successful sedation used Zoletil (tiletamine and zolazepam) diluted in cordial and delivered without restraint. Once drowsy, darting was used to induce full sedation. Building on this concept, the current protocol introduces Dormicum (midazolam) via syringe or atomizer, with conditioning centered on calm acceptance and distraction-based techniques. Desensitization to the bitter taste of midazolam was achieved by using paracetamol in training sessions. Togo has shown increased tolerance to voluntary oral delivery, reducing pre-darting anxiety and enhancing safety for both staff and animals.

These case studies underscore the importance of flexible, animal-centric approaches in sedation conditioning. By respecting each individual's history, adapting accordingly, and working closely with the veterinary health department, we strengthen welfare outcomes while maintaining procedural success. In line with this year's SEAZA conference theme, these examples illustrate how refining our methods to suit the animal in front of us leads to more compassionate, effective care in modern zoological practice.

Keywords: chimpanzee, voluntary, sedation conditioning

Jackson Raj

Jackson is Deputy Head Keeper who has 27 years of experience working with wildlife. He dedicates his days to protecting some of the most intelligent species of endangered primates.

Kevin Chandran

Kevin has been working in Singapore Zoo for 5 years as an Animal Keeper. He primarily works with great apes and small primates, with an area of interest in training and conditioning chimpanzees.

Cross-Taxa Evaluation of the WildThink Enrichment Framework: Assessing Effectiveness and Comparing Behavioural Responses Using a Standardized Scoring Method

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Behavioural enrichment plays a critical role in promoting species natural behaviours and enhancing animal welfare in zoological settings. To assess enrichment effectiveness, this study evaluated the WildThink Enrichment Evaluation Framework, which provides a standardised scoring method for analysing enrichment outcomes. From September 2024 to June 2025, a total of 328 enrichment sessions were assessed across six animal taxa: Aves, Carnivores, Herbivores, Primates, Reptiles, and Rodents. Each session was evaluated using four parameters: Interest in Enrichment, Activity Level, Goal Achievement, and Caretaker Effort, scored from 0 to 3. Statistical analysis, including descriptive statistics and one-way ANOVA, revealed significant differences among taxa across all behavioural dimensions ($P < 0.0001$). Herbivores consistently scored highest, while reptiles scored lowest, suggesting taxon-specific responsiveness to enrichment. These findings demonstrate that the WildThink Framework is effective in detecting practical and behavioural variation across species and supports its cross-taxa applicability. This method helps zoos make better decisions about enrichment by using clear, consistent scores. Using a minimum average score can help guide improvements and make sure enrichment activities support the well-being of each species.

Keywords: Behavioural enrichment, cross-taxa evaluation, animal welfare practice

Abdul Fattah

Fattah is an Assistant Curator at Taman Safari Bali that focus on animal welfare and husbandry practice, and animal nutrition-related program. He also works on developing and monitoring animal behaviour evaluation programs to support species-specific needs and care standards.

Olfactory Strategies for Asiatic Black Bear Conflict Mitigation: Investigating Behavioural Responses to Different Odours

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The study investigated the behavioural responses of bears to different odours to develop deterrents that can be used in human-asiatic bear conflict mitigation. During the before-baseline period, no bear sightings were recorded, which suggests that odours may have influenced subsequent bear responses. The study found that different odours such as garlic, chilli, bear scat, and dog scat elicited different responses from bears. Younger, less experienced bears exhibited curiosity, whereas older bears, especially males, displayed caution and distress. The latency of bears to return to the experimental site varied depending on the odour cues presented, suggesting a learned association between the site and food availability. The study also explored the concept of pungent odours potentially masking appealing scents for bears that can also be used as an effective deterrent against bear activity. The research findings have practical implications for mitigating human-bear conflicts, highlighting the need for tailored strategies and dynamic solutions for human-bear coexistence amid changing habitats and climate impacts. Further research is recommended on individual bear personality traits and sex related differences in risk-taking behaviour. In addition, the study drew upon internship experiences such as night patrols, bear miscaptures, and communication and outreach, which provided valuable insights for fieldwork. These experiences highlighted the practical challenges of bear conservation efforts and emphasised the importance of community engagement and effective communication in achieving human-bear coexistence.

Free-Flight Training for Blue-and-Gold Macaws in an Urban Aquarium

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Xpark, an inland urban aquarium in Taiwan (14,817 m²), originally provided basic flight training for its blue-and-gold macaws (*Ara ararauna*) using point-to-point (A-to-B) flights in a semi-open theater (30 × 24 m). To further enhance animal welfare and physical health, the training area was expanded to a larger outdoor space (143 × 43 m) with no height restrictions, allowing for essentially unrestricted flight. As an urban facility, Xpark faces various safety and management challenges when conducting free-flight training. For example, buildings may obstruct the birds' line of sight, and strong gusts caused by the urban wind tunnel effect can pose additional risks during flight. Nevertheless, the macaws adapted well to the broader flying environment.

Following a planned training program, we gradually expanded the flight range over approximately three years. Flight duration increased from approximately 3 seconds to up to 5 minutes, and flight distance expanded from 30 m to 438 m, with the birds consistently able to return to the training area on their own. Feather condition also visibly improved, with a marked reduction in feather-plucking behaviour. These outcomes align with studies showing that regular flight activity supports healthy locomotion and psychological well-being in parrots. Overall, this case supports the view that increasing flight range, even within the constraints of urban environments, remains a meaningful welfare goal for captive parrots.

Keywords: Blue-and-gold macaw, Free-flight training, Urban aquarium, Animal welfare, Parrot enrichment

Tu-Kai Huang

Tu-kai is the aquarium keeper of Xpark in Taoyuan Taiwan. The husbandry and medical training of avian and pinniped is his major daily work. He is also the main translator communicating the different husbandry methods between Taiwanese and Japanese keeper with his fluent Japanese.

From Fear to Familiarity: Predictable Patterns Supporting Behavioural Change

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At Mandai Wildlife Group, positive reinforcement is widely used to support animal welfare and training. This case study focuses on desensitising a male Spotted Hyena (*Crocuta crocuta*) with a fear of confinement related to the sliding doors throughout his enclosure. To help the hyena overcome this fear, keepers used operant conditioning centered on predictable, consistent patterns. The sliding door was closed and then reopened immediately, followed by a reward, creating a clear routine. This helped the hyena associate the door closing with a safe, temporary event, reducing anxiety, and thus changing his behaviour.

Training progressed gradually, from slightly moving the door to fully closing it while rewarding calm behaviour. The predictable sequence gave the hyena greater control and understanding of what to expect, leading to a decreased fear response, as evidenced by him accepting the slide being closed.

The goal was to enable safe confinement in the exhibit or dens for husbandry and emergencies. This method supports practical management and reduces stress by increasing the animal's sense of control and understanding of future events.

This case demonstrates how predictable routines combined with positive reinforcement can facilitate behavioural change in fearful animals. Approaches like this contribute to a growing knowledge base by providing frameworks that can be adapted and applied across various zoological settings to address complex behavioural challenges. Developing predictable training methods builds capacity for improved care of nervous animals in the region.

When the Vet Walks In: Tackling Contextual Fear Through Training

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Administering injections in large carnivores typically requires darting, which can elevate stress levels and pose risks to both animals and staff. At Singapore's Night Safari, keepers initiated a voluntary injection training programme with a female Malayan tiger (*Panthera tigris jacksoni*) to explore alternatives. The training focused on creating positive associations with procedures that are typically aversive—such as needle sticks, the presence of medical tools, and veterinary personnel. Initially, training relied on reinforcing calm stationing behaviour and desensitising the animal to touch and equipment through protected contact. However, as training progressed, it became evident that the presence of unfamiliar people—especially veterinarians—acted as a strong contextual cue, triggering anticipatory avoidance or heightened arousal. To address this, training sessions were extended to include gradual exposure to the appearance and scent of veterinary staff, while maintaining previously reinforced behaviours. The goal was to generalise the trained response across different people and situations, weakening the animal's conditioned fear responses to these contextual triggers. One successful voluntary subcutaneous hand injection (without the vaccine) was conducted, marking a key behavioural milestone. While further generalisation is required to achieve full reliability across contexts, this case illustrates the importance of classical conditioning in shaping emotional responses, and the need to target not just the behaviour but also the cues that predict perceived aversive events. This ongoing collaboration between keeping and veterinary teams also contributes to cross-departmental capacity building, strengthening institutional knowledge, and improving long-term animal care strategies.

Designing Habitats with Sustainable Collection

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Marine Safari Bali is Taman Safari Indonesia's newest marine park, located in Bali, Indonesia. Opened in December 2024, Marine Safari Bali aims to showcase a modern park with a collection of captive-bred, sustainable species collection only in our park. Over 70% of our collection is obtained through captive breeding programs, sustainable fisheries, and ornamental trade industries.

The design of our habitats incorporates multi-use spaces and collection, allowing us not only to showcase our animal collection but also use it for various encounter programs, education talks, messages, and experience with the animals up close such as our Ray Feeding Program, Bull Shark Cage Diving, Penguin Encounter, and Capybara Interaction, among others.

Aside from Encounter programs, other habitats are designed and curated to showcase conservation and education messages, including our smaller aquarium habitats that focus on captive-bred species and mariculture corals.

In this entire presentation, we will be showing all our dynamic habitat designs, on how the Curator curates the park's habitat design, collection acquisition, and turning them into encounter programs, education talks as well as conservational messages throughout the park.

Keywords: Dynamic Habitats, Sustainable breeding, Sustainable collection & conservation, Habitat Curation and Design

Ken Kwan
Ken Kwan is the Acting Senior Curator who manages the life science departments and collection over a span of terrestrial, reptiles and aquatic animals. He designs and curates the marine park's collection incorporating using sustainable collection from captive breeding, mariculture and aquaculture to showcase various habitats for guest encounter programs, educational talks as well as conservation efforts.

Reptile Enrichment: It's not EXTRA, it's Just Good ol' Husbandry

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Environment enrichment as a component of reptile care is often undervalued, viewed as supplementary rather than essential. At KFBG, we take a species welfare-driven approach that integrates enrichment into the foundation of our husbandry practices. KFBG receives seized reptiles from global origins, which require a progressive approach to dealing with their needs. Our reptile enclosures are designed to support species-specific behavioural repertoires, while also fulfilling functional, educational, and aesthetic objectives.

This presentation will highlight how enrichment is integrated into our daily practices, with a particular focus on physical habitat design. By creating dynamic environments that promote behavioural diversity, provide spatial complexity, encourage active engagement, and maximise usage, we have observed a range of fascinating behavioural expressions that speak to the reptiles' engagement with their environment.

These observations not only reflect improved welfare outcomes but also offer valuable insights into species-specific needs and preferences, demonstrating how enrichment can be embedded meaningfully into routine husbandry. Findings from our work in Hong Kong will be shared during the presentation.

Keywords: Reptiles, Enrichment, Functional Husbandry, Animal Welfare

Debbie Ng

Debbie Ng is a Senior Curator at KFBG's Fauna Conservation Department, managing the Animal Programmes & Exhibits Section. Her passion includes animal welfare, behavioural management, and working toward the goal of making enrichment synonymous with good husbandry and welfare.

Building a Buzz; Facilities that Inspire Invertebrate Awareness and Conservation

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Invertebrates play essential roles in ecosystem function yet remain underrepresented in conservation education and public engagement. At Mandai Wildlife Group, we have developed a suite of invertebrate-focused spaces and programs aimed to shift perceptions and highlight the ecological importance of these animals. This paper outlines how exhibit design, experiential learning, and partnerships with local academic institutions are integrated to build invertebrate awareness and conservation support.

Our Pollinator Garden showcases native plant-pollinator interactions in a habitat restoration setting. Simultaneously, the Learn About Butterfly Walk educates visitors on butterfly lifecycles and ecological roles through guided trails and signage. The Incredible Invertebrates Backstage Pass offers behind-the-scenes encounters with live terrestrial and aquatic invertebrates, providing tactile and close-up learning experiences. Live stingless beehive installations function as both educational displays and research platforms, with ongoing monitoring of colony behaviour, health, and foraging activity contributing to in-house studies.

We also actively engage both visitors and staff through invertebrate surveys, allowing them to participate in species monitoring within our managed habitats. Beyond public engagement, our facilities and animal collections are used by local Institutes of Higher Learning (IHLs) as field-based research sites. Students and faculty conduct a range of projects—from behavioural studies of predator-prey relationships between arthropods and vertebrates to morphological development studies, benefiting from access to curated exhibits and semi-controlled environments.

This layered approach—combining education, participation, and academic collaboration—demonstrates how zoos can serve as platforms for both public awareness and applied invertebrate research. We share insights into program outcomes, visitor response, and opportunities for scaling such models across other institutions.

Delvinder Kaur
Delvinder Kaur is an Assistant Curator (Ectotherms) at Mandai Wildlife Group, where she leads invertebrate programs, exhibits, and conservation efforts. She is passionate about invertebrate biodiversity and advancing public engagement in their conservation. Delvinder serves as the Ex-situ Conservation Focal Point for the IUCN SSC Conservation Planning Specialist Group, is a member of the IUCN SSC Butterfly and Moth Specialist Group, and is affiliated with the EAZA Terrestrial Invertebrate TAG.

Loh Krystofer Charles
Loh Krystofer Charles is a Keeper in the MWG Invertebrate team. He has a keen interest for invertebrates and the ecological significance they play in the ecosystem. He is also fascinated by the behavioural ecology of spiders. Together with the invertebrate team, Krystofer is tagging and mapping stingless bee colonies in our parks.

Development of the Philippine Endemic Species Exhibit in Cebu Safari and Adventure Park: Rescue, Rehabilitation and Exhibition of the Long-tailed Macaque, Philippine Palm Civet, and Philippine Brown Deer for Preservation and Visitor Education

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The Long-tailed Macaque in the Philippines (*Macaca fascicularis fascicularis*) is currently listed as Endangered on the IUCN Red List of Threatened Species. It was previously listed as Vulnerable, but was upgraded to Endangered in 2022 due to a projected population decline of over 50% within the next three generations. This elevated status reflects a significant decline in their population due to habitat loss, hunting, and other threats. Through a loan agreement with the Department of Environment and Natural Resources—Biodiversity Management Bureau (DENR-BMB), Cebu Safari and Adventure Park currently cares for 13 rescued macaques, all confiscated from individuals who lacked the permits and capacity to provide proper care. This paper describes the initial conditions under which the animals were kept in, and the subsequent development of a large, naturalistic exhibit for the macaques, and, subsequently for Philippine Palm Civet (*Paradoxurus philippinensis*) and Philippine Brown Deer (*Rusa marianna*) as a mixed exhibit. A 2,800 square metre naturalistic exhibit for the troop of 13 macaques was built after careful planning to achieve the objectives of conservation, education, and research. It has a large exhibit area, large holding cages, and keeper facilities to ensure optimum care can be provided. This exhibit will facilitate studies to be conducted of the behaviour and characteristics of long-tailed macaques and also educate both local and international park visitors on the importance of preserving endemic species. Educational programs highlighting the species' ecological role, conservation status, and threats in the wild will be highlighted. This integrated approach can promote awareness, foster public advocacy for wildlife protection, and contribute to the preservation of one of the Philippines' important primate species.

Keywords: Philippine long-tailed macaque, rehabilitation, exhibition, preservation, education

Mary Clarenz W. Tupaz, DVM

Mary Clarenz W. Tupaz, DVM is a resident veterinarian at Cebu Safari and Adventure Park in Carmen, Cebu, Philippines. She is on her sixth year with Cebu Safari, focusing on wildlife health, welfare, and species preservation.

Minimising Head Swinging Behaviour in Captive 0.1 Indian Rhinoceros

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This study examined the impact of feeding routines on stereotypic head swinging behaviour in an Indian Rhinoceros (*Rhinoceros unicornis*) under human care. A [35 year old] female exhibited repetitive head swinging during public display hours, initially hypothesized as a manifestation of boredom. Over 37 days, behavioural patterns were recorded using an ethogram-based methodology. Following the introduction of a consistent feeding schedule, the frequency of head swinging behaviour decreased and was eventually eliminated. Contrary to the initial assumption, findings indicated that the behaviour was anticipatory rather than boredom-induced. Although randomized feeding is commonly used in enrichment to simulate natural foraging, this case suggests that predictable routines can reduce stress and improve welfare in certain individuals. These findings highlight the importance of tailoring husbandry practices at the individual level and suggest further research into the effects of routine versus randomized feeding across different species in *ex-situ* environments.

Keywords: Anticipatory behaviour, Indian Rhinoceros, Rhinoceros unicornis, stereotypy behaviour

Donald Cheok & Hannah Bristow

Donald and Hannah are Keepers at Mandai, working with mainly large ungulates from around the world. While both are interested in animal behaviour research, Donald is also interested in reproductive research and Hannah's other interest includes captive breeding.

Training Basic and Advanced Respiratory Behaviours on *Tursiops Aduncus*

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Training dolphins in voluntary respiratory behaviours is essential for timely diagnostic evaluations and effective treatment of respiratory conditions, given the susceptibility of dolphins to respiratory diseases due to their complex respiratory systems, and environmental factors, such as Singapore's regional haze events. Ensuring their readiness for respiratory assessments and treatments is critical. This paper focuses on the implementation and outcomes of training programs for both basic and advanced respiratory behaviours in dolphins at Dolphin Island. The voluntary training aims to develop two categories of respiratory behaviours. Basic Behaviours such as chuffing and nebulizer use. Advanced Behaviours such as voluntary open blowhole, blowhole flush, and blowhole swab. In Marine Mammal Habitat, we use operant conditioning for behaviour modification and learning. The training outcomes demonstrate successful completion of these behaviours, enabling dolphins to undergo necessary diagnostic procedures and receive preventive and medical interventions. Our training program has effectively equipped the dolphins with essential voluntary respiratory behaviours, ensuring they are well-prepared for health evaluations and management in response to respiratory challenges. This approach enhances their overall care and preparedness in the face of environmental and health-related risks.

Keywords: Husbandry, Respiratory, Voluntary, Animal Health

Nabillah Hannani

Nabillah is a Senior Marine Mammal Specialist working with Indo-Pacific Bottlenose Dolphins. She is passionate with the care of Marine Mammals and is looking forward to expanding her knowledge in Animal Health to provide the best simulating environment for the animals.

Tactile Hoof Conditioning in Zebras: A Welfare-Driven Approach to Voluntary Hoof Care

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Zebra hoof care presents unique challenges due to their reactive nature and the risks posed by sedation or physical restraint. At the Singapore Zoo, we piloted a conditioning protocol integrating both positive and negative reinforcement strategies to encourage voluntary participation in hoof inspections and trimming—minimising stress while enhancing welfare in line with the Five Domains Model.

Training began with a male Grevy's zebra, 'Desta', familiar with the chute system. Keepers employed desensitisation and shaping techniques to extend tactile contact to the hind limbs, combining the use of a target stick, release of pressure, and food rewards to shape cooperative behaviours. Desta now reliably tolerates touch for up to one minute, with gradual improvements observed.

Crucially, this behavioural training is part of a broader, holistic strategy to improve hoof health. Adjustments to diet, substrate composition, and opportunities for natural locomotion have also been considered to address underlying contributors to hoof condition, supporting physical health alongside behavioural and mental wellbeing.

This initiative offers a practical, welfare-first model for non-invasive hoof care in equids and supports capacity building across Southeast Asia. By sharing this approach, we aim to empower regional animal care professionals with replicable strategies that elevate husbandry standards and foster long-term welfare improvements.

Keywords: hoof care, behavioural training, reinforcement, participation

Wong Sze Min and Nur Rifqah

Sze Min and Rifqah are both Ungulates keeper in the Singapore Zoo who works closely with the Grevy's Zebra. They are also involved in creating a mixed-species exhibit for the Zebras with Red River hogs and Marabou stock.

Study on the Defecation Frequency of Sloths Using a Real-time Urination Monitoring Sensor System

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Sloths are a common species kept in zoos, but we still know little about them. For example, it is said they defecate once a week in the wild, but how often do they defecate in captivity? To find out, we are currently conducting research on the frequency of sloth excretion in cooperation with researchers from the National Institute of Advanced Industrial Science and Technology (AIST).

The research methods are as follows. A sheet with a sensor is placed at locations where sloths have been known to defecate. When the sheet gets wet, the sensor reacts, and the time is recorded. The time can also be checked via a cell phone application. In addition, a camera is installed in the exhibit area, and by checking the images recorded at the time of defecation obtained by the sensor, the defecating individual can be identified. After the sensors and cameras were installed, it became clear that sloths' defecation times were not constant and that sometimes two sloths defecated simultaneously. In the future, we would like to synchronize the camera and sensor to identify individual sloths using AI and increase the sensor's sensitivity to obtain more detailed data. In addition, by understanding the frequency of sloth defecation, we would like to construct an environment in which appropriate measures can be taken for elderly individuals.

Keywords: Sloth, Urination monitoring, Sensor system, Zoo

Dr. Kanako Tomisawa

Kanako is the spokesperson for Omuta City Zoo, located in Fukuoka, Japan. She works for PR, education and other projects. She contributes as SEAZA SSC secretary, Carnivore TAG Vice Chair, Red panda species coordinator as well as SEAZA CEC member. She's also an IZE board member and a part-time lecturer at Kyushu University.

The Importance of Early Medical Training for Geriatric California Sea Lions (*Zalophus californianus*)

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California sea lions (*Zalophus Californianus*) in human care often live longer than their wild counterparts, leading to a higher prevalence of age-related medical conditions, particularly ophthalmic disorders like cataracts. Cataract surgery is a standard and effective treatment for pinnipeds, significantly improving their quality of life. This report details the successful cataract surgeries, including one performed at night, on two geriatric California sea lions, Pedro and Philipp, at the Singapore Zoo. We describe the comprehensive pre-surgical preparation, which included the exclusive use of positive reinforcement training and desensitisation to achieve the voluntary cooperation of the sea lions in eye examinations (tonometry, ultrasounds), squeeze cage entry, injections, transport to the hospital, and voluntary acceptance of anaesthesia via a cone. Furthermore, all these behaviours needed to be performed on the actual day of surgery without food rewards. Post-operative recovery involved approximately 3-4 weeks without access to water, regular eye examinations, and application of topical medications. The success of these procedures highlights the critical role of extensive pre-operative training in achieving optimal medical outcomes for geriatric pinniped patients.

Hakim Jaafar

Hakim is a Senior Trainer/Presenter in the Animal Behaviour & Programmes Department at Mandai Wildlife Group, taking care of California Sea Lions, African Penguins and Pelicans. His main interests include conducting animal presentations, improving animal care and finding new enrichment activities for the penguins and sea lions.

Captive Confidence: A Behavioural Blueprint for Sri Lankan Leopard Desensitisation

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The conservation of endangered species, such as the Sri Lankan leopard (*Panthera pardus kotiya*), increasingly depends on the success of carefully managed captive breeding programmes. A vital component of such programmes is the systematic desensitisation of individuals to unfamiliar environments and their human caregivers—both of which are key to promoting welfare, facilitating husbandry, and ultimately increasing reproductive success.

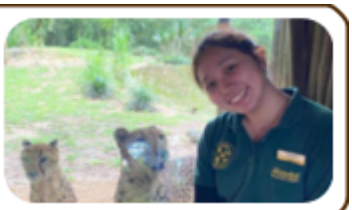
This case study details the behavioural observations and management strategies employed to desensitise a newly imported male Sri Lankan leopard to his new surroundings and to prepare him for eventual pairing. The acclimatisation process was structured into five distinct phases: (1) desensitisation to outdoor enclosures and caregiver presence, (2) call-over exercises and voluntary shifting into dens, (3) introduction to operant conditioning, (4) exposure to female scent-marked substrates, and (5) gradual visual access to a potential female mate.

The phased approach was guided by individual behavioural responses and aimed to cultivate trust and predictability - conditions conducive to successful breeding introductions. The methodology not only maximises the male leopard's reproductive potential but also serves as a capacity-building reference for regional facilities engaged in similar efforts. This initiative illustrates how strategic desensitisation can be scaled across member institutions to enhance animal welfare, promote standardised practices, and strengthen collaborative breeding frameworks throughout South East Asia.

Keywords: Sri Lankan Leopard, animal conditioning, desensitisation

Vernice Ng

Vernice is currently working with the Carnivores and Small Mammals at the Singapore Zoo. She has worked with 2 subspecies of Tigers - the Malayan and Bengal Tigers. As different animals showcases different traits and personalities, she is determined to explore various ways towards PRT for each animal.



Laying Foundations for Lifelong Care - Cooperative Health Management in Ageing Jaguars

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Voluntary medical husbandry is an integral part of supporting the long-term health and wellbeing of geriatric jaguars (*Panthera onca*) under human care. As these big cats get older, they often face health challenges such as arthritis, dental problems, and organ issues that need more regular attention. Implementing cooperative care techniques, such as voluntary blood draws, injections, and physical checks, reduces stress and increases the frequency of medical assessments. Cooperative care minimises the need for anaesthesia and other intrusive methods, which carry higher risks in older animals, but also empowers jaguars to participate in their own healthcare. Success relies on a strong training foundation built through consistent reinforcement, trust and daily interactions. By working together, keepers and veterinarians can develop individualised, proactive care plans that improve both quality of life and lifespan of the ageing jaguars. Animals trained for voluntary husbandry handle medical care with fewer signs of stress and better long-term health outcomes, especially when managing chronic conditions. Moving forward, expanding voluntary medical husbandry programmes and sharing best practices across institutions will be key to advancing geriatric care. Working together will help ensure a more ethical and effective approach to ageing animal management, ensuring that older animals continue to thrive and support their wellbeing as they age. Investing in these practices now, we build capacity for the future by empowering the next generation of animal care professionals with the tools, skills, and mindset needed to support lifelong welfare.

Use of Social Media at Zoos

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In Japan, zoos have generally been perceived as recreational facilities. To change this perception, we disseminated the four roles of zoos to visitors through various events and interactions with live animals. However, it was not possible to hold any events at the zoo between 2020 and 2022 due to the COVID-19 pandemic. Since 2013, general information, such as details about events, has been shared on X at Ueno Zoo. During the pandemic, however, we strategically utilised X by posting videos and photographs instead. These focused on the morphological and ethological characteristics of animals to disseminate the fascinations of them and to encourage the viewers to observe these traits more closely. In light of the increasing influence of social media, this report highlights the successes, failures, and considerations to be careful of before making posts.

Keywords: social media, Encouraging observation

Hiroki Kanazawa

He works as an animal interpreter, engaging in activities such as hosting events to educate zoo visitors about animal ecology and developing educational programs in collaboration with schools.

Conservation Through Education: A Case Study from Taipei Zoo's "Right Where Lives Belong" Special Exhibition

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In Taiwan's low-elevation mountainous areas, human activities frequently overlap with wildlife habitats. Traditionally, roadkill was regarded as the primary threat to native species in these regions. However, recent data from camera traps have revealed that free-ranging animals may pose an even greater risk to wildlife. In response to this growing concern, Taipei Zoo curated a special exhibition titled "Right Where Lives Belong" at the end of 2024, held in its Education Center. The exhibition introduces key concepts such as invasive species, native species, and free roaming animals, and highlights the serious impacts that free roaming animals have on native wildlife. To assess the exhibition's educational effectiveness, a pre- and post-visit questionnaire was conducted, measuring changes in public awareness and understanding. The results provide valuable insight for shaping future conservation education strategies.

Keywords: free roaming animals, wildlife conservation, conservation education, native species, public awareness

Ming-chun Cheng

Ming-chun is a research assistant of Education section in Taipei Zoo. Who is dedicated to wildlife conservation and environmental education, with a focus on human-wildlife interactions in Taiwan. My work explores how public engagement can support biodiversity through informed awareness and action.

Exploration of Aquarium Education Materials: A Case Study Of "Reborn: The Blue Whale's Journey" at NMMBA

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"Reborn: The Blue Whale's Journey" is a permanent exhibition launched in December 2023 by the National Museum of Marine Biology and Aquarium. It features a 20-meter-long blue whale calf: the first documented in Taiwan. This non-captive exhibit presents a rare opportunity to engage the public in marine conservation. To enhance its educational reach, the museum developed interactive resources including presentations, worksheets, and origami-based anatomy activities. Recognizing the need for inclusive educational design, the museum convened a multidisciplinary focus group of experts in marine science, environmental education, and curriculum development. Their collaboration informed age-appropriate teaching strategies that align with conservation goals. This study explores the exhibit's educational framework and shares insights from the focus group process, offering a model for integrating exhibition design, science communication, and public outreach in marine conservation settings.

Keywords: Environmental Education, Ocean Literacy, Science Education

Wang Yang-sheng

Yang-sheng is the assistant manager of service department and trainer of interpreter in NMMBA, he has 15 years' experience of interpretation in the aquarium and now focuses on environmental education study.

A Preliminary Study of Public Attitudes toward Cetacean Exhibitions and Interpretation: A Case Study of the Beluga Whale at NMMBA

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Cetacean exhibitions are usually key attractions in aquariums. The National Museum of Marine Biology and Aquarium (NMMBA) is the only aquarium in Taiwan that exhibits beluga whales (*Delphinapterus leucas*), providing people with a unique opportunity to encounter this polar species. Currently, the belugas at the NMMBA are exhibited in a static, non-interactive manner without incorporating any entertainment-style performances. The NMMBA plans to introduce a future program that will allow visitors to observe the care and husbandry of belugas and to explore issues related to the welfare of animals under human care through more educational interpretation. In this study, we use questionnaires to survey visitors to understand their expectations and opinions regarding the development of future beluga-related programs. The survey results show that over 95% of respondents are interested in more educational programs about beluga whales. Respondents also expressed both expectations and concerns regarding animals under human care. The findings of this study will serve as a basis for developing future educational programs about beluga whales.

Keywords: cetacean exhibitions, welfare of animals in captivity, marine education

Yu-Hui Lai

Yu-Hui Lai received her M.S. in Marine Biology from Wageningen University in the Netherlands. She currently serves as an interpreter and the Associate Director at the National Museum of Marine Biology and Aquarium in Taiwan. Her research interests lie in marine ecology and biology, with a particular focus on marine mammals.

Advancing Engagement with Volunteers to Drive Research and Conservation Efforts

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Citizen science has emerged as a powerful way to leverage the collective power of volunteers from diverse backgrounds and age groups to advance our understanding of the marine environment and influence policy decision making. At Singapore Oceanarium, citizen science programmes are developed to foster community involvement, raise awareness about biodiversity, and highlight human impacts on our marine ecosystem. Through partnerships with researchers, volunteers have opportunities to learn scientific skills such as photography, sample preservation, and to conduct hands-on biodiversity and environmental monitoring surveys. They also interact with experts, contributing to species checklists and providing valuable insights into ecosystem health. From our past collaborative research efforts, our findings have resulted in the publication of new records of species sightings in local journals. It is evident that, by engaging and empowering volunteers, it is possible to tap into a vast pool of enthusiasm, expertise, and local knowledge that enhances the scope of research and drives conservation efforts.

Keywords: citizen science, empowerment, community involvement, conservation actions

Cynthia Wong Yee Man

Dr. Cynthia Wong is the Manager with the Conservation and Science Department and manages the Conservation Team. Her interest includes marine ecology, conservation, environmental education and sustainability.

TESDA and Avilon Zoo: A Public-Private Partnership for Zoo Personnel Professionalization

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The job of zookeeper in the Philippines has minimal qualifications and a relatively narrow job description. At present, their tasks are generally limited to habitat upkeep and animal feeding. Career advancement is also limited for zookeepers, and supervisory positions are usually reserved for staff with higher education and experience. In addition, zoo-based research, development of conservation practices, and other higher-level activities are performed either by staff with a zoology or veterinary medicine background, or by non-affiliated students from the undergraduate or graduate levels.

To this end, Avilon Zoo has partnered with the Technical Education and Skills Development Authority (TESDA). This is the government agency responsible for the management and supervision of technical-vocational education in the Philippines. Its mission is to provide opportunities for all citizens to learn practical skills they can utilize in finding an occupation. The zoo was authorised to offer the TESDA-accredited program Animal Health Care & Management NC III and developed its own program, Zoo Animal Welfare Level II, both seeking to upskill zookeepers on best practices and enhance higher order thinking on animal welfare. In turn, staff can be motivated to develop ways to improve the habitats of animals under their care and contribute to conservation efforts within and outside the zoo.

Through these programs, TESDA and Avilon Zoo seek to provide an inclusive path for everyone to consider a career in zookeeping and upskill staff to ultimately improve zoo-based efforts on animal welfare, conservation, and education, while also providing pathways for career advancement both in the Philippines and abroad.

Daniel Albert E. Castillo

Daniel Albert E. Castillo is a Regional Lead Trainer handling subjects under the Animal Health Care and Management NC III and Zoo Animal Welfare Level II programs being offered by the Avilon Wildlife Conservation Foundation and School of Practical Veterinary Management, Inc. He is an Instructor at the Department of Biological Sciences, College of Science, University of Santo Tomas; the Chief Communications Officer of the Southeast Asian Zoos and Aquariums Association; and a member of the Technical Working Committee of the Philippine Zoos and Aquariums Association. His research interests are on snake venom toxicology, natural products for the treatment of non-communicable diseases, and zoo-based research on animal welfare, conservation, and education.

Conservation and Research Program of Sunda Pangolin in A'Famosa Safari Wonderland

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Sunda Pangolins (*Manis javanica*) are anteaters with a body covered with protective overlapping scales except for their neck and belly. Listed as critically endangered, they face many threats, including habitat loss and poaching. A'Famosa Safari Wonderland is home to five Sunda pangolins, including one pregnant female. Our conservation program focuses on meeting their dietary needs, monitoring their behaviours, and establishing an optimal environment that encourages breeding activities. Basic husbandry practices, natural behaviour, and monitoring of fundamental needs, together with Positive Reinforcement Training (PRT), minimise stress and help us better understand the pangolin. Our PRT program includes voluntary training in weight monitoring, ultrasound procedures, and blood collection where the animal participates without any restraints. The goal of all the programs is to provide optimal care, simultaneously gathering data for future reference while encouraging *ex-situ* conservation efforts for wildlife.

Keywords: Sunda Pangolin, conservation program, research, PRT

Heni Paramita Indraswari

Heni is veterinarian in A'Famosa Safari Wonderland, Malaysia. Passionate in animal health and care management, her goal is to support wildlife conservation by ensuring the well-being and resilience of the animals under her care.

Building Standards, Sharing Strength: The Role of Zoo Association Membership

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Southeast Asia is home to a wide range of zoos operating under diverse social, cultural, economic, and legislative conditions. Such variation presents ongoing challenges for achieving consistent standards of animal welfare, conservation, and zoo management throughout the region. Many Southeast Asian zoos continue to fall short of international best practices, highlighting the need for greater support, guidance, and accountability. Zoo associations, such as SEAZA, have a vital role in mentoring and encouraging underperforming zoos to join and actively engage with the association. By offering practical advice, professional development, and opportunities for peer learning, established members can help others improve their operations and align more closely with agreed standards. With the region facing accelerating biodiversity loss, the role of zoos in conservation, education, and public engagement is becoming increasingly important. This makes it more urgent than ever for all zoos to meet basic standards and strive for continuous improvement. Strengthening compliance is essential, but so is building zoos' capacity and motivation to make lasting changes. In line with the SEAZA conference theme of "Building capacity for the Future, Protecting Wildlife Together," this presentation explores how mentorship can be a strategic tool to raise standards region-wide. It encourages a collaborative approach, where experienced members support others in their efforts to improve, contributing to a more cohesive and effective regional zoo community. By investing in mentorship and partnership, SEAZA can help ensure that all member zoos are equipped to play a meaningful role in biodiversity conservation and responsible animal care.

Anna Fourage
Anna Fourage is a PhD Candidate at Oxford Brookes University. Her thesis explores how zoos in Southeast Asia conform to the established objectives of modern zoos. Specifically, Anna is interested in enhancing animal welfare for captive wildlife. Anna is a trustee of the UK registered charity, For Tigers, which focuses on improving the lives of captive tigers in Thailand.

Understanding the Life History of Wild Chinese Pangolins to Improve *Ex Situ* Conservation Approaches: A Case Study in Taiwan

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Captive breeding and reintroduction programs are critical conservation strategies for endangered species. Since 1987, Taiwan has developed husbandry techniques and related medical research for the Critically Endangered Chinese pangolin (*Manis pentadactyla*). Beginning in 1997, the Taipei Zoo has successfully bred Chinese pangolins, establishing an *ex situ* population. However, for the Chinese pangolin, most data regarding postnatal development and reproduction are typically derived from observations of captive individuals, which may not accurately reflect the status of wild populations. For instance: 1) Captive Chinese pangolins do not exhibit the same seasonal mating and birthing patterns as their wild counterparts; 2) Captive-born infants are significantly longer and heavier at birth than wild-born infants; 3) Captive pangolins experience faster weight gain than wild individuals. This rapid growth may be associated with the high nutritional content of captive diets. This study reveals the dietary composition of wild Chinese pangolins, including prey species, nutritional content, and seasonality. The findings offer insights into the nutritional formulation of artificial diets to enhance *ex situ* conservation strategies. We also suggest that mitigating the risk of obesity and promoting natural reproductive cycles should be set as objectives for the captive management of Chinese pangolins.

Keywords: artificial diet, Manis pentadactyla, captive management

Nick Ching-Min Sun

Nick is an Assistant Professor in Taiwan, specializing in the ecology of wild pangolins. His primary interests include understanding the life history of wild pangolins, as well as utilizing field data to address the management challenges faced by captive pangolins.

Negros Forest Park: Paradigm for *Ex Situ* Conservation Initiatives in the West Visayas of Philippines

Flavio Aguirre Nava

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Negros Forest Park (NFP) is the main Ex Situ Conservation Facility of Talarak Foundation Inc. (TFI), and is internationally and locally known to be the only establishment that primarily works on captive management of the "West Visayan Big 5," i.e., Visayan Warty Pig, Rufous-headed Hornbill, Visayan Spotted Deer, Visayan Tarictic Hornbill, and Negros Bleeding-Heart Pigeon. The facility was formerly known as the Biodiversity Conservation Center (BCC) of Negros Forest and Ecological Foundation Inc. (NFEFI), until TFI took over management to continue ex-situ efforts and added an educational emphasis for schools and the public of the area, changing its name to Negros Forest Park. NFP has made notable achievements and continues to further optimise its operations, including captive breeding of some of the region's rarest species and rehabilitating rescued or turned-over exotic and native fauna. More importantly, maintaining high standards of animal welfare for captive wildlife, particularly for endemic species, is crucial. Additionally, wildlife workshops and public engagements are conducted throughout the year, alongside visits and activities at local schools and universities. And of course, collaborating with other organisations aligned with TFI's vision, such as the recent repatriation of the Negros Bleeding-Heart Pigeon from Mandai. NFP received recognition from several institutions, including the Philippine Department of Environment and Natural Resources Region VI, where their staff commended the establishment as the best and only current facility for Zookeeping and Ex-Situ Conservation.

Keywords: West Visayan Big 5, Ex-Situ Conservation, Animal Welfare, Conservation Education

Flavio Aguirre Nava

Flavio is an avid wildlife photographer and conservationist who specifically advocates for the conservation of the West Visayan Fauna. He is the In-House Veterinarian in NFP and is responsible for the animal welfare, biosecurity planning, veterinary care and wildlife rescue and rehabilitation in the facility.

Re-Wilding of Europe. Successes and Failures. What Can We Learn from it?

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Europe is a small and very densely populated continent. It was the first to undergo an industrial revolution that resulted in rapid economic growth, including forestry and agriculture. That, in turn, resulted in the rapid shrinkage of habitats available to animals leading to local or global extinctions. Some species of megafauna were totally lost, such as the tarpan—a wild forest horse, or the aurochs—the species from which domestic cattle originate from (the last individual was poached in 1627 despite special protection given by Polish kings). Other species retreated from the most altered habitats to less densely populated areas like mountains or eastern parts of the continent. Gradually a large gap in distribution of many charismatic ones appeared, especially in the case of larger predators like lynx, wolf, wolverine or brown bear. Direct prosecution reduced larger birds of prey to remnants. A kind of island ecology had thus been created. Two major world wars in the 20th century did not help, as they led to increased poaching. One of the victims was a European bison that luckily could be rescued from zoo stock and now roams wild in the 1000's.

The increasing wealth as well as ecological consciousness resulted in favourable conditions for the rewilding. Some species simply managed on their own to recolonise the long lost territories, sometimes vacated over several hundred years. The champion of this is undoubtedly a European wolf, which shows a strong resilience to hunting and ability to survive even in most seemingly unacceptable habitats. A number of species had been actively translocated or reintroduced like moose, reintroduced in Poland in 1974 and now numbers over 30,000, or the beaver that grew from around 30 families located in two areas of eastern Poland to approximately 40,000 families today. There were also failures, of course, such as the European mink case.

Radoslaw Ratajszczak

Radoslaw Ratajszczak begun his career in zoos as an animal keeper at Poznan zoo, becoming the first one with higher university education. We then progressed through the ranks to become a vice Director of Poznan zoo, a post held for 11 years until he took over Wroclaw ZOO as a Director. He retired in 2022 but is still involved in zoos as an adviser. During his career he served as a member of EAZA and WAZA Councils as well as various committees. He made several surveys in Vietnam, Philippines and Indonesia rediscovering three species of langurs in Vietnam and taking first ever pictures. He is still very much involved in conservation in SEA.

The Development of Knowledge Communication in a Zoo-Based Museum to Promote Participatory Conservation Learning

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Khon Kaen Zoo, under the Zoological Park Organization of Thailand, established a zoo-based museum to promote out-of-classroom learning and raise awareness of wildlife and environmental conservation. Initially centered on taxidermy and biological specimens, the museum faced challenges in accessibility and engagement. To address this, a visitor-centered communication model was introduced under the concept "From Objects to Knowledge, From Perspectives to Understanding," utilizing multimodal and inclusive media to enhance learning, interaction, and conservation awareness across diverse audiences.

The museum was comprehensively redesigned with five key enhancements to its educational media: (1) "interactive insect displays," (2) "animal skin replicas for tactile learning," (3) "integrating natural soundscapes with scientific narration to create immersive experiences," (4) "utilizing virtual reality (VR) to simulate natural environments," and (5) "ensuring accessibility through Braille, audio descriptions, and sign language via QR codes."

Additionally, interactive workshops and Q&A sessions were introduced to promote participatory learning. A visitor survey conducted from June 2022 to June 2025, involving 167,491 participants, revealed a consistent annual increase in attendance, along with a notable improvement in visitor satisfaction. Media engagement evaluation showed that the insect exhibit received the highest satisfaction rating (42.8%), followed by tactile animal skin replicas (40.3%), VR media (10.07%), and accessibility media for persons with disabilities (6.83%). Participatory activities achieved the highest satisfaction rate at 95.18%. In addition to satisfaction metrics, learning achievement was assessed using pre- and post-visit questionnaires.

Results indicated an average increase of 24.96% in knowledge and understanding of wildlife and conservation across all target groups. These outcomes affirm the effectiveness of inclusive communication strategies in enhancing both accessibility and educational engagement.

Khon Kaen Zoo's museum now serves as a dynamic learning space and a scalable model for inclusive, conservation-oriented education for all audiences.

Keywords: Zoo-based Museum, Education, Interactive media, Visitor engagement, inclusive learning

Vannisa Yala
Vannisa is the Zoo Educator at Khon Kaen Zoo under the Zoological Park Organization of Thailand. In her role as a Learning Promotion Officer, she focuses on designing creative learning processes, organizing engaging activities, and developing educational materials that are accessible and inspiring for diverse audiences.

Beyond the Animals Posts: What Content Captivates Zoo Audiences Online? *A Study on Instagram Content Engagement at Gembira Loka Zoo*

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Social media has become an important tool for zoos in building public image, delivering education and conservation messages, and fostering good relationships with online audiences. Among the various types of content uploaded by a zoo, animal-themed content is often considered the main attraction. However, many other types of content can also attract audiences, such as general information, giveaways, promotional content, content about attractions, and more.

This abstract aims to analyse and compare engagement levels on social media by measuring impressions, interactions, and profile activity between animal-related and non-animal-related content on the Instagram account of Gembira Loka Zoo. Instagram was chosen in this case because the platform has a diverse audience demographic: 9.6% aged 18–24, 26.2% aged 35–44, and 58.7% aged 25–34.

The purpose of this abstract is to measure engagement levels across predetermined content types, determine whether animal-themed content consistently garners the highest engagement or if other categories are equally or even more engaging, and provide strategic recommendations for more effective social media content that can boost interaction and connection with the public.

The method used is a quantitative analysis of several posts from July 2023 to October 2025, accompanied by content categorization into animal-related (e.g., National Animal Day, enrichment, medical check-up, and unique animal facts) and non-animal-related (e.g., general information, promotions, attraction, and facility content).

Findings indicate that non-animal content can also be more engaging than animal-related content. Therefore, it is necessary to implement a balanced content strategy between animal and non-animal themes. Running both content types in parallel could lead to broader and more effective social media outreach.

Muhammad Devan Dewanto, S. I. Kom
Devan is responsible for managing and developing content across Gembira Loka Zoo's social media platforms, including Instagram, YouTube, and TikTok. Working closely with the marketing team, he plans, creates, and curates engaging content that promotes the zoo's mission, activities, and conservation efforts. Passionate about wildlife conservation and audience engagement, Devan strives to connect zoo visitors—both on-site and online—with meaningful stories that inspire care and action for animals.

From Planning to Measuring Impact: Applying CSPTC to Guide and Evaluate Mandai Education Programmes and Campaigns

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Conservation education helps people understand nature and the importance of protecting it. It is most impactful when it is intentionally designed, meaningfully delivered, and rigorously evaluated.

At Mandai Wildlife Group, our Conservation and Sustainability Pathway to Change (CSPTC) is a strategic and actionable framework that underpins the design, implementation, and evaluation of all our education programmes, staff and public campaigns, and engagement initiatives. This presentation will demonstrate how we apply CSPTC to align messaging and content curation with intended learning outcomes, while advancing broader conservation and sustainability goals to inspire people to act for wildlife.

Through concrete examples, we will showcase how the framework supports programme design across a range of audiences and formats, ranging from school workshops to public campaigns. We will also illustrate how CSPTC enables us to define meaningful indicators of effectiveness and capture data beyond attendance numbers, including shifts in awareness, attitudes, and behaviours of participants.

Participants will gain practical insights into how this adaptable and robust framework supports the delivery of meaningful, measurable outcomes in conservation education.

Keywords: Conservation education, impact evaluation, school programmes, environmental education

June Chen

June Chen is Assistant Vice President, Education at Mandai Wildlife Group. She enjoys crafting meaningful educational experiences through exhibitions, programmes, and online video content. She is curious about how people engage with different learning and discovery touchpoints and how data can be paired with observations to gain deeper insights.

Vera Yang

Vera is Senior Manager, Education at Mandai Wildlife Group. She is passionate about creating programmes and campaigns which facilitate connection to nature and pro-environmental mindsets and behaviours. She is also interested in the behavioural research that underpins these processes.

Innovative Pathways to Conservation: Cross-Curricular Programmes at Ocean Park

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Cross-curricular learning offers an innovative approach to developing students' knowledge, skills, and ability to integrate concepts across disciplines. By linking subjects through engaging, real-world themes, it not only stimulates critical thinking and problem-solving but also fosters environmental awareness—helping to advance conservation for nature. In 2024/25, Ocean Park Hong Kong delivered a range of cross-curricular programmes and competitions for students and teachers, connecting conservation with diverse subject areas. This presentation will highlight two examples.

Discover2se—Minecraft in Education used "Minecraft: Education Edition" to blend real-time interactions with the physical environment in an open virtual world. Centred on wildlife conservation, it inspired students to explore animal biology and habitats, collaborate creatively in the metaverse, and broaden learning beyond the classroom.

The Animal Photo-poetry Creative Challenge, co-organised with the Education Bureau's English Language Education and Arts Education Sections, encouraged students to combine photography and poetry. This initiative promoted "Language Across the Curriculum," enriched language learning, and nurtured appreciation for nature through artistic expression.

These initiatives demonstrate how Ocean Park integrates technology, creativity, and subject-bridging strategies to inspire conservation action while enhancing both academic and personal growth.

Keywords: cross-curricular learning, conservation education, educational innovation

Alan Wong
Alan is the Discovery & Education Manager at Ocean Park Hong Kong, specializing in developing conservation education programmes for school groups. He is passionate about designing engaging learning experiences that connect audiences with specific themes and educational objectives. Alan is also a certified Interpretive Guide, bringing expertise in effective communication and audience engagement.

Saving Scales: Integrating Veterinary Care and Post-release Monitoring for Rescued Pangolins at Taipei Zoo

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From 2023 to 2025, Taipei Zoo's Wildlife Rescue Center admitted 51 Formosan pangolins (*Manis pentadactyla pentadactyla*) due to dog attacks, vehicle collisions, trap injuries, debilitation, orphaning, illegal possession, and mistaken healthy individuals. Pangolins deemed healthy were released; those with untreatable injuries were euthanized, and others received medical care and rehabilitation. Rehabilitated individuals were evaluated using a pre-release assessment of locomotion, hiding, defense, foraging, and exploratory behaviour in semi-natural settings. Those failing to meet the criteria received extended training or were kept for *ex-situ* conservation. Six pangolins (3 males, 3 females) were fitted with VHF transmitters for post-release monitoring. Three died, one lost its tag, and two were recaptured due to injury. Tracking ranged from 12 to 50 days. Survival appeared linked to sex and foraging ability, and continued monitoring is essential to improve reintroduction strategies.

Keywords: Formosan pangolin, wildlife rescue, rehabilitation, reintroduction, post-release monitoring

Pin Yu Chang

Pin Yu is a veterinarian at Taipei Zoo and a PhD student at National Taiwan University. He previously worked at the Wildlife Rescue and Research Center under the Taiwan Biodiversity Research Institute.

Assisted Parental Rearing of Javan Hawk-Eagle (*Nisaetus bartelsi*) Chicks: A Case of Complementary Keeper Intervention

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The Javan Hawk-Eagle (*Nisaetus bartelsi*), a critically endangered raptor and Indonesia's national symbol, faces severe population pressures in the wild. Captive breeding programs play a critical role in supporting species recovery. In 2023, Taman Safari Indonesia Bogor successfully bred and released captive-born individuals. Coming from the same pair who neglected their previous chick, Taman Safari Indonesia implements a Novel hand-rearing approach using assisted parental rearing. This paper is a case study of how keeper intervention as complementary care for Javan Hawk Eagle pairs, assists their parental behaviour. Within three days post-hatch, the parents ceased provisioning the chick, necessitating human assistance. Keepers initiated supplemental feeding using a bird-mimic glove to minimise imprinting risks, starting with a 5-gram portion of newborn white rat (Rattus norvegicus). Initial parental aggression toward the intervention was observed but subsided as the parents began to mimic the feeding behaviour. Initial parental aggression toward the intervention was observed but subsided as the parents began to mimic the feeding behaviour. This method enabled successful chick development without fully removing it from the social influence of its biological parents. The individual continued to thrive under this hybrid care approach and reached 38 days of age at the time of reporting. The case demonstrates the potential of adaptive rearing protocols in improving breeding outcomes for raptor species with inconsistent parental behaviour in captivity.

Keywords: Javan Hawk-Eagle, Nisaetus bartelsi, assisted rearing, captive breeding, parental care, raptor husbandry, Taman Safari Indonesia.

Sumanang Yusuf Rosiadi

Sumanang is an Assistant Curator at Taman Safari Indonesia Bogor. His primary interests include the care of carnivorous animals and primates. He has worked at Taman Safari Indonesia Bogor since 2021.

Multisectoral Collaboration for Komodo Dragon (*Varanus komodoensis*) Reintroduction: A Pioneering Conservation Milestone in Indonesia

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Komodo dragon (*Varanus komodoensis*) is the largest extant lizard species and a relic of prehistorical world's only surviving species of giant prehistoric fauna, and is endemic to several islands in Indonesia. Classified as Endangered by the IUCN and listed in Appendix I of CITES, its conservation is of urgent global concern. In a landmark achievement, six captive-bred Komodo dragons were successfully reintroduced into the wild—marking the first and only instance of such a program globally. This conservation milestone was enabled through a multisectoral partnership guided by the pentahelix model, bringing together key stakeholders: Taman Safari Indonesia (TSI), the East Nusa Tenggara Natural Resources Conservation Agency (BBKSDA NTT), and PT Smelting (private sector). Each partner contributed distinct but complementary roles. TSI ensured the health, reproductive viability, and pre-release conditioning of the Komodo dragons. BBKSDA NTT facilitated regulatory approvals and site selection, and collaborated with the National Research and Innovation Agency (BRIN) to confirm the genetic suitability of the released individuals through haplotype matching with the existing wild population in the Wae Wuul Nature Reserve. PT Smelting contributed critical financial support, community outreach, and technological infrastructure, including camera traps for habitat monitoring and GPS harnesses for post-release tracking. The reintroduction was conducted at Wae Wuul Nature Reserve, where the estimated wild population is critically low (13–38 individuals), well below the minimum viable threshold. This program not only supports genetic diversification and population recovery but also exemplifies the power of coordinated action across scientific, governmental, and private sectors to deliver tangible conservation outcomes.

Keywords: Komodo dragon, Varanus komodoensis, wildlife reintroduction, multisectoral collaboration, species conservation

Yessy Amaeda Dachi

Yessy is an Assistant Curator at Taman Safari Indonesia Bogor, working with a diverse range of animal species. Her main interests focus on animal welfare, as well as research related to both ex-situ and in-situ wildlife conservation. She is passionate about integrating scientific knowledge into daily animal management and contributing to conservation strategies that bridge zoological institutions with field-based initiatives.

The Initial Census Findings of Eastern Sarus Cranes in Thailand: Establishing Population Baselines and Promoting Conservation Collaboration

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The Eastern Sarus Crane (*Grus antigone sharpii*), once declared extinct in the wild in Thailand, has been successfully reintroduced into natural wetlands through a long-term conservation breeding and release program led by the Zoological Park Organization of Thailand (ZPOT). Since 2011, a total of 181 captive-bred individuals from Nakhon Ratchasima Zoo have been released into Buriram Province. Remarkably, since 2016, these cranes have bred and raised over 50 chicks in the wild, resulting in an upgraded national conservation status from Extinct in the Wild (EW) to Critically Endangered (CR). Researchers conducted the first national census of Eastern Sarus Cranes during the non-breeding season from March to May 2025 to evaluate the status of the reintroduced population and establish a scientific baseline for long-term monitoring. The survey employed standardised roadside count methods, adapted from successful census models in Cambodia and Vietnam, with observation posts positioned along six routes in five districts of Buriram Province based on habitat suitability and historical sightings. The survey found a total of 88 Eastern Sarus Cranes (82 adults and 6 juveniles), with most of them located in the wetlands where they were released-Huai Chorakhe Mak Reservoir (51.2%), Huai Talat Reservoir (27.9%), and Sanambin Reservoir (9.3%). Smaller groups were also found in surrounding wetlands. Even with challenges such as limited access and few staff, the survey successfully gathered important information on the population's growth after release, how they use their habitat, and where they are located. This study exemplifies the importance of multi-stakeholder collaboration in zoo-based reintroduction programs. Key partners included the Department of National Parks, Wildlife and Plant Conservation (DNP), Mahidol University, Bird Conservation Society of Thailand (BCST), and local communities. The census provides essential guidance for adaptive management, future habitat restoration, and long-term planning for the species and its wetland ecosystems.

Keywords: Eastern Sarus Crane, population census, reintroduction, habitat monitoring, zoo-led conservation

Piyapong Chindate

Mr. Piyapong Chindate (Tucky) currently works as a zoo scientist at the Animal Conservation and Research Institute under ZPOT. He has been responsible for handling conservation programs at ZPOT and functioning as the project manager for Science Communication and the Sarus Crane community participation initiative.

Back from the brink, the recovery efforts for Maratua Shama at TSI-PCBA

Jochen Menner

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Conservation breeding is often the last hope for some of the world's most threatened species. Many of Indonesia's Songbirds are on the very verge of extinction and may well be among the most threatened species worldwide. At Taman Safari Prigen Conservation Breeding Ark (PCBA), we are working to establish safe *ex-situ* populations to safeguard species from looming extinction. One such species is the Maratua Shama (*Copsychus barbouri*), which is highly likely extinct in the wild and persists only at PCBA. Starting from an all time low of only eight globally known individuals we are working towards not only a safe *ex-situ* population but also the timely return of the world's largest Shama to its native Island. The Maratua Shama's continued existence is clear proof of how efficient *ex-situ* conservation can work and how much individual zoos can contribute to the survival of species on the very brink of extinction.

Keywords: conservation breeding, ex-situ, extinct in the wild

Jochen Menner

Jochen is the curator of Taman Safari's Prigen Conservation Breeding Ark, dedicating his life to the conservation of some of Indonesia's most threatened species.

Reintroducing the Javan Banteng (*Bos javanicus*) in Pananjung Pangandaran Nature Reserve: A Model for *In-Situ* Wildlife Conservation

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The reintroduction of four Javan banteng (*Bos javanicus*), into the Pananjung Pangandaran Nature Reserve represents a significant milestone in Indonesia's *ex situ* link to the *in situ* conservation program. This strategic program is initiated by Taman Safari Indonesia in collaboration with the Ministry of Forestry. This project also aligns with the GSMP (Global Species Management Plan) recommendations for reversing the population decline of this threatened species. The primary objective was to restore wild populations and contribute to ecosystem balance by returning captive-managed individuals to their native habitat. The reintroduction process followed a structured protocol, including individual selection, health screening, quarantine, acclimatization in adaptation enclosures, and a phased release strategy. Post-release monitoring was carried out intensively to assess behavioural adaptation, spatial movement, and health status. All four individuals successfully adapted to the new environment, demonstrating key natural behaviours such as grazing and social interactions, indicative of positive acclimatization. This initiative not only strengthens Javan banteng conservation efforts but also provides a replicable framework for future reintroductions of threatened endemic species in Indonesia. Moreover, it underscores the role of multi-institutional collaboration and public engagement in achieving species recovery goals.

Keywords: Reintroduction, Javan banteng (Bos javanicus), In-situ conservation

Eko Windarto

Eko Windarto is the Animal Curator at Taman Safari Indonesia. He currently holds the position of Studbook Keeper for the Javan banteng (*Bos javanicus*). In addition, he is actively involved in the Education Division of PKBSI (the Indonesian Zoological Parks Association) and serves as a member of the Education Working Group under the Global Species Management Plan (GSMP). His work focuses on wildlife conservation, captive breeding management, and public education to raise awareness about endangered species.

Ethical Assessment of Genome Resource Banking (GRB) in the Singapore Zoo

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Genome Resource Banking (GRB) is offering promising conservation outcomes by helping halt the rapid loss of valuable genetic diversity amidst the ongoing mass extinction. At Mandai Nature, GRB supports a range of applications, including Assisted Reproductive Technologies (ARTs), scientific research, and stem cell-based technologies—all directed towards safeguarding endangered wildlife populations in the zoo. However, alongside the promising conservation outcomes, GRB also raises ethical challenges. The relative novelty of GRB procedures in wildlife creates blurred lines between research and standard veterinary practice, especially in zoo settings, highlighting the need for the careful integration of ethical rigor into practice. A systematic ethical evaluation—balancing environmental, animal welfare, social, and research ethics—is therefore essential to ensure the responsible implementation of GRB and to strengthen public trust and support. The Singapore Zoo is committed to deploying ETHAS, an ETHical self-ASsessment tool to help monitor ethical practice for wildlife conservation projects (de Mori et al., 2024), using a web platform. ETHAS is, amongst others, specifically tailored to GRB in wildlife and evaluates each relevant ethical dimension in practice. This checklist-based framework integrates risk analysis with criteria from animal welfare, environmental, social, and research ethics, enabling GRB practitioners to assess their work ethically and effectively. The framework helps GRB projects comply with high ethical standards, enabling meticulous implementation of procedures in zoos. The use of ETHAS may also prompt a shift in focus, encouraging greater attention to key ethical aspects and promoting communication among staff and stakeholders. After presenting the tool, the talk illustrates its potential application at Singapore Zoo and other institutions.

Keywords: Genome resource bank, ethics of biobanking, ethical self-assessment, ethical tool, conservation ethics, research ethics, zoo ethics, stakeholder communication

Inspiring Young Minds: Immersive Conservation Education through Roleplay, Fun Games and Cultural Connection at Gembira Loka Zoo

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Gembira Loka Zoo is more than just a home for animals—it's a dynamic learning landscape where curiosity sparks compassion, and discovery leads to action. Guided by the principle "*to know is to love, to love is to care*," the zoo creates immersive experiences that foster empathy, environmental awareness, and a deeper connection to the natural world. Moreover, inspiring children and youth is central to building a strong foundation for zoo conservation and future leaders.

A standout feature is the zoo's imaginative Play Corner, which we call "Pojok Bebek"—which means 'corner for play and get inspired to conserve'. Children are able to step into the shoes of wildlife professionals—becoming veterinarians, zookeepers, biologists, or animal nutritionists through roleplay. The play corner provides uniform, interactive tools, games, worksheets, and more. This engaging environment not only nurtures dreams but also builds a foundation of respect for science, care, and conservation.

Other interactive play we do also teaches visitors to be aware of pests, how vets sedate animals, and how to feed animals correctly with their appropriate foods. Furthermore, Gembira Loka Zoo seamlessly weaves Indonesia's rich cultural heritage into its educational mission. As well as the play corner, during our school visits and zoo tours, children are given interactive experiences with traditional music, toys, wayang (shadow puppetry), batik art, and animal-themed puzzles. Vsitors of all ages are invited to explore the deep ties between culture, tradition, and the environment.

By blending conservation education with creative play and cultural storytelling, Gembira Loka Zoo offers a fun, inspiring, and holistic experience—one that cultivates not only future conservationists, but also culturally aware stewards of the planet.

Keywords: zoo education, creative play, junior keeper, zoo profession roleplay

Tri Wahyu Priyatiningsih, S. Si

Yuning is a zoo educator at Gembira Loka Zoo, where she initiates a variety of educational programs such as Zoo Goes to School, Outdoor Classes, Education Corner and special zoo events. Her work focuses on creating meaningful and engaging learning experiences for children and families. Driven by the belief that conservation awareness should begin early, Yuning is passionate about using creative, memorable approaches to inspire young minds to love and protect nature and wildlife.

Awareness Building through Experiential Youth Camp for Eastern Sarus Crane Conservation in Thailand

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Nakhon Ratchasima Zoo, under the Zoological Park Organization of Thailand, actively promotes wildlife and environmental education. This project aimed to raise youth awareness and engagement in Eastern Sarus Crane conservation through experiential learning. The program, "Wildlife reintroduction and conservation camp," has successfully completed three rounds, with the fourth currently underway. This year, the program targeted 30 selected youth nationwide. Participants engaged in a three-day workshop covering breeding techniques, captive care, reintroduction, ecological relationships, and conservation values through nature interpretation.

A pre-activity survey revealed only 50% of participants had basic knowledge of Sarus Cranes. However, following the training, over 80% demonstrated increased understanding and attitudes consistent with the project's objectives. Key outcomes include increased youth awareness and positive attitudes towards wildlife conservation, along with the formation of the Youth Volunteers for Eastern Sarus Crane Conservation network. Building on this success, the project aims to expand its reach by engaging a broader target audience in wildlife conservation awareness activities, ensuring a more widespread and collaborative conservation effort.

To extend its reach into local communities, the project also launched the Crane Friends Volunteer Program for individuals aged 20–40, fostering direct community engagement in crane habitats and gathering insights for future conservation efforts.

Keywords: Eastern Sarus Crane, conservation education, youth engagement, wildlife reintroduction

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Passionate about learning from nature, both in zoos and in the wild.

Rewilding Negros: The Talarak Foundation's Conservation Journey

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The Talarak Foundation, Inc. is a conservation NGO based on Negros Island, Philippines, focused on the protection and preservation of endemic and endangered species within the West Visayan Faunal Region. Through a holistic conservation approach, Talarak integrates *ex-situ* and *in-situ* strategies, including conservation education, field assessments, captive breeding, and the release of captive-bred individuals into the wild, and long-term monitoring of these animals in the wild.

These efforts are exemplified at the Bayawan Nature Reserve; a protected site that serves as a release area for four threatened species: the Visayan Spotted Deer (*Rusa alfredi*), Visayan Warty Pig (*Sus cebifrons*), Visayan Hornbill (*Penelopides panini*), and the Negros Bleeding-heart (*Gallicolumba keayi*). Released individuals are monitored through telemetry, camera traps, and direct observation to assess their welfare, survival, movement patterns, and behavioural adaptation to the wild. These species have demonstrated promising signs of adjustments and reproduction in the reserve, indicating early successes in species releases. The release program is further supported by ongoing habitat restoration through native tree planting and strengthened by community-based initiatives in education, alternative livelihoods, and participatory monitoring. Together, these strategies aim to build long-term ecological resilience and species recovery in Negros.

Keywords: species release, Negros, ex-situ, in-situ, biodiversity recovery, habitat restoration

Yobert Marc Juanillo

Yobert is a Research Associate with the Talarak Foundation, Inc., working on the conservation of Negros endemic wildlife. He has experience in field-based biodiversity monitoring, including wildlife and environmental assessments, and has a growing interest in learning more about animal husbandry and welfare.

Where Did the Sulawesi Babirusa Go? African Swine Fever As Extinction-Level Threat to Sulawesi's Endemic Wild Pig

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African swine fever (ASF) is a highly contagious and fatal disease for domestic and wild pigs. Since making its way to Indonesia in 2019, ASF cases have been reported mainly in domestic pigs and only several confirmed cases in wild boar in Sumatra. This situation proved that ASF threats to wild pigs, especially endemic species, have been underreported. In August 2023, several carcasses of Sulawesi's endemic pig species were found in Bogani Nani Wartabone National Park (Bonawa) located in northern Sulawesi. Subsequently, the first case of ASF in sulawesi babirusa (*Babyrousa celebensis*) was confirmed in Bonawa in October 2023 through PCR testing. In total, between August 2023 and December 2024, 6 sulawesi babirusa and 59 sulawesi warty pig (*Sus celebensis*) carcasses were found around the national park area. Moreover, data from 50 camera traps in monitoring grids of the national park resulted in 0 images captured for babirusa. This is in stark comparison to previous camera trapping from 2020 to 2023, prior to ASF outbreak, which consistently captured babirusa in an average of 40.2% out of the total 50 camera traps installed in the same monitoring grids. These findings mark the first case of ASF in babirusa and it indicates that ASF could very well pose an extinction-level threat to endemic wild pig species in Indonesia and possibly Southeast Asia. Thus far, the Ministry of Forestry has acted immediately against the situation, including initiating cross-sector coordination, conducting forest survey to find carcasses, developing handbooks on ASF control and training for field staff, implementing biosecurity measures in the national park and raising awareness of forest-edge communities. Nonetheless, further conservation actions are still required, including surveys to locate remnant individuals; the establishment of rescue and breeding facilities; and, as a last resort, implement collaborative *ex situ* links to *in situ* conservation programmes.

Keywords: African swine fever, endemic pig, outbreak, population, sulawesi babirusa

Saving the Critically Endangered White-bellied Heron: Harnessing Expertise from the Japanese Association of Zoos and Aquariums

Ami Nakajima and JAZA Conservation committee White-Bellied Heron conservation team

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The White-bellied Heron (Ardea insignis, hereafter WBH) is a large bird species inhabiting freshwater river ecosystems in the Himalayas. The global population is estimated to be fewer than 60 individuals, with approximately 25 in Bhutan, where only three breeding pairs are currently known. Classified as Critically Endangered (CR) on the IUCN Red List, the WBH faces an extremely high risk of extinction.

The Royal Society for Protection of Nature (RSPN) in Bhutan has been engaged in WBH conservation efforts for over 20 years. In 2021, RSPN established the White-bellied Heron Conservation Center in Tsirang, Bhutan, with the aim of developing an *ex-situ* conservation population. Currently, five individuals are housed at the Center; however, successful captive breeding has not yet been achieved.

In December 2024, RSPN and the Japanese Association of Zoos and Aquariums (JAZA) signed a Memorandum of Understanding (MoU) to collaborate on WBH conservation. JAZA members are contributing by sharing expertise gained through captive breeding and conservation programs for endangered bird species, particularly the Crested Ibis (*Nipponia nippon*) and Oriental White Stork (*Ciconia boyciana*), both of which were once extinct in Japan and have since been successfully reintroduced into the wild.

Keywords: White-bellied Heron, ex-situ conservation, captive breeding

Ami Nakajima

Ami is a member of Global conservation affairs sub-committee of JAZA. She has been involved in the conservation of Oriental White Storks as a population manager of the species and now is a member of the WBH conservation team of JAZA conservation committee.

Approach to wild long-tailed macaque management in Mandai Wildlife Reserve

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The long-tailed macaque (*Macaca fascicularis*) is a highly adaptable and widespread primate species found in Southeast Asia, including Singapore. As a forest edge species, they thrive at the interface between urban development and natural habitats, especially as urbanisation expands in Singapore. This has led to growing human-wildlife interactions, habituation, and management challenges. An estimated population of 300-350 wild individuals across seven troops were found to use the 126-hectare Mandai Wildlife Reserve, which comprises wildlife parks, public spaces, and a resort and is adjacent to forested habitats. In an endeavour to coexist with the macaques, a structured, adaptive approach to managing human-macaque interactions and the macaque population has been adopted. Extensive monitoring has been conducted to collect data on macaque activities and encounters, home range patterns, population size and social dynamics to inform site-specific management strategies. For the long-term management of macaques, three key approaches have been established to guide management actions implemented by a dedicated internal working group: (i) knowledge and awareness building; (ii) preventive measures; and (iii) behavioural and population management methods– including monkey guarding and sterilisation. This multi-pronged approach has enabled more effective management and contributed to the reduction of negative interactions among humans, wild macaques, and animals under human care within Mandai Wildlife Reserve.

Keywords: long-tailed macaque, management approaches, population management, Singapore

Carmen Choong

Carmen is a Manager at Mandai Nature, focusing on biodiversity conservation. Her passion for wildlife protection began with the early exposure to illegal wildlife trade and human-wildlife conflict, shaping her commitment to promoting human-wildlife coexistence.

Advancing Zoo and Aquarium Science: Publishing Opportunities with *Zoo Biology*

Bethany Krebs
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Founded in 1982, *Zoo Biology* has served for over four decades as a leading peer-reviewed forum for research on the care, conservation, and biology of animals in zoos, aquariums, and related *ex situ* settings. The journal was established to embrace all biologically relevant aspects of zoological institutions—including ecology, reproduction, genetics, behaviour, health, nutrition, husbandry, and education—and continues to maintain a multidisciplinary and empirical focus. More recently, it has expanded its scope to include visitor studies, conservation psychology, and applied conservation work led by zoos, aquariums, or wild animal parks.

Zoo Biology's international audience within the zoo and aquarium community ensures that papers published in the journal are wide reaching. As of 2024, the journal's impact factor is 1.4, and the h-index is 69, indicating its reach. The journal provides several paper formats, including technical reports on novel apparatuses or techniques, husbandry reports for publishing novel care techniques or processes for hard-to-care-for species, standard research articles, review articles, and commentaries.

Despite a generally broad reaching audience, the publisher and editors of *Zoo Biology* hope to increase participation by zoo and aquarium professionals in the Asia-Pacific regions. Opportunities for involvement include manuscript submission, manuscript review, and topic or guest-editing suggestions for Special Issues of the journal. This presentation, given by the current Executive Editor of the journal, will provide examples of highly cited papers, growing research areas of interest to the journal, and general tips for submitting manuscripts. We will also solicit feedback from the audience regarding how *Zoo Biology* can better serve Southeast Asian zoological professionals interested in publishing.

How can Aquariums Play a Part in Countering the Illegal Trade of Marine Species?

Tang Yong Jen
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Illegal wildlife trade is the fourth largest criminal activity by value and poses a significant threat to marine biodiversity worldwide. Aquariums, often perceived as places of recreation, are emerging as key stakeholders in the conservation of threatened marine species and ecosystems and as significant contributors in efforts to reduce illegal trade. By partnering with governing authorities, aquariums can provide subject matter expertise for enforcement efforts and offer facilities to house confiscated animals. These confiscated animals under an aquarium's care can serve as ambassadors to conduct educational outreach, raise awareness of illegal marine wildlife trade, and present opportunities for research on species typically inaccessible in the wild. Through these efforts, aquariums can generate evidence-based data that may influence policy and legislative changes at national, regional, or even global levels to combat illegal wildlife trade. This presentation aims to highlight ways aquariums globally have played a part in counteracting illegal wildlife trade and, hopefully, bring together SEAZA aquariums for greater collaboration on future efforts to amplify the impact of conservation work for endangered marine species.

Keywords: CITES Global Youth Network, Napoleon Wrasse, conservation, population sustainability

Tang Yong Jen

Yong Jen is from the Conservation & Science team in Singapore Oceanarium. He leads the citizen science programmes, youth engagement, and is establishing a wildlife management protocol across Resorts World Sentosa. Outside of work, he is a member of the CITES Global Youth Network (CGYN), the IUCN Young Professional Task Force (YPTF) and the Coalition to Address Reptile and Amphibian Trafficking (CARAT). In his free time, Yong Jen is a free-lance nature guide and goes around looking for *Draco* lizards.

The Role and Potential of Aquariums in Aquatic Species Recovery

Riley A. Pollom
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For decades, accredited zoos have made substantial, groundbreaking, and successful strides to captively breed and reintroduce threatened terrestrial species to augment and help recover their wild populations. More recently, zoos and aquariums have stepped up to similarly promote the recovery of aquatic species in both marine and freshwater systems. These institutions are uniquely poised to assist with species recovery efforts because of their unmatched expertise in husbandry, their respected roles in public education and outreach, and the institutional network that comprises the global zoo and aquarium community. Partnerships are essential for success in species recovery; partners outside the zoo and aquarium community provide important conduits into local communities, expertise on *in-situ* populations, and broad perspectives on addressing threats. This presentation explores how zoological institutions work with diverse partners to recover depleted populations of threatened aquatic species. From invertebrates to freshwater fishes to sharks, these collaborations harness the skills and expertise of the zoological community to lead the way in wild aquatic species recovery.

Riley A. Pollom

Riley is Assistant Director of Conservation & Science at Singapore Oceanarium. He is interested in species recovery and ecosystem restoration and has expertise on sharks and rays, seahorses, pipefishes, and seadragons.

Empowering Marine Wildlife Conservation: The Role of The Yas SeaWorld Research & Rescue Center (YSWRRC) in Building Regional Capacity

Komsin Sahatrakul, Jonathan Diaz, Nicholas Todd, Christine Ferrara, Rebecca Bissett, Matteo Sommer, Miceala Shocklee, Elsburgh 'Tres' Clarke, Danial Denk, and Elise Marquis

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The Yas SeaWorld Research & Rescue Center (YSWRRC) represents a vital step forward in the Middle East and North Africa (MENA)'s regional marine wildlife conservation, serving as a dedicated facility for the rescue, rehabilitation, and release of sick, injured, or stranded marine wildlife animals in the Arabian Gulf. Strategically located and fully equipped with advanced veterinary, husbandry, and life support systems, the center enhances the UAE's capacity to respond to marine wildlife emergencies and contributes to global conservation priorities.

Aligned with the theme "*Building Capacity for the Future, Protecting Wildlife Together*," the Yas SeaWorld Research & Rescue Center not only delivers high-standard clinical care to individual animals, but also serves as a hub for collaborative learning, scientific research, and public education. The Center provides high-standard veterinary care to a wide range of marine species while supporting rescue, rehabilitation, and release efforts across the Gulf region. Through partnerships with local authorities, academic institutions, and international organisations, it fosters knowledge exchange and builds local expertise in marine animal health, rescue protocols, and environmental stewardship.

By investing in state-of-the-art infrastructure and professional development, the Center strengthens the region's capacity to protect vulnerable species while inspiring a culture of conservation within the community. As environmental threats to marine life continue to escalate, the Yas SeaWorld Research & Rescue Center stands as a powerful example of how integrated, collaborative action can drive meaningful change. By combining clinical expertise, scientific research, education, and community engagement, the Center plays a critical role in protecting vulnerable species and maintaining ecosystem health. Its work not only contributes to immediate wildlife rescue and recovery but also builds long-term regional capacity and resilience, helping to safeguard marine biodiversity for future generations.

Keywords: Yas SeaWorld Research & Rescue Center, marine wildlife, conservation, rescue, rehabilitation

The Master of Disguise in the Ocean: The Zebra Shark

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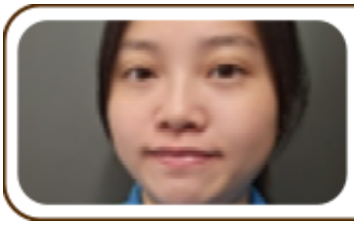
The global population of zebra sharks is suspected to have declined by 50–79% over the past three generations (approximately 52–72 years). This decline is particularly severe in the Western Indian Ocean-Southeast Asian subpopulation, which faces intense and unregulated fishing pressure, along with significant habitat degradation. In regions such as Thailand through to Indonesia, the species is believed to be locally extinct in parts of this range. As a result, the International Union for Conservation of Nature (IUCN) has classified the zebra shark as Endangered (EN).

From 2021 to 2023, Ocean Park Hong Kong successfully hatched 25 zebra shark pups. This breeding program has provided extensive data on growth rates, husbandry training, behavioural observations, and medical records, contributing to improved population management techniques and conservation strategies.

In addition, Ocean Park Hong Kong has been actively collaborating with the Stegostoma tigrinum Augmentation and Recovery (StAR) project in Indonesia. Through the exchange of husbandry techniques and expertise, this partnership aims to support the recovery of wild zebra shark populations and highlight the critical role of public aquaria in marine conservation.

Keywords: Zebra shark, breeding, husbandry training, shark conservation



Lung Yuen Ling

Ling serves as an Animal Care Officer at Ocean Park Hong Kong, She has a particular passion for breeding sharks, seadragons, and seahorses.

How Genomics is Revolutionizing the Future of Wildlife Conservation?

Agostinho Antunes

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The One Health goal, as proposed by the World Health Organization, integrates unifying 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 interdependent. Such considerations are particularly important for preventing, forecasting, identifying, and addressing global health threats such as zoonoses infection diseases. Recently, advances in genomics have been fundamental to understanding health, genetic disease, biodiversity and conservation, and greatly assisted our understanding of species evolution, including the rapid diversification of zoonoses. The interpretation of whole genome sequencing data generated across multiple organisms is elucidating their genetic uniqueness, evolutionary histories, past, and current patterns of genetic diversity, which are highly valuable for comprehensively conserving species in the future, effectively *in-situ* and *ex-situ*. Recent advances in next-generation genomics for conservation of biodiversity will be discussed with emphasis on charismatic case studies comprehending several endangered species (e.g. mammals, birds) from Southeast Asian and elsewhere.

Agostinho Antunes

Prof. Agostinho Antunes is the Head of the Evolutionary Genomics and Bioinformatics Group at the CIIMAR, Interdisciplinary Centre of Marine and Environmental Research, University of Porto, and he is a Professor of Genetics at the University of Porto, Portugal. Currently, he is also an Adjunct Professor at the Animal Genomics and Bioresource Research Unit, Faculty of Science, Kasetsart University, Bangkok, Thailand.

Planning for the Glide: Landscape Strategies and Habitat Connectivity for Colugos at Singapore Zoo

Jayne Chong and Horticulture Team
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In rapidly urbanising environments, effective biodiversity conservation requires integrated, site-sensitive approaches. This presentation showcases how cross-departmental collaboration can drive impactful conservation action within Singapore Zoo's managed landscape. The Horticulture team works in close partnership with in-house ecologists to support *in situ* conservation efforts for the Sunda colugo (*Galeopterus variegatus*), a native gliding mammal residing on the Zoo grounds.

While Sunda colugo shows some adaptability to habitat disturbance, it remains highly dependent on continuous canopy cover for movement and roosting, making it vulnerable to habitat fragmentation resulting from construction and landscape modification. Drawing on colugo sighting records and analyses of projected gliding paths, the team developed targeted planting schemes to bridge canopy gaps and enhance habitat connectivity. This initiative not only strengthens the species' resilience but also exemplifies how thoughtful landscape management can directly support broader conservation objectives. It reflects an ongoing commitment to building internal capacity for species-sensitive planning across the Mandai precinct and underscores the essential role of horticulture in biodiversity protection.

Learnings from Staff Visits to *In-Situ* Conservation Projects – team Bonding and Participation

Ten Swee Kien, Donald Cheok, Berni Chen, and Moh Ai Wei

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Mandai Wildlife Group (MWG) provides employees across the organisation (irrespective of their department) with opportunities to participate in the Company's conservation and research efforts. Mandai Nature, the conservation arm of MWG, supports over 50 conservation projects across Southeast Asia. Each year, one or two such projects are identified for MWG's staff to visit. Any staff with at least six months of service can apply for this programme. Since 2017, six such trips have been coordinated and attended by 44 MWG staff.

This presentation will share learnings from two most recent visits to (i) Kupang & Rote Island, Indonesia—to understand the *ex-situ* breeding program and witness the reintroduction of the Rote Snake-necked Turtles (*Chelodina mccordi*) and (ii) Phnom Penh & Sre Ambel, Cambodia—to strengthen *in-situ* habitat protection, monitoring release, conservation breeding, and head-starting of the Southern River Terrapin (*Batagur affinis*) as well as the Siamese Crocodile (*Crocodylus siamensis*). The teams involved for both these conservation trips comprised of members from diverse backgrounds within MWG ranging from the various animal care taxonomic teams, veterinary healthcare, horticulture, park operations as well as corporate services functions from sales and experience and transformation office.

While in Indonesia, the team worked with Wildlife Conservation Society Indonesia Program (WCS-IP) and local stakeholders for the soft release of 10 turtles at both Lendeoen Lake and Ledulu Lake, habitat monitoring activities, environmental assessment, water quality measurements, and patrol work around the lakes. About 6000 kilometres away from the island of Rote, the team in Cambodia worked with the Cambodian WCS counterpart at the Koh Kong Reptile Conservation Centre and along the Sre Ambel River. During the trip, the team assisted in many husbandry and care activities, setting up of signs at potential breeding sites, shifted boundary markers, collected tracking data and spoke to the various locals that monitor and protect the Sre Ambel river which the turtle and crocodile call their home.

Through this experience, both the teams learnt the realities and complexities of species conservation, project management, adaptability, diverse stakeholder engagement, and practical husbandry scenarios. The witnessing of these efforts and understating the true spirit of One Plan Approach provided the teams with the understanding of the greater scheme of conservation and gave meaning and purpose for their individual role at work. The staff realised that each of their respective works serves as a jigsaw puzzle piece to contribute collectively to complete the conservation of the species together.

Rethinking Preventive Medicine: Prioritising resources to optimise animal healthcare for animals under managed care

Dr. Heng Yirui, BVMS DACZM
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Preventive medicine is a cornerstone of veterinary care in zoological medicine, allowing proactive management of diseases in animals under human care. While core practices such as quarantine, faecal parasite screening, vaccination, and postmortem examinations are commonly performed, routine health assessments are more controversial and inconsistently applied, especially in European zoos. To optimise preventive efforts, Mandai Wildlife Group launched a geriatric healthcare programme, mandating annual veterinary examinations for any animal that had reached 80% of its expected captive lifespan. After five years, the programme's effectiveness was reviewed by analysing all geriatric health assessments performed over one year. A total of 182 assessments were conducted, of which 64.3% (117/182) were elective. Only three elective assessments involved sedation, and just six yielded new medical findings, including musculoskeletal (n=4) and metabolic (n=2) disorders. Given the low diagnostic yield of these routine checks, the preventive medicine strategy was revised. Instead of broadly screening based on age, the team shifted to a targeted approach rooted in historical data on mortality and morbidity. Key diseases affecting the animal population were identified, and each was assigned to a veterinarian responsible for data collection and developing action plans in collaboration with curators. These plans were presented during monthly Life Sciences division meetings for feedback and refinement. This revamped strategy enables more efficient resource allocation, disease-specific prevention, and improved collaboration between veterinary and management teams to address animal health issues more effectively.

Dr. Heng Yirui, BVMS DACZM

Dr. Heng Yirui is deputy vice president of veterinary healthcare at Mandai Wildlife Group. He is an American College of Zoological Medicine board certified specialist in zoological medicine, with a particular interest in internal medicine, crisis management and diagnostic imaging.

Surveillance Trends of Infectious Diseases in Zoos: Insights from Longitudinal Monitoring Programs in Thailand (2018–2024)

***Waleemas Jairak*, Wanlaya Tipkhanta, Piyaporn Kongmakee, Saowaphang Sanannu, Arpussara Saedan, and Yongchai Utara**

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Infectious diseases remain a critical threat to animal welfare, conservation efforts, and public health within zoological institutions. This study presents a comprehensive overview of communicable disease surveillance conducted in several zoos of the Zoological Park Organization of Thailand (ZPOT) between 2018 and 2024. It aims to highlight epidemiological patterns, identify emerging risks, and guide future disease monitoring protocols for the zoo community. Data were obtained from mammals and avian through active and passive surveillance programs, covering 2,845 animals tested for 50 pathogens. Among the most frequently detected diseases, leptospirosis (43.35%) and tuberculosis (1.02%) were found across multiple taxa and years. Toxoplasmosis in mammals, with a 45.44% seroprevalence, is regularly detected and remains a concern due to its environmental persistence. In recent years, avian hemosporidian parasites (Plasmodium spp.) have emerged as one of the most common findings in avian collections. Their high prevalence in tropical regions, long persistent infections, and severity in susceptible birds underscore the need for effective monitoring and disease control strategies. The long-term scope of this program provides rare insights into disease persistence, emergence, and management across diverse species and institutions. These findings emphasise the importance of sustained, zoo-based surveillance for early detection, proactive health management, and zoonotic risk reduction. In conclusion, routine infectious disease monitoring is essential not only for safeguarding animal and staff health but also for supporting zoo-based conservation programs.

Keywords: *surveillance, infectious disease, zoos*

Waleemas Jairak

Waleemas Jairak is a veterinarian of Animal Conservation and Research Institute of Zoological Park Organization of Thailand. She focus on epidemiology, outbreak investigation, and infectious disease surveillance in zoos.

Captive Umbrella Cockatoo (*Cacatua alba*) Breeding Success in the Grand Taman Safari Prigen

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The Umbrella Cockatoo (*Cacatua alba*) is one of several endemic bird species native to the North Moluccas in Indonesia and has become popular as a pet, hence increasing illegal trade and decreasing its population. In the interest of conserving this species, captive breeding emerged as one of the solutions to settle the problem. However, captive breeding of Umbrella Cockatoos is quite difficult due to their natures of nesting selection. Success breeding of Umbrella Cockatoos in captivity has been reported in several reports, including this one, in The Grand Taman Safari Prigen. One mated pair was given their own enclosure sized 6 m² equipped with a perch, a drinking trough, and some enrichments. Their nest materials and structure were the main concern, whereas the birdhouse was crafted from wood, and the nest materials were made from sawdust. The observed mated pair successfully produced viable offspring under the provided captive conditions. This study highlights the importance of understanding and replicating natural nesting conditions to improve the success rate of Umbrella Cockatoo breeding in captivity.

Keywords: Umbrella Cockatoo, Captive Breeding, Nesting Structure

Mahfud Ihwantoro

Mahfud is one of our dedicated Aves Keeper in Taman Safari Indonesia Prigen. He works with various orders of birds, but his main expertise is in parrots and lorikeets, especially for those species' which endemic in Indonesia.

A Golden Breakthrough: First Ever Natural Hatching of Wreathed Hornbills (*Rhyticeros undulatus*) at Taman Safari Bali

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In November 2024, Taman Safari Bali welcomed the first naturally hatched Wreathed Hornbill chicks (*Rhyticeros undulatus*) in the park's history. This achievement was not a coincidence but the result of long-term improvements in husbandry, especially in how the birds' biological needs, environmental conditions, and nesting behaviours were supported.

Once a bonded pair had adapted well to their exhibit, the team started daily observations. Knowing that hornbills rely heavily on fruit for energy and reproductive health, the diet was adjusted to ensure consistency, variety, and nutritional value. Since females stay sealed inside their nests for months during incubation and chick-rearing, a custom nest cavity was prepared inside the enclosure, shaped and placed to resemble a natural tree hollow.

The enclosure itself had also gone through renovation. It now includes tall wooden structures and a more forest-like layout, offering both security and natural movement space for the birds. The placement of the nest box was designed to give the female peace and protection during the breeding season.

Both chicks hatched and were raised by their parents without human interference. This outcome shows that with careful attention to species-specific needs, natural breeding behaviours can occur even in a managed setting, offering valuable lessons for future conservation programs.

Keywords: Wreathed Hornbill, natural breeding, ex-situ conservation, nest cavity design, captive breeding success

Kadek Kesuma Atmaja

Kadek Kesuma Atmaja is the Animal Curator at Taman Safari Bali, specializing in exhibit design and wildlife conservation. He is actively involved in restocking and release programs for native species.

Cross-Matching for Blood Transfusion in Zoo: The Case Study in Thailand

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The blood cross-matching test is an essential procedure that helps expand the scope of veterinary treatment, especially in animals with severe anemia requiring urgent blood transfusion. This test plays an important role in minimizing the risk of immune reactions during blood transfusion, thereby improving both the safety and effectiveness of the treatment. While cross-matching tests are well established in domestic animals, limited data and research remains available for wildlife species. Therefore, the Zoological Park Organization of Thailand has initiated blood compatibility testing on several species in zoos, including the Malayan tapir, stump-tailed macaque, and clouded leopard. Blood samples from donor animals were cross-matched with sick individuals. The case studies showed varying results. In Malayan tapirs and clouded leopards, the blood compatibility test results were positive, and the blood transfusion was successful. In contrast, the stump-tailed macaque, the test results were negative, and transfusions could not be performed.

In addition, cross-matching tests were conducted in both adult elephants and calves to establish a database for emergency cases, such as the treatment of elephants infected with EEHV, which often require immediate blood transfusions. The case studies showed the importance of cross-matching tests in increasing the survival rate of sick wild animals and served as a guideline for developing a blood compatibility database in wild animals, which can be further developed for research and applied in the future.

Keywords: blood transfusion, cross-matching, zoo animals, wild animals

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Singapore Oceanarium, Excellence in Aquatic Veterinary Healthcare

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The new Singapore Oceanarium (SGO) is a world-class ocean institute dedicated to inspiring deeper knowledge, love, and action for our ocean, with a special commitment to animal wellbeing and veterinary excellence, supported by investment in resources to build even stronger capabilities.

Key to this transformation is the enhancement of the SGO Veterinary Centre, a specialised facility dedicated to advancing veterinary healthcare for aquatic animals. Purpose-built and significantly upgraded, the Centre has been further equipped to meet the evolving unique needs of our aquatic residents and to support Singapore Oceanarium's broader mission in innovation, education, and *ex-situ* conservation engagement.

The enhanced SGO Vet Centre features dedicated areas for both wet and dry veterinary procedures. The center also includes a dedicated space for radiologic examinations, a vital component in modern aquatic animal diagnostics. With the right equipment and design, the veterinary team can conduct complex procedures safely and efficiently, enhancing both diagnostic accuracy and patient care.

Beyond clinical spaces, the SGO Vet Center includes two laboratories focused on Clinical Diagnostic and Environmental Health, respectively. The former is equipped with advanced technology to facilitate clinical pathology, microbiology, molecular, endocrinology, and reproductive analysis. The latter is where water analysis (among other environmental parameters) is performed to monitor and ensure the wellbeing of our habitats. The Environmental Health Lab runs over 5,000 water tests weekly, analysing key physicochemical parameters and bacteriology. It also monitors air quality, rainwater, and soil, helping us ensure that every aspect falls within a healthy range.

Beyond its comprehensive and cutting-edge clinical set-up, the SGO Vet Centre seeks to facilitate collaboration and learning. It will serve as a cornerstone for educational programs and behind-the-scenes tours, offering guests a unique window into the complexities of animal care. For those passionate about education and transparency, it offers an inspiring experience.

As Singapore Oceanarium continues to forge more academic and research partnerships, its veterinary facility will also serve as a regional hub for professional development and knowledge exchange through hosting training sessions and technical demonstrations conducted by our veterinary team, and other such activities that serve to advance aquatic veterinary science across the region.

A symbol of commitment to aquatic animal care

The SGO Vet Center is a symbol of the team's enduring commitment to pushing boundaries to deliver the highest standards of animal care. It reflects our continuous pursuit of excellence in aquatic animal veterinary science and reinforces our broader mission in marine education, research, and conservation.

Health Management of Aquatic Collection, Ocean Park's Perspective

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Veterinary services for aquatic collections pose certain unique challenges compared to the conventional terrestrial zoological collections. This presentation elaborates on Ocean Park Hong Kong experiences in building up a veterinary team that works closely with the animal care team in health management of the aquatic collection. This working philosophy sets a coordinated high standard of husbandry care and medical training, enabling veterinary services to be utilised to the fullest in advancing healthcare and welfare of collection animals. We move the veterinary role away from the basic 'firefighting mode' to a more holistic role, providing inputs on habitat design, behavioural training, husbandry strategies, research, and conservation programs which are an integral part of the healthcare management of the collection.

Keywords: health management, veterinary services, aquatic collection

Lee Foo Khong
Foo joined Ocean Park Corporation Hong Kong in 2007 and currently working as senior veterinarian looking after the park's animal collection. His interest in zoological institutions and its contributions to conservation, also sees him working closely with fellow colleagues in the region in advancing healthcare and conservation of species under human care, and serving as a board member of the Asian Society of Conservation Medicine.

Field Biosafety at the Human-Animal Interface: Strengthening Zoonotic Disease Prevention in Zoos

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Zoos serve as vital centers for conservation, education, and research, but the close interaction between humans and animals also poses risks for zoonotic disease transmission. Field biosafety, which involves applying biosafety principles outside laboratory settings, is crucial for protecting both zoo personnel and the animals in their care. This presentation explores best practices for minimizing biological risks at the human-animal interface in zoos. These include conducting routine risk assessments, implementing the use of appropriate personal protective equipment (PPE), health screening and vaccination of staff, effective animal quarantine protocols, and implementing proper sanitation measures. Staff training in biosafety awareness, zoonotic disease identification, and emergency response is critical for early detection and containment of outbreaks. Drawing on cross-sector biosafety experience, the discussion emphasises how a culture of biosafety can be fostered in zoological settings without compromising animal welfare. By integrating field biosafety into daily operations, zoos can prevent the introduction and spread of zoonotic pathogens. This approach supports long-term capacity building and reinforces the One Health principle—recognizing that the health of humans, animals, and ecosystems is interconnected and must be protected together.

Keywords: Field biosafety, zoonotic diseases, human-animal interaction, zoo worker protection, One Health

Rodel Jonathan S. Vitor II
Ron is an Assistant Professor at the Department of Biology, College of Arts and Sciences, University of the Philippines. His interests are veterinary pathophysiology, epidemiology, and biorisk management, both in the laboratory and in the field. He is a Certified Biosafety Professional with International Certifications in Biorisk Management, Biosecurity, Biological Risk Assessment, and Cyberbiosecurity.

Abstracts

Poster Presentations

Sustainable Species Collection in Public Aquarium

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Marine Safari Bali is Taman Safari Indonesia's newest Marine Park, located in Bali, Indonesia. Open in December 2024, Marine Safari Bali aims to showcase a modern park featuring a collection of captive bred sustainable species, sourced exclusively from our park. We aim to achieve over 70% of our collection from captive breeding, sustainable fisheries, as well as ornamental trade industries. Despite sourcing only a collection of sustainable species, Marine Safari Bali is still able to showcase a wide variety of animals from Terrestrial, Birds, Marine Mammals, Reptiles, and Aquatic Animals in the park.

Among our collection, we have a few highlights from our 100% captive bred reptile collection, ranging from 20 different species, captive bred capybara, captive bred Paddlefish & Sturgeon, captive bred Giant snakeshead, down to Arapaima, and freshwater stingrays. Marine Safari Bali also worked with fellow public aquariums around Southeast Asia in collection exchanges of Captive Bred Elasmobranchs, where we currently have a collection of Captive-Bred Eagle Rays and Leopard Rays. In our smaller aquarium habitats, we collaborate with local ornamental breeding facilities to showcase mariculture corals, aquaculture dwarf cuttlefish, clownfish, and seahorse.

One of our most outstanding achievements is that we currently house the world's most extensive collection of captive-bred saltwater species, with over 10 captive bred angelfishes, surgeonfish, and more in a single habitat.

Lastly, in line with our conservation efforts in giving back to Indonesia's wildlife and aquatic life, Marine Safari Bali builds several captive breeding facilities around the park, from a reptile breeding center to our state-of-the-art laboratory for all our animal health and nursery needs, to a few greenhouses for larger elasmobranch breeding and grow out facilities to sustain our conservation breeding efforts.

Keywords: Sustainable breeding, Captive breeding, sustainable collection & conservation

Ken Kwan
Ken Kwan is the Acting Senior Curator who manages the life science departments and collection over a span of terrestrial, reptiles and aquatic animals. He believes strongly in sustainable collection and that modern technology and knowledge able us to breed many more species under human care which can lead to an aquarium facility rely mainly on captive bred species, genetic exchanges and lesser wild collection for display purposes.

Monitoring Gastrointestinal Health and Welfare in Eastern Bongos Through Fecal Scoring: A Tool for Conservation and Population Management

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Tragelaphus erycerus isaaci, also known as Eastern Bongos, is a critically endangered species found mostly in the highlands of Kenya. The Bongo Surveillance Project is known to be the only project dedicated to protecting and conserving these critically endangered mountain bongos. At Mandai Wildlife Reserve, there are four Eastern Bongos being housed together under our care. These animals are known for having very sensitive gastrointestinal tracts, which often lead to gastroenteritis among the species.

A standardised fecal score chart for the species is introduced as a non-invasive and practical tool for monitoring their welfare in managed care. The fecal chart is designed based on the data collected over the past three years. Daily fecal scoring assesses keepers in gaining insights into gastrointestinal health, nutritional balance, and responses to environmental or social changes of the species. Variations in fecal consistency act as an indicator of both physical health and mental well-being of the animals.

By integrating fecal scoring into daily husbandry routines, early warning signs of stress or illness can be identified, and enhances proactive care for the animals. The chart plays a role as low-effort, high-impact assessing tools during key population management events such as pairings, group mixing and introductions. Besides, fecal scoring supports breeding programs for the species by ensuring optimal welfare, reproductive readiness and group dynamics. The chart serves as a reference in the preservation and conservation of these sensitive species.

Keywords: Easter bongos, fecal score chart, gastrointestinal issues, conservation plan, population management, animal welfare

Subha Letchumy A/P Ratnakumar
Subha is a junior keeper currently based at the Night Safari (Mandai Wildlife Group), where she plays an active role in the daily care and husbandry of the Eastern Bongos. Through her close and consistent interaction with this species, she has developed a strong interest and passion for their behaviour, welfare, and conservation. Her hands-on experience has deepened her understanding of their individual personalities and needs, and she continues to seek opportunities to enhance their care and enrichment.

Integrating African Animals into Mixed Species Exhibits in Wild Africa, Singapore Zoo

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"No man is an island," a common quote connoting that no one person is truly self-sufficient. Interestingly, animals are no different. The codependence observed between animals of different species is called a symbiotic relationship, which we often see among our African species. Some notable instances include zebras and wildebeest migrating together, where one navigates while the other detects predators; olive baboons keep a lookout for predators for elephants, in exchange for a drink from the elephants' water holes. What if we replicated these bonds inside our very own zoos? This is what we experimented with in two of our exhibits:

1. 4.0 Rothschild's giraffes, 1.0 marabou stork, 1.1 Grevy's zebras, and 0.2 Nile lechwes in our giraffe exhibit
2. 1.2 Grevy's zebras, 1.0 marabou stork, and 1.2 red river hogs in our zebra exhibit

In both exhibits, the animals are flourishing and living peacefully with each other to date. While conducting this trial, some problems we faced included mitigating conflict together while ensuring each species was able to consume the proper diet despite sharing the same space. To tackle these problems, we brainstormed several solutions such as drafting mixing plans before every mixing activity, reinforcing recall training from exhibit to dens, along with implementing segregated feeding areas.

Through this study, we have also observed the many benefits of having mixed species exhibits, including providing social enrichment for each species, increasing activity levels due to the naturalistic interactions between each species, maximising the use of space as well as enhanced guest experience through better educating visitors about the diverse range of animals that coexist together in particular regions—in our case, Africa.

To conclude, although having mixed species exhibits creates challenges such as resource compatibility as well as species compatibility, it is ultimately significantly beneficial to zoos, as not only does it contribute to the welfare of our animals, but it also expands space utilisation in zoos.

Keywords: mixed-species exhibit, symbiotic relationship, animal welfare, species compatibility, zoo management

Ng Jingwen

Jing Wen is a junior keeper currently working with the ungulate team at the Singapore Zoo. Her primary focus is on the care and training of the giraffe herd, where she plays an active role in the ongoing hoof care program.

One Hoof at a Time: The Power of Small Steps in Giraffe Welfare

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In Southeast Asia, cooperative training for giraffes is still emerging, particularly for hoof care, which presents unique welfare challenges. To address hoof issues in two young giraffes, our team implemented a positive reinforcement-based training programme focused on trust-building and voluntary participation.

After researching global practices and trialling various training methods, we began with daily morning sessions involving desensitisation and behavioural shaping. Over time, we successfully trained key behaviours such as targeting, hoof lifts on a verbal cue, and desensitisation to touch and tools, all within a chute system designed for safety, comfort, and ease of access.

Key factors in the programme's success included:

- Consistent trainer presence and a simplified team structure
- Purpose-built chute features (adjustable bars, an open concept, and multiple access points)
- A shift in team mindset that prioritised training as part of daily welfare

Despite early setbacks, the animals showed lasting behavioural progress, becoming more confident, calm, and engaged. This journey highlights how even small, patient steps can lead to meaningful change, proving that cooperative care is possible, even in settings with limited resources. This case study underscores how capacity building can enable meaningful welfare advancements through patient, evidence-informed care.

Keywords: cooperative training, giraffe hoof care, positive reinforcement, voluntary participation, behavioural training, chute system

Feeding Preferences and Behavioural Budget of Lesser Chevrotains (*Tragulus* sp.) Under Managed Care

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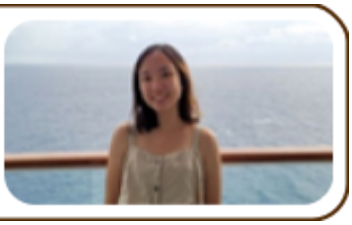
A diet preference assessment and behavioural observations of lesser chevrotains (*Tragulus sp.*) were conducted across four zoological parks in Singapore: Rainforest Wild Asia, Singapore Zoo (Fragile Forest), Night Safari, and Bird Paradise. Individuals were housed in either enclosed or walk-through exhibits and provided a standardised diet over seven days, consisting of vegetable A (leafy greens), vegetable B (fruit vegetables), vegetable C (root vegetables), alfalfa hay, herbivore pellets, and browse. Feed consumption patterns varied, with vegetables B and C emerging as the most preferred items, accounting for approximately 50–70% of total intake. In contrast, alfalfa hay, herbivore pellets, browse, and vegetable A were minimally consumed. Behavioural observations in the walk-through Fragile Forest exhibit revealed that lesser chevrotains spent the largest proportion of time on self-directed behaviours (24.2%), followed by active feeding (11.3%), and passive association with conspecifics (9.6%). This study provides valuable husbandry and behavioural insights for this native species of ecological and cultural significance. Despite their importance in maintaining tropical forest balance, lesser chevrotains remain underrepresented in published research. These findings highlight their conservation relevance, support improved husbandry practices, and strengthen long-term care strategies under managed conditions.

Keywords: lesser chevrotains, diet preference, behavioural observations

Law Mei Ting
Mei Ting is a volunteer involved in Animal Behaviour Research & Management at Mandai Wildlife Group. She is also a marine geoscience PhD student studying contemporary coral reef growth in the Maldives. Her research interests include coral reef development and sea-level rise, marine biodiversity and conservation, as well as science communication and community engagement.

Isabel Goh Si En
Isabel works in the Animal Behaviour Research & Management department at Mandai Wildlife Group, studying both general and specific behaviours of various species of animals. Her main research interests include wildlife and animal behaviour research, with a particular focus on mammals.



Beyond the Borders: A Holistic Approach to Rote Island Turtle Conservation

Karthiriish Chandra
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Mandai Wildlife Group (MWG) is committed to biodiversity conservation in Southeast Asia, leveraging on extensive expertise and well-equipped facilities to address critical wildlife challenges. The Rote Island Snake-necked Turtle (*Chelodina mccordii*) is a critically endangered turtle, thought to be extinct in the wild since 2009 due to poaching and habitat destruction. Mandai Wildlife Group (MWG) has played a vital role in leading conservation efforts to bring them back to thrive in the wild.

MWG's early efforts laid a strong foundation in Indonesia, including the provision of technical support, assistance with facility set up, staff training, and habitat assessments at the rescue centre facilities in Kupang.

In Singapore, Mandai Animal Quarantine (MAQ) has been instrumental in providing dedicated care for the turtles, supporting rehabilitation efforts with the species. The complex journey of the turtles involved transferring captive bred specimens from the Bronx Zoo, USA, to Singapore, and then to Indonesia. MAQ served as a pit stop for the turtles to acclimate to the weather conditions in the tropics. Additionally, the animals had detailed diet and behaviour monitoring and veterinary assessments for transmissible diseases.

As a quarantine keeper working hands-on with these turtles at MAQ, I was directly involved in the repatriation efforts of two batches of turtles in 2021 and 2022. An expedition to Kupang and Rote Island in 2025 was pivotal in shaping my understanding of the conservation efforts for the species. I witnessed the dedication and unique challenges faced by local stakeholders, committees, conservation partners, and government officials on the ground. Through these engagements, I recognised the importance that the support of the local community had in ensuring the continued success of the conservation efforts. My experience could exemplify how actively engaging staff can lead to greater staff empowerment and conviction for the success in conservation efforts.

Karthiriish Chandra
Karthiriish is a Senior Veterinary Keeper with extensive experience in the care and well-being of captive wildlife. With years of hands-on experience and a deep understanding of animal behavior, Karthiriish plays a crucial role in ensuring the health and upkeep of wildlife residents in quarantine. Beyond daily care, Karthiriish has a keen interest in global conservation efforts, actively seeking opportunities to contribute to broader species recovery and protection.

Shifting From A Scarcity To Abundance Mindset: Building Novel Enrichment Devices Using Upcycled Materials

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The scarcity mindset is the focus on limitations and challenges. In the context of designing enrichment devices for bottlenose dolphins, this mindset usually stems from the need to consider multiple factors such as safety and potential hazards in the design. This perceived need for meticulous attention to detail often discourages trainers from attempting to build their own enrichment devices. While ready-made enrichment items are available for purchase, they are typically limited to standard shapes like balls and buoys. Larger or more complex designs can sometimes be easy to dismiss because of concerns about an increased budget, which may not be feasible for all facilities. The scarcity mindset thus creates analysis paralysis, where creativity is often stifled. On the contrary, an abundance mindset means actively looking for opportunities to explore alternative options such as using upcycled materials. By using upcycled materials (e.g. garden hoses, tires, plastic containers, PVC pipes, fire hoses etc.), trainers can build novel enrichment devices that provide sensory and foraging opportunities while encouraging synchronous play. This approach moves beyond simple items for the animals to push or toss and offers a customisable array of interaction opportunities. The dolphins have shown a high interest in these novel, odd-shaped creations, engaging meaningfully when they are introduced.

Keywords: enrichment devices, upcycled, novelty, creativity, opportunities

Jane Neo
Jane is a Senior Marine Mammal Specialist & Enrichment Program Coordinator, working with Indo-Pacific Bottlennose Dolphins (*Tursiops aduncus*), at Singapore Oceanarium. She is passionate about enhancing animal welfare through innovative enrichment activities and using data-driven insights to inform and implement meaningful changes.

Conservation Program of Sunda Pangolin at A'Famosa Safari Wonderland

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The Sunda Pangolin (*Manis javanica*) is categorised as Critically Endangered globally, and its population in the wild is declining due to multiple factors, including poaching and habitat loss. Therefore, conservation breeding in captivity is being reinforced at A'Famosa Safari Wonderland, allowing for the evaluation of their overall welfare for future studies and offering crucial information regarding their physiological and psychological health.

At A'Famosa Safari Wonderland, the animal caretakers are trained to make careful observations and monitor the animals to gather data, especially on their behaviours. Our goal is to deeply understand and meet their needs to enhance welfare in the zoo, while also fostering positive welfare that benefits both wildlife and the zoos. By grasping their fundamental needs and behaviours, we can implement the best possible husbandry practices and Positive Reinforcement Training (PRT), allowing wildlife to receive optimal care and enabling humans to learn more about them without having to resort to negative methods, such as administering anaesthesia or using physical restraint.

Our conservation program aims to ensure that their dietary needs are met, managing their behaviour while establishing a conducive environment that encourages breeding activities. We also strive to develop a comprehensive health profile of the Sunda Pangolin at A'Famosa Safari Wonderland through our PRT programs, which benefit both the animals and the zoos—ensuring the animals remain stress-free while the zoo gathers essential data on the wildlife. Our PRT programs encompass voluntary training for weight measurement, ultrasound procedures, and blood collection, where the animal voluntarily participates in the procedure without any restraint. All of these training efforts are aimed at providing optimal care for wildlife while simultaneously gathering data for future enhancements.

Nor Al-Shuhadah Binti Sabarudin
Nor Al-Shuhadah, a Veterinary Assistant, acts as a Conservation Officer working specifically on the Sunda Pangolin Breeding Programme, and also supervises other local wildlife breeding programmes at A'Famosa Safari Wonderland. Her main interests are in wildlife and animal care, research and study on the behaviour of wildlife in captivity.

Enhancing Welfare by Expanding Degrees of Freedom

Bryce Teoh
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This case study follows a male fennec fox (*Vulpes zerda*) at Mandai Wildlife Group, transforming from a shy and cautious individual into a confident participant in public engagement. The main focus on increasing his degrees of freedom by offering greater choice and control to improve welfare and support training goals for the Explorer Outpost.

Training began with gentle desensitisation to human presence, followed by target training. As trust developed, keepers gradually reduced obvious cues, encouraging the fox to rely more on environmental and routine signals rather than constant prompts. This shift toward behavioural fluency expanded his degrees of freedom, enabling him to act more independently and self-direct his behaviours.

Crate training, focus exercises, tunnel navigation, and digging were introduced next. These activities engaged his natural behaviours while providing opportunities to build agency. Generalising skills across different settings further increased his adaptability and reduced stress in new situations.

Increasing degrees of freedom means expanding the animal's ability to make choices and control their environment. Through consistent reinforcement and flexible shaping, the fox gained greater control over his interactions. This approach enhanced his wellbeing and improved keepers' skills in responsive, adaptable animal training.

By prioritising predictability, choice, and autonomy, this work demonstrates that increasing degrees of freedom are essential to animal welfare. It also offers valuable insights for teams building capacity to care for species in Southeast Asia's evolving zoological environments.

Improving Knowledge of the Ecology and Behavior of the Binturong to Enhance the Conservation of Wild Populations and the Management of the Species in Zoos

Elea Delsaux

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The binturong (*Arctictis binturong*) is a poorly known and little-studied arboreal mammal endemic to Southeast Asia. Classified as Vulnerable on the IUCN's Red List of Threatened Species, its populations are declining due to habitat loss and degradation, and over-exploitation. Binturongs are predominantly frugivorous, and they participate effectively in the seed dispersal of several fruit species, such as figs (*Ficus* spp.), and may be a keystone species for forest conservation. Since the binturong spends most of its time up in the canopy, is primarily nocturnal or crepuscular, and solitary, available information from the wild is limited. Further investigation is needed to elucidate the ecological characteristics of the species. ABConservation has been conducting *ex-* and *in-situ* research through its Bearcat Study Program to improve the management of binturongs under human care and enhance the conservation of wild populations. A radio tracking study of the binturong is about to be launched for the first time in the Philippines, where the species occurs only in Palawan. The aim is to analyse home range size, daily activity, and habitat use, as well as to observe feeding habits and behaviours. The results will be combined with camera-trap data, and one objective is also to characterise the binturong's microhabitat preferences. This project will give insights into areas of priority conservation in Palawan. Additionally, a better understanding in the binturong's natural diet will enable the improvement of feeding practices in zoological institutions. Indeed, the species' nutritional needs remain poorly understood, and several concerns have been raised about the dietary management of captive binturongs. ABConservation recently completed a preliminary comparative analysis of dietary influences on binturong behaviour across four French zoological institutions. Results underscored the influences of management practices, environmental context, and individual traits on feeding behaviour. As threats to wild binturong populations continue to grow and the species' presence increases in zoological collections worldwide, research and conservation efforts need to be stepped up across Southeast Asia.

Keywords: Binturong, habitat, diet, in and ex situ research

Elea Delsaux

Elea is the Research Program Manager of ABConservation in Palawan, Philippines. She is passionate about animal behavior, wildlife conservation research, and loves conducting fieldwork in the tropical forests.

Reintroduction of *Hylarana taipehensis* through Integrated *ex-situ* Conservation and Habitat Restoration in Northern Taiwan

***Nian-Hong Jang-Liaw*, Wei-Yu Tai, and Eric Tsao**

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Taipei Zoo initiated an *ex-situ* conservation program for the Taipei frog (*Hylarana taipehensis*) in 2014, establishing a stable captive population while assessing the conditions required for habitat restoration. We found that both aquatic breeding sites and terrestrial grassy areas are essential for the species, with grasslands serving as important buffer zones for foraging and shelter. Since 2017, we have conducted experimental releases within the zoo and determined that recently metamorphosed froglets show better survival and growth than adults or tadpoles, making them ideal candidates for release. Building on these efforts, since 2022, we have worked with local farmers to restore historical habitats in northern Taiwan. Released froglets return the following year during the breeding season, showing courtship behaviour and successful pairing. This integrated approach—combining ex situ breeding, targeted life-stage release, and habitat restoration—demonstrates the zoo's role in native species recovery and supports the reestablishment of wild Taipei frog populations.

Keywords: Taipei frog, reintroduction, habitat restoration

Nian-Hong Jang-Liaw

Nian-Hong Jang-Liaw is the curator of the Conservation Animal Area and the head of the Conservation Genetics Lab at Taipei Zoo. He is also involved in wildlife research that bridges in-situ and ex-situ conservation efforts, focusing on species such as Eurasian otters, leopard cats, and Taipei frogs.

Successful Treatment of elasmobranch Caligoid Copepods in a 1,450 m^3 Seawater Mixed-Species Exhibit

Patinan Rookkachard

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Caligoid Copepods are obligate external parasitic crustaceans of elasmobranchs. Clinical signs are primarily related to the feeding process and include local erythema and ulceration, increased mucous production, skin irritation ("flashing"), anemia, lethargy, and inappetence. It was reported that one bull shark and one gray reef shark were developing multiple diffuse white patches on the body, and one zebra shark had cloudy eyes. One bull shark and one zebra shark were caught for physical examination; consequently, Caligoid copepods were found to be the cause of the lesions. At Marine Safari Bali, the Theater Tank is the biggest exhibit. Its total volume is 1,450 m^3 of tropical seawater. The semi-open aquarium system is a biological and mechanical marine water system with ozone disinfection. This mixed-species exhibit over 30 species housed tropical marine fish approximately 5,000 tropical fish and elasmobranchs including bull shark (*Carcharhinus leucas*), Gray reef shark (*Carcharhinus amblyrhynchos*), shark rays (Rhina ancylostoma), zebra sharks (*Stegostoma fasciatum*), leopard whipray (*Himantura leoparda*) etc. Diflubenzuron (Dimilin®) was considered an effective and safe treatment. The target exposure time was a minimum of 10 hours. The Ozone and FF venturi pump were turned off during treatment. The drug was re-dosed after 72 hours after the first dosing for a total of 10 treatments. No parasites were observed after complete treatment with no adverse effects on water quality parameters and water clarity.

Keywords: copepods, elasmobranch, diflubenzuron, treatment

Patinan Rookkachard

Dr. Patinan Rookkachard, DVM., CertAqV. Certified Aquatic Veterinarian from World Aquatic Veterinary Medical Association (WAVMA), Veterinarian Manager at Marine Safari Bali, Indonesia. He's in charge of Animal Health and Animal Welfare.

A Case Study of Isopod Infestation, Quarantine and Treatment in Bigeye scads (*Selar crumenophthalmus*)

Patinan Rookkachard

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Marine fishes are host to a variety of crustacean ectoparasites. Isopod is one of the parasites in Cymothoids (Crustacea, Isopoda, Cymothoidae) that infect a wide variety of fish species. They feed on blood; some species settle in the fish's buccal cavity while others reside in the gill chamber or on the body surface. Bigeye scads (Selar crumenophthalmus) are one of the marine fish caught for the wild and collected for aquarium tank display as schooling fish. Commonly, bigeye scads are infested with the isopod, Norileca indica, which is always found infected in the bigeye scads' buccal cavity. Isopods can cause morbidity and mortality in aquarium fish captivity. The damage to the gill filaments was thus not only due to the feeding of the blood and wounds but also to the pressure exerted by the dorsal side of the parasite. Erosion of gill lamellae, damage of gill rakers, and pale gills were the severe gross lesions observed as a consequence of isopod infestation, which disturbed the fish's respiration and secondary bacterial infection. Before being placed in the exhibit, the marine fish must be quarantined and given the necessary treatment.

Keywords: Parasitic isopods, Marine Fishes, Bigeye scads, Quarantine, Prevention, Treatment

Patinan Rookkachard

Dr. Patinan Rookkachard, DVM., CertAqV. Certified Aquatic Veterinarian from World Aquatic Veterinary Medical Association (WAVMA), Veterinarian Manager at Marine Safari Bali, Indonesia. He's in charge of Animal Health and Animal Welfare.

Blending Animal Welfare and Exhibit Innovation: Designing an Open Chameleon Exhibit in a Modern Zoo

Mark Baker
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Chameleons are highly specialized, arboreal reptiles known for their colour-changing abilities and sensitivity to environmental conditions. Traditional exhibits often limit vertical space and restrict natural behaviours. At Wanpi World Wildlife Zoo, we developed an open-style exhibit—without glass or fences—to improve animal welfare and visitor experience. The exhibit houses Parson's chameleons (*Calumma parsonii*), panther chameleons (*Furcifer pardalis*), and veiled chameleons (*Chamaeleo calyptratus*), all large, visually striking species. Each individual is kept in a tall, 80–100 cm wide potted habitat (approx. 2.5 m high), planted with mixed-species vegetation and equipped with artificial vines, misting systems, UVB, and plant lighting. This allows the chameleons to move freely, choose perching heights, and display natural behaviours. Visitors walk through the space without barriers, experiencing the animals as if in a natural forest. This immersive, welfare-focused design not only prioritises environmental complexity and behavioural choice, but also demands careful attention from the husbandry team in monitoring individual needs, environmental stability, and safety. The exhibit serves as a practical model for innovative reptile exhibition and education.

Keywords: Chameleons, open exhibit, animal welfare, exhibit innovation

Mark Baker
Mark is the Curator of the Amphibian and Reptile House at Wanpi World Wildlife Zoo, overseeing its management and exhibit design. He views the zoo as a vital bridge between humans and animals. With a strong emphasis on animal welfare and staff safety, he focuses on creating exhibit experiences that leave a lasting impression on visitors through thoughtful and engaging design.

Reducing Food Waste through Repurposing of Fresh Produce from F&B Kitchens for Animal Feeding

Yunus Bin Awal and Prakash Sudandiran
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Preparing and sorting vegetables in restaurants inevitably generates unwanted parts such as husks, stems, stalks, cores, root tips, and peels. These parts are typically not consumed by humans due to taste or texture preferences, rather than nutritional concerns. However, in animal feeding, a broader range of vegetable parts can generally be used, provided they are not extremely hard or highly indigestible. This approach helps reduce waste in the animal kitchen. To repurpose these unconsumed vegetable parts, a cross-departmental collaboration was established between the Food and Beverage team and the Wildlife Nutrition team at Mandai Wildlife Reserve. The initiative aimed to explore the potential of incorporating these vegetable items into animal diets as part of sustainability efforts. The nutrition team assessed the quality of the vegetables, and feeding trials were conducted to evaluate acceptance by selected animal species. These trials were guided by the wildlife nutritionist. The results showed that some items, such as broccoli stems, cauliflower leaves, and long beans, were well accepted by the animals without any adverse effects. Other vegetables were excluded from the trials due to concerns over their quality. Once a vegetable item was accepted, an equivalent deduction in food orders was implemented. A streamlined procedure was developed that included notifications from restaurants, vegetable collection and quality assessment, and distribution to approved animals. In addition to reducing food waste, this initiative also resulted in cost savings by reducing food purchases.

Keywords: unconsumed vegetables, sustainability, restaurants, wildlife nutrition centre

Yunus Bin Awal

Yunus is an Animal Feed Assistant at the Wildlife Nutrition Centre, Mandai Wildlife Group. He prepares food for animals based on diet sheets and assesses food quality to ensure it meets the required standards.

Improving Sleep Dynamics and Mobility in Asian Elephants: A Case Study at Night Safari

Nursyafiqah Bte Mohamed Yusof and Arumugam Lachmana
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There is a lack of discussion regarding the sleep behaviours of captive elephants. Elephants can avoid sleeping in a recumbent posture when the environment changes, when hierarchy issues arise, with age-related vulnerability, or when joint and foot issues are present. Sleep avoidance is an important welfare issue, as it may impair sleep and lead to sleep deprivation. Elephants are known to sleep both standing and in a recumbent posture. Lying down allows them to fall into deep sleep—this is when REM (Rapid Eye Movement) sleep is presumed to happen, although the definitive evidence is still lacking in elephants. Furthermore, elephants only lie down when a sense of safety and comfort is present, as recumbency places the animal in a vulnerable position. But how do we manage an elephant that suddenly stops sleeping in a recumbent posture after having an altercation with the herd? What contributory factors do we change?

The Asian Elephant Jamilah, housed at the Night Safari, is facing compatibility/hierarchy issues within her herd. After an altercation with the herd in February 2024, Jamilah was observed to have stopped sleeping in a recumbent posture—for approximately 5 months. Before the altercation, Jamilah was recorded having an average daily sleep time of 3 to 4 hours, mostly between 2:00 a.m. and 6:00 a.m. She exhibited recumbent sleep, alternating sides. This presentation will cover the steps taken to encourage Jamilah to return to sleeping in a recumbent posture post herd altercation.

Additionally, Jamilah was diagnosed with pododermatitis on both third toenails of her forelegs in December 2005, leading to lesions on both forelegs. In March 2020, she was observed having a slower gait and difficulty walking. Radiographs of her feet were taken regularly to monitor her condition, and signs of osteomyelitis were found. There was also a pronounced medial deviation of her left hind leg. These physical issues are chronic and hence contributed to the changes in sleeping posture.

Using a single case study, this presentation will cover the following: (I) methods the team used to assist Jamilah to lie down in a recumbent posture (II) changes made in management to improve the quantity of side sleeping time. Management changes aimed to improve mobility and encourage a recumbent posture for elephants that may resist side sleeping due to physical issues (feet-related conditions) or herd dynamic changes. Results were that the Asian Elephant that resisted side sleeping for up to 5 months was now able to sleep an average of 3-5 hours daily in a recumbent posture. As her physical condition continues to improve, eventual integration back into the herd will also be explored.

Nursyafiqah Bte Mohamed Yusof

Nursyafiqah is a Senior Keeper at the Elephant Section under Night Safari who has been caring for elephants for 8 years. Her main topic of interest is to find different ways to manage elephants to further improve their quality of life under human care.

A New JAZA Research Grant Program to Promote Integrated *In-Situ* and *Ex-Situ* Conservation Efforts

Keiichi Sato
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The conservation of biodiversity has become a core mission for zoos and aquariums, with increasing societal expectations. *In-situ* conservation remains essential for the holistic preservation of ecosystems and habitats, while *ex-situ* approaches are critical for the propagation of threatened species and the reinforcement of wild populations. Research to link these two approaches in a complementary and balanced way is becoming ever more important for enhanced conservation strategies. To promote such integration, JAZA has launched a new research grant programme in collaboration with Mitsubishi UFJ Financial Group (MUFG). In this first year, the programme received 21 proposals from JAZA member institutions. An external review committee selected six projects for funding, including studies on cetacean conservation using non-invasive DNA sampling and monitoring, and on reproductive physiology and ecology of the Rock Ptarmigan through studies of captive and wild populations. Looking ahead, the programme aims to expand support for research through partnerships with international zoo and aquarium networks.

Keywords: Biodiversity research In-situ and Ex-situ, Research grant program

Keiichi Sato

Keiichi Sato, Ph.D., is an Executive Director of JAZA, concurrently serving as Vice Chair and Director in charge of the research committee. In addition to his role as Director of Okinawa Churaumi Aquarium, he is a researcher studying sharks and rays, conducting studies on their reproductive biology, physiology, and conservation.

Rigid Endoscopy as a Diagnostic Tool for Gill Pathologies in Aquatic Species

Komsin Sahatrakul, Matteo Sommer, Miceala Shocklee, and Elsburgh 'Tres' Clarke
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Rigid endoscopy offers a minimally invasive and highly effective diagnostic technique for the direct evaluation of gill structure in teleosts and elasmobranchs under human care in public aquaria. This approach allows real-time visualization of the gill arches, filaments, and lamellae, enabling detailed assessment of mucosal integrity, vascularization, and pathological changes such as hyperplasia, telangiectasia, hemorrhage, parasitic infestations, and necrosis. It significantly enhances diagnostic precision beyond what is possible through external observation or wet mount microscopic examination alone.

The use of rigid endoscopy is particularly advantageous in high-conservation-value individuals—such as endangered or rarely housed species—where early and accurate diagnosis is critical for both individual welfare and population sustainability. It is especially beneficial for species with challenging anatomical features, such as small body size, limited opercular access, or poor visibility—factors that can hinder effective evaluation using traditional methods like external inspection or gill biopsy.

Furthermore, the integration of video recording and high-resolution still imaging during endoscopy allows clinicians to capture detailed visual documentation of gill structures *in situ*. This capability not only enhances immediate diagnostic precision but also enables consistent longitudinal monitoring, making it possible to track subtle changes in gill health over time, assess treatment responses, and communicate findings effectively across veterinary and husbandry teams.

By increasing diagnostic accuracy and enabling more targeted and timely medical interventions, rigid endoscopy contributes to improved clinical outcomes, more informed husbandry decisions, and enhanced animal welfare. As such, it plays a vital role in advancing aquatic animal healthcare and supporting broader conservation and management efforts in public aquarium settings.

Keywords: Rigid endoscopy, aquatic animals, diagnosis, gills, pathology

Enhancing Wound Management in Elasmobranchs Under Human Care Using Platelet-Rich Plasma (PRP) Therapy in a Public Aquarium Setting

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Platelet-Rich Plasma (PRP) therapy, originally developed in human sports medicine, has gained recognition for its role in promoting the healing of acute soft tissue injuries. In veterinary medicine, PRP has shown success in managing osteoarthritis and musculoskeletal injuries in both small animals and equine patients. Despite its growing use in terrestrial veterinary care, the application of PRP in aquatic species, particularly teleosts and elasmobranchs, remains underreported and poorly understood.

A variety of elasmobranch species under human care, including the Oceanic manta ray (*Mobula birostris*, the Lesser devil ray (*Mobula hypostoma*), Oman cownose rays (*Rhinoptera jayakari*), Eagle rays (*Aetobatus ocellatus*), the Swell shark (*Cephaloscyllium ventriosum*), the Honeycomb stingray (*Himantura uarnak*), and Cowtail rays (*Pastinachus sephen*), presented with wounds of traumatic and/or infectious origin. In a preliminary trial (n = 11) conducted between April 2024 and June 2025, both autologous and allogeneic intralesional PRP injections were administered as part of medical regimens to affected individuals. Subjectively, clinical observations indicated that animals receiving PRP therapy exhibited notably accelerated wound healing, decreased local inflammation, and enhanced tissue regeneration.

These initial observations support the potential of PRP as an effective adjunctive therapy for wound management in elasmobranchs under human care. Its ability to promote faster tissue healing may reduce the need for prolonged antibiotic use, aligning with broader efforts to combat antimicrobial resistance, enhance animal welfare, and improve recovery outcomes in managed care settings. This study underscores the growing need for regenerative treatment options in aquatic veterinary medicine, particularly in public aquaria, where such innovations remain limited but increasingly important.

Keywords: platelet-rich plasma, elasmobranch, wound management, regenerative medicine, public aquaria

Integrated Husbandry and Veterinary Approaches to the Successful *Ex Situ* Breeding of Six Penguin Species at SeaWorld Yas Island, Abu Dhabi

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The 2024–2025 breeding season marked the first reproductive success at SeaWorld Yas Island, Abu Dhabi, since the facility's establishment. Six penguin species were involved , including King (*Aptenodytes patagonicus*), Gentoo (*Pygoscelis papua*), Chinstrap (*Pygoscelis antarctica*), Macaroni (*Eudyptes chrysolophus*), Adélie (*Pygoscelis adeliae*), and Rockhopper (*Eudyptes chrysocome*) penguins, which were bred under human care. Through a collaborative husbandry and veterinary program, 21 healthy chicks (from 19 breeding pairs) were hatched and reared, representing a significant milestone in *ex situ* penguin conservation and management.

Species-specific husbandry protocols were established to accommodate the distinct ecological and behavioural needs of each species. Key practices included the use of advanced lighting systems with photoperiod manipulation to simulate seasonal cues, precise temperature and humidity regulation in nesting areas, and tailored nutritional programs to support reproductive health. Nesting materials and configurations were adjusted according to species preferences to enhance breeding behaviour and egg retention.

Veterinary oversight played a critical role in optimizing reproductive outcomes. Egg fertility monitoring, targeted supportive care for eggs and neonates, and routine physical examination for chicks, enabled early detection and intervention for any developmental or health concerns. Close collaboration between zoological and veterinary teams ensured timely decisions throughout incubation and rearing.

This successful multi-species breeding season demonstrates the effectiveness of a coordinated, science-based approach to penguin propagation under human care. Beyond immediate reproductive success, the establishment of a sustainable in-house breeding program reduces reliance on wild collection or inter-facility transfers, contributing to long-term population stability. It also supports broader conservation goals by fostering self-sufficient animal management practices and increasing the educational and conservation value of zoological institutions.

Keywords: penguins, captive breeding, ex-situ conservation

Animal Translocation and Nutrition Support for Rainforest Wild Asia

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Animal translocation requires careful planning and coordination to ensure a smooth transition, including the continuity of appropriate diets. Between late 2024 and early 2025, in preparation for the opening of Rainforest Wild Asia (RWA), which houses 36 species with unique dietary requirements, animals were relocated between parks. In addition to maintaining a consistent food supply, the Avian Nutrition Centre had to adapt and expand its operations to include daily diet preparation for RWA animals, on top of its existing responsibilities for Bird Paradise. Key focus areas included food supply and delivery logistics, accuracy of diet preparation, and feed quality. During the translocation process, the nutrition team worked closely with keepers and feed suppliers to ensure uninterrupted food provision and precise diet execution. An online system was used to manage diet sheets, allowing for immediate updates and minimising errors. Workflows at the Nutrition Centre were also revised to improve efficiency and meet the increased demand. All animals were successfully relocated within the planned timeframe, with no disruptions to food supply or loss of dietary information. As nutrition is a core component of the five domains of animal welfare, the nutrition team played a vital role in ensuring species-specific, balanced diets continued to support animal health and well-being throughout the transition.

Keywords: animal translocation, diet management, food preparation, nutrition centre

Omar Bin Yusof

Omar is the Supervisor at the Avian Nutrition Centre, Mandai Wildlife Group. He is responsible for overseeing food preparation, quality control, and inventory management at the Centre, where diets are prepared daily for the animals at Bird Paradise and Rainforest Wild Asia within Mandai Wildlife Reserves.

Partners in the Aviary: Social Bonding and Breeding Dynamics in Captive Hornbills

Adilah Adam
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Even with international managed species programmes, *ex situ* zoo populations of threatened rhinoceros hornbills (*Buceros rhinoceros*; n=159) and wreathed hornbills (*Rhyticeros undulatus*; n=140) are decreasing, with annual deaths exceeding births in the last five years. Mandai Wildlife Group (MWG) displays both species, but despite successfully breeding several other hornbill species, has had little success with these two. The rhinoceros hornbill pair were frequently observed displaying breeding behaviours such as visiting their nest box, but has never bred, while the wreathed hornbill pair was previously described as tolerant of one another but unbonded. These observations prompted further investigation into the behavioural dynamics of both species, over a 16-day period using focal sampling and spatial mapping. Findings showed that the female rhinoceros hornbill's restricted flight from a wing injury influenced her perch use and spatial positioning, while the female wreathed hornbill's history as a show ambassador bird contributed to persistent keeper-oriented behaviour and hence limited pair bonding. The rhinoceros pair demonstrated stronger pair bonding, marked by a 15% higher frequency of affiliative behaviours compared to the wreathed pair, and over 50% of their time spent in close proximity. In contrast, the wreathed pair exhibited predominantly antisocial and human-oriented behaviours, with more than 90% of observations showing them over one metre apart. Preliminary targeted enrichment strategies and enclosure modifications demonstrated some effectiveness in improving captive breeding outcomes, contributing to long-term conservation efforts.

Local Coral Conservation: Restoration and Education

Iris Lo

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Hong Kong is home to some of the most unique marine environments, holding 84 reef-building species within the significantly developed yet biodiverse waters. Although previously suggested to be less susceptible to bleaching, coral communities in Hong Kong are facing a general decline in coverage, highlighting a need for action to protect and conserve local corals. Ocean Park Hong Kong holds a range of coral species from different sources, including confiscated corals, donations from universities, and rescued local fragments, playing an important role in the Park's coral restoration initiatives. Most of the collections are on display, acting as a channel to enhance public understanding of local corals and conservation efforts. With expanded facilities and accumulated husbandry knowledge over the years, the Park has built a foundation for taking up an active role in local coral conservation and education, not only facilitating front-line restoration work, but also providing a platform that connects *in situ* and *ex situ* institutions to work together and enhance coral conservation efforts.

Keywords: corals, restoration, conservation education

Iris Lo

Iris is an aquarist at Ocean Park Hong Kong supporting the Park's coral husbandry, restoration and conservation work. Her interests encompass animal care, marine life rehabilitation and conservation education.

Songbird Management for Conservation and Education in Bird Paradise, Singapore

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Southeast Asia is a region recognised for its rich songbird diversity. Bird Paradise in Singapore holds 41 species of Asian songbirds (Passeriformes), including threatened species such as the straw-headed bulbul (Pycnonotus zeylanicus), Sumatran laughingthrush (*Garrulax bicolor*), blue-crowned laughingthrush (*Garrulax courtoisi*), and Bali myna (*Leucopsar rothschildi*). The birds are managed in netted individual or mixed-species enclosures at the Breeding Centre (off-display) and Winged Sanctuary (public display), as well as two large free-flight walk-through aviaries (public display) at Wings of Asia and Songs of the Forest. Birds at the Breeding Centre and Winged Sanctuary are species prioritised for breeding and/or of high conservation value, while birds at the walk-through aviaries are primarily managed for display and conservation education. The 0.27 ha Songs of the Forest is an aviary dedicated to songbirds; a daily keeper chat and curated interpretation educate visitors on songbird ecology, including vocalizations, and how the cagebird trade threatens songbirds and causes "Silent Forests." This presentation details how Asian songbirds are a focal group of birds that Bird Paradise is focusing on for breeding, conservation and education, especially given our location and hence ability to contribute *in situ*.

Divyashini Lakshimanan

Divyashini is a Keeper caring for the animals in mixed species walk-through aviaries at Bird Paradise. Her favourite animals to work with are the parrots, but she has expanded her interests to other species of birds too. She also enjoys planning and creating enrichment devices for the animals under her care.

Managing Complicated Crown Fracture in Canine Teeth As A Serious Dental Disease in Malayan Sunbear Perform With Open Surgical Extraction

Heni Paramita Indraswari[1], Lohanthira Kumar[1], Noralshuhadah[1], Bagus Brahmanto Aji Guno[2], Nisrina Rohadatul 'Aisy[2]

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Dental disease is one of the most common health issues in wildlife and is closely associated with impaired animal welfare. The complex pain response—including inflammatory pain, physiological pain, and neuropathic pain—makes dental disease a condition that causes spontaneous and persistent pain signals to be transmitted to the central nervous system. In wild animals, dental disease often progresses as a chronic condition due to limited access to examinations and the challenges associated with diagnostic approaches that require general anesthesia. The sun bear (*Helarctos malayanus*) is an omnivore with a strong bite, a long tongue for feeding, and a broad skull. The species has 42 teeth, with large canines essential for cutting and being the most vulnerable to trauma, especially under stress from environmental changes. Complicated crown fractures often occur when the animal bites into hard materials, exposing the pulp-containing nerves, blood vessels, and lymphatic tissues. If left untreated, this condition can progress to pulpitis and eventually pulp necrosis, resulting in tooth death and increasing the risk of systemic complications. Treatment for pulp necrosis or dead teeth that are accompanied by damage to the root (apical) area and periodontium—known as endo-perio lesions—requires tooth extraction. An open surgical approach is a mandatory procedure when extracting canine teeth to prevent complications such as oronasal fistula formation.

Keywords: Complicated Crown Fracture, Pulp Necrosis, Unvital Teeth, Open Teeth Extraction

Heni Paramita Indraswari

Heni is veterinarian in A'Famosa Safari Wonderland, Malaysia. Passionate in animal health and care management, her goal is to support wildlife conservation by ensuring the well-being and resilience of the animals under her care.

Physical Therapy for Flight Rehabilitation in Quarantine: A Case Study of a Rescued Brahminy Kite (*Haliastur indus*)

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The Brahminy kite is a medium-sized raptor that can be found throughout coastal and wetland areas in South and Southeast Asia, with a main diet of fish and other small animals. Mandai Wildlife Group works closely with local wildlife rescue organisations in Singapore, often providing veterinary assistance to rescued wildlife. A rescued Brahminy kite, suspected of having been kept as a pet, was sent to the Mandai Wildlife Healthcare & Research Centre to receive veterinary attention. It was noted to be conditioned for handfeeding, with broken primary feathers on both wings and the tail, and was only able to glide up to a metre in length. As it was likely imprinted on humans with presumed disuse atrophy of its flight muscles, the bird was integrated into the animal collection due to its unsuitability for release.

New additions to the animal collection will first be held at Mandai Animal Quarantine (MAQ), which serves as both a barrier for pathogens and a buffer for acclimatisation. Upon admission to quarantine, the bird was kept in a large yard with access to natural sunlight, and was provisioned with a variety of mobile perches for physical flight therapy. Food was used to encourage the bird to glide short distances between perches, allowing it to strengthen its flight muscles. Dynamic branches were added to exercise the bird's balancing and perching capabilities through wing flapping. The bird's take-off and landing skills were also monitored during these daily controlled flight training sessions. As the bird's flight capabilities improved, the distances between the perches were progressively increased in height and length, to build its confidence in flying across longer distances. Foraging enrichment was utilised to encourage the bird to display more natural feeding behaviours. The provision of a large water tray for bathing also helped to promote the growth of new wing and tail feathers.

By the end of the 30-day quarantine period, the bird was able to comfortably fly across the entire enclosure. The successful flight rehabilitation of this Brahminy kite in the short time frame of quarantine highlights the potential for MAQ to contribute to avian wildlife rescue and rehabilitation purposes in Singapore, by providing a flight aviary with minimal human interaction for recovered birds to regain flight abilities prior to release.

Keywords: quarantine, flight rehabilitation, physical health

Mohamad Fauzi bin Awang Kechik

Fauzi is a Veterinary Keeper working at Mandai Animal Quarantine, Singapore. He has over 15 years of experience with a variety of avian species in veterinary settings. He enjoys the challenges of working with different animals and coming up with novel methods of enrichment.

Managing Gill Fluke Infestation in Captive Lesser Devil Rays (*Mobula hypostoma*): Lessons for Long-Term Welfare

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Mobula rays (Mobulidae) are filter-feeding elasmobranchs of high conservation concern and flagship species for marine education and conservation messaging. This study details the clinical, pathological, and parasitological findings of a gill fluke (*Polyopisthocotylean monogenean*) outbreak in *Mobula hypostoma* (Mh). Between 25.5.2022 and 1.6.2022, 22 juvenile Mh were quarantined as part of the setup of a large conservation-focused public aquarium. Across three intake cohorts (n=8/6/8) housed in one system, the first gill parasite associated mortality occurred on 23.6.2022. Clinical signs were limited to reduced appetite. Gill endoscopy confirmed severe parasitism in the cohorts. Animals were treated in separate tubs with praziquantel (10 mg/L, 1-hour bath, every 3 days, total of 3 treatments), followed by freshwater gill flushing and covered supportively with antibiotics and corticosteroids. Intervention proved highly effective resulting in rapid parasite clearance. Ultimately, 7/22 animals (32%) died from direct effects of parasitism or longer-term complications. Pathology demonstrated severe gill hyperplasia with intralesional parasites and emaciation. Two surviving animals showed chronic post-parasitism gill compromise, renal lesions, and persistent emaciation at necropsy months after initial infection, indicating long-term impacts related to parasitism or treatment. No concurrent pathologies were detected, supporting a primary parasitic aetiology. Parasites were molecularly characterised, showing 95% identity to *Narcinecotyle longifilamentosus* based on 28S rDNA. This represents the first report of a *Narcinecotyle*-like monogenean in *Mobula* species and raises the possibility of a previously undescribed or poorly characterised parasite. This study demonstrates how close integration of clinical medicine, pathology, and parasitology enables timely diagnosis, informed treatment, and a deeper understanding of emerging disease challenges, representing a collaborative model vital for advancing aquatic animal care. It emphasises the need for proactive parasite screening and rapid response when managing high-conservation-value elasmobranchs and underscores the importance of tailored treatments, long-term monitoring to mitigate delayed morbidity, and the value of molecular parasite identification.

Keywords: Narcinecotyle-like monogenean, Mobula hypostoma, gill fluke

Reintroduction of the Critically Endangered Great Hornbill (*Buceros bicornis*) in Northern Thailand

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The Great Hornbill (*Buceros bicornis*) is critically endangered in northern Thailand and has been absent from the wild for over two decades. The Zoological Parks Organization of Thailand (ZPOT) has successfully bred this species in captivity since 2011. This study aligns with ZPOT's 2019 conservation strategy and evaluates the feasibility of reintroducing the species to reestablish self-sustaining hornbill populations and enhance ecological integrity in northern Thai forests. Mitochondrial DNA analysis of 97 captive hornbills revealed high genetic diversity. Release candidates were selected for haplotypes aligned with historical northern Thai populations to ensure regional genetic compatibility. Habitat suitability was assessed across six protected areas in Chiang Mai, Chiang Rai, Lamphun, and Lampang provinces, considering ecological factors such as food diversity (including *Ficus* spp., *Knema* spp., *Myristica* spp., *Litsea* spp., and other native species), availability of large trees for natural nesting cavities and artificial nest boxes, threat levels, and community engagement. All sites consistently met the criteria for reintroduction, with no significant differences ($p > 0.05$). Behavioural rehabilitation, conducted for over one year per pair, included flight conditioning, familiarisation with wild food sources, and human avoidance training, which facilitated successful acclimatization prior to soft release. Between 2022 and 2025, four pairs were soft released at two pilot sites: Chae Son National Park (Lampang Province) and Doi Chiang Dao Wildlife Research Station (Chiang Mai Province). Two years of post-release monitoring using GPS Argos telemetry and field observation confirmed successful adaptation. Released hornbill pairs successfully adapted to the wild and exhibited natural foraging on diverse plant and animal species within home ranges averaging over 4.6 km². Pre-installed artificial nest boxes were utilised, although wild reproduction has not yet occurred. Initial survival rates suggest strong potential for long-term establishment. Community engagement through pre- and post-release awareness activities significantly supported field reporting and ongoing conservation efforts. These preliminary results highlight the potential for successful reintroduction of B. bicornis in northern Thailand and provide a foundation for broader conservation initiatives. Future efforts will follow IUCN SSC and AZA guidelines to support sustainable population recovery.

Keywords: Great Hornbill, Reintroduction, Habitat suitability, Post-release monitoring, and Wildlife rehabilitation

Yollada Taengphukhieo

Ms. Yollada Taengphukhieo (Paeng) is currently a researcher at Khao Kheow Open Zoo under the Zoological Parks Organization of Thailand (ZPOT). She is responsible for managing various research projects for ZPOT and serves as the lead coordinator for the Great Hornbill reintroduction program, as well as conducting hormone analysis of wildlife in the laboratory.

Eco-Friendly Odor Control and Composting: The Use of Indigenous White Mold for Manure Management in Khon Kaen Zoo

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Khon Kaen Zoo emphasises sustainable management of animal waste, particularly from large herbivores such as elephants, rhinos, and hippopotamuses. These species generate large volumes of manure, which may cause odour problems and negatively affect animal welfare if not properly managed. This study explores the use of indigenous white mold resilient, locally adapted fungi to accelerate manure decomposition and control odour. Manure from elephants, rhinos, and watusi cattle was divided into inoculated and control groups. Results showed that elephant manure exhibited the highest white mold growth. Inoculated manure decomposed more rapidly and produced significantly less odour. The decomposed material was tested as a potting medium for tree seedlings and showed comparable root and shoot development to that in commercial soil. To evaluate broader applications, white mold was also applied to Malayan porcupine manure, known for its strong odour. Hydrogen sulfide (H_2S), a key odour indicator, was measured twice daily. The control group recorded average H_2S levels of 0.48–0.49 ppm, while the treatment group showed a reduction to 0.30–0.31 ppm. This study demonstrates that indigenous white mold effectively degrades fibrous manure, reduces unpleasant odours, and produces usable compost. It presents a practical, eco-friendly strategy for sustainable waste management aligned with green zoo principles.

Keywords: Indigenous white mold Manure management Odor control Sustainable zoo Composting

Siriwan Kimkamkaew

Siriwan is currently serving as a researcher under the Division of Conservation, Research, and Animal Health at Khon Kaen Zoo, where she conducts her work in the veterinary laboratory, with a focus on microbiological and parasitological diagnostics and research.

Preparation and Transportation Techniques of Eastern Sarus Crane from Thailand for Reintroduction at Vietnam

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The translocation process of Eastern Sarus Cranes from Thailand to the Socialist Republic of Vietnam for reintroduction into the wild at Tram Chim National Park was initiated as part of a regional cooperation agreement for the conservation of the species in Southeast Asia. The process involved several key stages: the selection and preparation of the animals, domestic transport within Thailand, reception and rehabilitation at the destination, and the final transfer to the acclimatisation area prior to release into the wild. Transport was conducted using both trucks and commercial passenger aircraft between February and April 2025. As a result of the operation, six 7-month-old Eastern Sarus Cranes, each weighing approximately 5 kilograms, were successfully translocated. They underwent a 30-day quarantine period, were transported in specialised transport boxes via a medium-sized truck, and were accompanied by a team consisting of one veterinarian and two zookeepers. The journey began at Nakhon Ratchasima Zoo and proceeded to Suvarnabhumi Airport, from where the birds were flown to Vietnam on a passenger flight. The total transport time was 16 hours. Upon arrival, the cranes entered a rehabilitation and quarantine period at Saigon Zoo and Botanical Garden. The rehabilitation lasted 3 days, followed by a 10-day quarantine period. They were then transferred to Tram Chim National Park, a 4-hour journey, bringing the total duration of the entire translocation process to 45 days and 20 hours. Currently, all six cranes are in the acclimatization phase in preparation for their release into the wild. This was the first translocation of Eastern Sarus Cranes, which faced several challenges and helped pave the way for international conservation collaboration.

Keywords: Sarus Crane, translocation process, wildlife conservation, reintroduction

Tanat Uttaraviset

Tanat is zoo scientist at Nakhon Ratchasima Zoo, under the Zoological Park Organization of Thailand. He has expertise in breeding and preparing Eastern Sarus Cranes for reintroduction. He has been assigned to oversee the relocation of the cranes from Thailand for reintroduction in Vietnam.

Co-Occurring Appendicitis and Cystic Endometrial Hyperplasia in an Orangutan: A Case Study

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A 29-year-old female Bornean orangutan (*Pongo pygmaeus*) presented with intermittent vaginal bleeding for three months, along with loss of appetite, absence of defecation for two weeks, abdominal distension, and was unresponsive to medical treatment. A comprehensive diagnostic workup, including physical examination, abdominal ultrasonography, and haematological analysis was performed under general anesthesia using ketamine (2–3 mg/kg) combined with xylazine (0.5 mg/kg), and maintained with isoflurane. Findings revealed excessive gas accumulation in the gastrointestinal tract and signs of endometrial hyperplasia. Haematology and blood chemistry results showed leukocytosis, mild hyperglycemia, and an elevated cancer antigen 125 (CA-125) level.

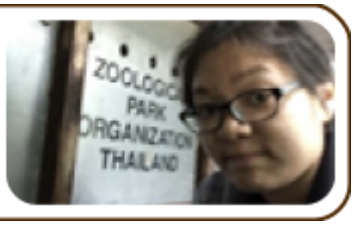
Initial supportive treatment, including ultrasound-guided gas release and administration of antibiotics and anti-inflammatory drugs, led to mild clinical improvement. A subsequent CT scan confirmed uterine enlargement with a thickened endometrium. Exploratory surgery revealed an inflamed, distended appendix and a markedly cystic uterus. Surgical intervention included an appendectomy and ovariohysterectomy. Histopathological evaluation confirmed severe subacute diffuse necrotic suppurative appendicitis and cystic endometrial hyperplasia (CEH) with a granulosa cell tumor. Postoperative management consisted of intensive supportive care, antibiotic therapy, and close clinical monitoring. The orangutan recovered uneventfully and showed significant clinical improvement.

This case represents a rare co-occurrence of appendicitis and cystic endometrial hyperplasia (CEH) in a great ape, emphasizing the importance of considering multiple concurrent conditions when evaluating nonspecific clinical signs in zoological patients. Long-term health monitoring of geriatric individuals is essential. Implementing voluntary medical training can support earlier detection of illness and promote overall animal well-being.

Keywords: Orangutan, cystic endometrial hyperplasia (CEH), appendicitis

Saowaphang Sanannu

Dr. Saowaphang Sanannu is the Head of Genomic Resource Center and a Zoo Veterinarian at the Animal Conservation and Research Institute under the Zoological Park Organization of Thailand. I'm responsible for conservation health care, with a focus on the health and well-being of animals.



DNA Speaks for Conservation: Tracking Genetic Diversity of Small Rodents in the Natural Habitat of Khon Kaen Zoo

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Khon Kaen Zoo is located within a national forest reserve, covering approximately 1,000 acres. Only one-third of the area is used for zoo operations; the rest is preserved for biodiversity conservation. To support its mission of nature-integrated management, the zoo initiated a genetic monitoring project focused on small mammal diversity. Between 2023 and 2025, 34 specimens of small rodents were collected from the natural forest area, comprising three species: Yellow Rajah rat (*Maxomys surifer*) (n=8), Indochinese ground squirrel (*Menetes berdmorei*) (n=4), and Finlayson's squirrel (Callosciurus finlaysonii) (n=22). Mitochondrial DNA (control region) analysis was conducted to assess genetic diversity. *C. finlaysonii* exhibited the highest genetic diversity, with six haplotypes related to populations from Japan and Southeast Asia. The Indochinese ground squirrel (*M. berdmorei*) showed three haplotypes closely related to those found in Myanmar. The Yellow Rajah rat (*M. surifer*) also exhibited three haplotypes, similar to populations in Vietnam. These findings suggest that small rodent populations within the zoo's natural habitat maintain notable genetic diversity, especially Finlayson's squirrel (*C. finlaysonii*), which may still preserve its ancestral population structure. The results also reveal potential natural dispersal routes and historical human-mediated introductions. This study underscores the ecological and evolutionary importance of localized genetic surveillance in conservation planning. The data provide valuable insights into regional biodiversity connectivity and support future efforts to protect genetic resources in semi-natural zoo environments.

Keywords: genetic diversity, mitochondrial DNA, small mammals, rodent, conservation genetics

Pornpan Kaentou

Pornpan Kaentou is a Researcher in the Conservation, Research, and Animal Health Department at Khon Kaen Zoo, under the Zoological Park Organization of Thailand. My role involves conducting molecular biology operations and managing the veterinary laboratory at Khon Kaen Zoo.

Identifying Risk Pathways for Tick-Borne Hemoparasite Introduction in Malayan Tapirs: A Participatory Qualitative Risk Assessment at Khao Kheow Open Zoo

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The Malayan tapir (*Tapirus indicus*), a reserved wildlife species in Thailand, is classified as endangered by the International Union for Conservation of Nature (IUCN). Captive breeding is crucial for conserving this species. Therefore, factors impacting its health can disrupt conservation efforts. Nowadays, the climate crisis may increase the risk of tick-borne diseases, with wild ungulates, as natural reservoirs of these pathogens pose transmission risks to captive wildlife. Many zoo ungulate species, for example tapirs, Eld's deer and rhinoceroses, have been reported to be affected by tick-borne hemoparasite infections, such as *Anaplasma* spp., *Theileria* spp., and *Babesia* spp. Some of these animals, such as the Malayan tapir, can develop severe clinical signs, which may lead to death. The effective management in disease prevention is crucial for these groups of endangered species. Qualitative risk assessment (QRA) is an effective initial step in developing a disease risk prevention plan. The first step of QRA is the identification of the disease risk pathway. This study aims to identify key risk pathways and engage multidisciplinary zoo staff, including veterinarians, curators, researchers, and keepers, to initiate the QRA of tick-borne diseases in captive Malayan tapirs at Khao Kheow Open Zoo, Thailand. A half-day workshop was conducted with 15 participants from the health, animal care, and research units of Khao Kheaw Open Zoo and the Animal Conservation and Research Institute. Using structured brainstorming and risk pathway diagrams, the group analysed the risk in three parts, including entry, exposure, and consequence. Preliminary findings highlighted possible entry routes (e.g., new animal arrivals, fomites), exposure risks (e.g., tick seasonality, density), and consequences such as health impacts, conservation loss, and economic concerns. Participants co-developed a draft shared risk pathway, which will inform the next workshop phase on risk estimation by using a risk matrix. This approach encourages cooperation among zoo departments and sets the stage for future disease prevention and management strategies.

Keywords: Qualitative risk assessment, Risk pathway, Tick-Borne Hemoparasite, Malayan Tapir

Pornsuda Khotapat
Pornsuda Khotapat (Numpueng) is a veterinarian at the Animal Conservation and Research Institute, Thailand, and a master's student in Zoo Animal and Wildlife Health Management at Mahidol University. Her research focuses on tick-borne diseases, wildlife disease surveillance, health management and risk assessment in captive wildlife.

Ex Situ Rearing and Breeding of Singapore's Native Coastal Horseshoe Crabs (*Tachypleus gigas*)

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The coastal horseshoe crab, *Tachypleus gigas*—currently listed as Data Deficient on the IUCN Red List of Threatened Species—is increasingly threatened by anthropogenic stressors. To assess the feasibility of captive breeding of *T. gigas* in an ex situ setting, this study examined the egg hatching success rates and subsequent survival and growth rates of *T. gigas* juveniles. A total of 1,303 fertilised eggs were collected from a mature mating pair of *T. gigas* housed in a controlled tank at the Singapore Oceanarium. Eggs were incubated for up to 35 days, where overall egg yield, hatching success, and embryogenesis development were recorded. Subsequently, hatched larvae were cultured at five temperature levels ranging from 26 to 30 °C to determine the optimum environmental conditions for promoting survival and growth of juveniles. Findings from this study will provide insights into establishing a framework for local *ex-situ* breeding of *T. gigas* to support future conservation and research efforts for the species.

Keywords: arthropod, ex-situ breeding, conservation breeding, culturing

Effects of Sun bear Enrichment on Pacing Behaviour

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One of the biggest issues with captive animals is the occurrence of stereotypical behaviour. To ensure the welfare of animals by encouraging species-specific behaviours, a study was conducted on three sun bears at the Singapore Zoo "Noi" (11 years old, female), "Ballu" (29 years old, male) and "Matahari" (23 years old, female) to examine the impact of food-based enrichment on behavioural changes. Two time periods were included in the study: baseline and provision of solution period. Sun bear behaviours were recorded using an ethogram that was divided into categories: Active, inactive, exploratory, self-maintenance, social, and undesirable. Baseline data showed greater abnormal behaviours and inactive behaviour than active behaviour. "Ballu" and "Matahari" showed an increase in active behaviour and a decrease in abnormal behaviours with the provision of enrichment devices; this included both newly introduced devices and combinations of pre-existing enrichment devices planned within an enrichment calendar to ensure no repetition of enrichment given to the sun bears. While "Noi", on the other hand, showed an increase in undesirable behaviours. In conclusion, employing a range of enrichment methods may help sun bears in captivity display less abnormal behaviour, as demonstrated by "Ballu" and "Matahari" achieving reductions in undesirable behaviours. However, as demonstrated in "Noi" cases, enrichment is not an answer to solving all the problems, instead the physical habitat or environment is another crucial consideration.

Keywords: Sun bear, stereotypical behaviour, enrichment

Asyiqin Yahya

Asyiqin is an Animal Care Staff Keeper working with sun bears at Singapore Zoo, Singapore. She strongly believes enrichment is not an "extra" but instead should be included as essential for the animal's daily life.

Detection of Feline Calicivirus Infection and Associated Clinical Signs in Captive Bengal Tigers (*Panthera tigris tigris*)

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Seventeen adult Bengal tigers (*Panthera tigris tigris*) with no prior history of feline calicivirus (FCV) vaccination were housed in the same area of a zoological facility. Initially, three tigers showed clinical signs, and FCV was detected in two of them through polymerase chain reaction (PCR) testing. Over the following 10 days, eight additional tigers presented with similar clinical signs, bringing the total number of symptomatic individuals to 11. Clinical signs observed among symptomatic tigers included tongue ulcerations (11/11), anorexia (9/11), lethargy (8/11), salivation (6/11), lameness (4/11), and yellowish diarrhoea (2/11). One individual also developed a localized cutaneous ulceration that took six months to heal completely. Supportive treatments were administered to affected individuals. All tiger enclosures were disinfected to limit further viral transmission. The mean duration for appetite and activity to return to normal was 5.3 days, while the healing of tongue ulcerations required more than three weeks. All symptomatic tigers ultimately recovered. Post-recovery serological testing using the ELISA method detected FCV-specific IgG antibodies in all 17 tigers, indicating 100% seropositivity and confirming widespread exposure to FCV. Additionally, FCV-specific antibodies were detected in asymptomatic African lions. Since the lions and tigers were maintained in different enclosure areas, indirect transmission was suspected. To reduce the risk of future outbreaks, routine disinfection and the separation of husbandry equipment between enclosures are important steps.

Keywords: feline calicivirus, tiger

Dr. Yiru Chen

Dr. Chen has served as a zoo veterinarian at Leofoo Safari Park since 2017 and is now the head of the veterinary department. She has accumulated clinical experiences ranging from avian to the megavertebrates.

Exploring the Fecal Microbiome of Rescued Chinese Pangolins (*Manis pentadactyla*) in Taiwan, Conservation

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In Taiwan, a proportion of Chinese pangolins (*Manis pentadactyla*) rescued and treated at the Wildlife Rescue and research center of the Taiwan Biodiversity Research Institute (TBRI) unfortunately succumbed despite receiving medical intervention. Retrospective analyses of necropsy reports indicate that malnutrition and emaciation are the most frequently observed clinical conditions among these individuals, with pneumonia and gastrointestinal disorders identified as the principal causes of mortality. To elucidate the potential association between gastrointestinal pathology and gut microbiota composition in pangolins, this study employed 16S rRNA gene sequencing to analyse the microbial communities present in initial faecal samples collected from rescued individuals. Preliminary findings revealed the presence of not only previously characterised microbial taxa but also unique and hitherto undocumented gut microorganisms. Subsequent investigations will aim to further characterise the biological properties and functional roles of these novel microbes. These findings provide essential baseline information on gut health in pangolins under human care. In the future, comparative analyses of gut microbiota composition may inform dietary planning and husbandry strategies to enhance the survival of pangolins in captivity, offering valuable insights for practical *ex situ* conservation efforts.

Keywords: Chinese pangolin, Fecal, microbiome

Ada Fang-Tsui Liang

Ada is a rehabilitator at the Taiwan Biodiversity Research Institute. Her work focuses on the rescue, rehabilitation, and conservation of native species, with a particular interest in the Chinese pangolin (*Manis pentadactyla*). She is currently investigating the gut microbiome of rescued pangolins to improve captive care and long-term survival. In her free time, she enjoys talking to pangolins—even though they rarely respond.

Making the Okapis Feel Right at Home

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Zoos transfer animals for various reasons, namely for species management, and its role in wildlife conservation. Though common practice, it is undeniable that this process—from documentation to the actual move, and to helping the animals settle into their new home—is complex, tedious and can be stressful for both animals and the people involved. The Okapi (*Okapia johnstoni*) is a highly sensitive species classified as endangered in the wild. With the opening of Rainforest Wild (Africa), four individuals were brought over to Singapore from different institutions in Europe to be exhibited for the first time in Southeast Asia. This exchange presented us with a unique opportunity to educate the public about the species; it also allows us to contribute to a demographically stable and genetically diverse *ex situ* Okapi population. While Okapis typically inhabit rainforests, the four that arrived were born and bred in countries where the climate, and therefore the feed types available, are distinctly different. This poster aims to share the behind-the-scenes work that we undertook to help the Okapis settle into warm and humid Singapore. Various aspects of the husbandry preparatory process i.e., diet transition to our local produce and forage will also be covered. The insights gained from this transfer can hopefully help further our collective knowledge on how we can better support animal welfare when acclimatising large hoofstock to new environments.

Keywords: animal transfer, Okapi, acclimatization

Lee Jia Yan Gladys

Gladys is a Deputy Head Keeper working with the Okapis at Rainforest Wild (Africa), Singapore. She has worked with various small mammal species throughout her career in Mandai, but has never forgotten her love for *Giraffids*. She is keen to further her knowledge and understanding of animal behaviour and welfare.

Vasectomy as a Welfare-Oriented Population Management Tool in Zoological Collections: A Case Report in a Red-Tailed Boa

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This report describes the first vasectomy performed in a red-tailed boa (*Boa constrictor constrictor*) in South Korea, conducted at Uchi Zoo. The adult male (4.2 kg) was originally an illegally smuggled individual that was rescued and provided with appropriate care. After the introduction of a resident female, frequent mating behaviour raised concerns about uncontrolled breeding and potential overcrowding. As Uchi Zoo serves as a sanctuary for rescued and displaced animals, population control was necessary to ensure sustainable management and future rescue capacity.

Male neutering in snakes is technically challenging due to their elongated body and intra-coelomic testes. Preoperative imaging using CT, radiography, and ultrasonography was used to localise the testes, with ultrasonography providing the most accurate identification. Anaesthesia was induced with alfaxalone and medetomidine, followed by isoflurane inhalation and intermittent positive pressure ventilation. Vasectomy was performed via a left lateral coeliotomy. Postoperatively, the snake recovered uneventfully with normal feeding and no complications during a one-month follow-up.

This case demonstrates the feasibility of vasectomy in large snakes and highlights its potential as a welfare-oriented population management tool in zoological institutions.

Keywords: Vasectomy, Boa constrictor, Ultrasonography

Hajin Jeong
Hajin Jeong, DVM, is the Head Veterinarian at Uchi Zoo, a national hub zoo in South Korea. She led the renovation of the zoo's animal hospital in 2022 to enhance veterinary care. Jeong also oversees the animal care team and is committed to applying principles of animal well-being and end-of-life care to foster a welfare-centered zoo environment.

Reconstructive Surgery of the Chelonian Plastron: Techniques and Challenges in Artificial Shell Fixation

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The plastron is essential for organ protection, weight-bearing, and infection prevention, making it a critical factor in animal welfare. However, due to its bony nature, it has very limited self-healing capacity. In particular, congenital defects often require surgical intervention for long-term survival, yet veterinary approaches to such cases have been rarely reported. This case report describes the customized prosthetic reconstruction of a congenital plastron defect in a Sulcata tortoise (*Centrochelys sulcata*, CITES Appendix II). Surgical objectives included lesion protection, prolapse prevention, and defect gap reduction. A customized prosthetic plastron was fabricated using resin, acrylic bond, and putty. The prosthesis was designed as a screw-fixed, openable structure to allow regular postoperative inspection and maintenance of internal tissues. The adhesion surface was roughened to enhance bonding, and putty sealing was applied to minimise tissue toxicity and ensure close contact between the prosthesis and surrounding tissues. Long-term follow-up confirmed structural stability and functional preservation, with the tortoise exhibiting normal behaviour and appetite. This case demonstrates the feasibility of surgical reinforcement for congenital plastron defects and provides a useful reference for future prosthesis design and surgical applications in chelonians.

Keywords: Artificial plastron, resin, acrylic bond, putty

Juwon Kang

Juwon Kang, DVM is the Veterinarian at Uchi Zoo, a national hub zoo in South Korea. He is a zoo veterinarian specializing in wildlife and rare species care and surgery (ex. Lion flank approach surgery, Asiatic black bear laparoscopic surgery, ring-tailed lemur radius and ulna fracture surgery.

Caring for, Raising and Breeding of the Kagu in Bird Paradise

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In 2025, Mandai Wildlife Group became one of a few zoological institutions worldwide to successfully breed the endangered Kagu (*Rhynochetos jubatus*). Notorious for being difficult to breed in human care, the keepers were heavily invested in encouraging and facilitating breeding behaviours since the parent birds arrived from Yokohama Zoo in 2023. In 2024, the pair laid two eggs but failed to incubate them in separate clutches, leading to a decision to artificially rear the third egg to maximise its chances of survival. Kiara, named after a public vote, hatched on 1 March 2025 after 25 days of incubation. This paper will cover, (1) the process of caring for and facilitating breeding in an adult pair of Kagus, (2) the failed and successful attempts of egg incubation in the said pair, and (3) the steps taken to successfully artificially rear a Kagu from an egg to an independent juvenile. With an estimated *ex situ* population of 50 birds, every successful hatch represents a valuable opportunity to contribute to the limited scientific knowledge of these rare birds, especially in the field of animal care.

Nickholas Thomas

Nickholas is a keeper at Bird Paradise, Singapore who cares for the birds in Winged Sanctuary, which houses birds prioritised for breeding and have high conservation value. His favourite birds are the Galliformes, especially the domestic varieties, and he has an interest in interacting with and educating guests at the park.

Gastrointestinal Stasis in the Natuna Island Surili (*Presbytis natunae*): A Clinical Case and the Urgent Need for Feeding Ecology Research

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A case of gastrointestinal stasis was diagnosed in a female Natuna Island Surili (*Presbytis natunae*), a leaf-eating monkey endemic to Natuna Island. The Natuna Island Surili was a new specimen in Taman Safari Bogor that was originally confiscated by the authorities from an individual illegally possessing the animal as a pet, and then transferred to Taman Safari Bogor for care and rehabilitation. Clinical findings were documented as anorexia, lethargy, and the evidence of small amounts of feces found on the enclosure. The animal was then sedated with Zoletyl (3 mg/kg) for a comprehensive examination. Physical examination revealed a distended and tense abdomen while radiographic imaging identified a severely enlarged stomach filled with semi-radiolucent material, exerting pressure on the *diaphragma* and heart. Initial attempts at gastric lavage via nasogastric tube (size 14 Fr) were unsuccessful because the gastric contents were too solid to pass through the tube. The animal then prescribed with Metoclopramide (0.4 mg/kg b.i.d), Meloxicam (0.1 mg/kg), Probiotic *Lactobacillus acidophilus*, fish oil, normal saline intravenous fluid, Vegeta (psyllium fibre), and a change to a fibre-rich diet, with an increase in the variety and amount of forage. A follow-up after 1 week attested the successful treatment by regaining normal digestive function and found no gastric mass on radiographic examination. This underscores the digestive sensitivity of colobine primates such as the Natuna Island Surili, whose specialized folivorous diet requires careful dietary management. Currently, no formal research exists on the feeding ecology of this endemic species. Dedicated studies are urgently needed to establish baseline dietary profiles and prevent the recurrence of gastrointestinal disorders both in captivity and *in situ* conservation settings.

Keywords: Natuna Island Surili, gastrointestinal stasis, leaf-eating monkey diet

Anindito Agung Nugroho

Anindito is a Veterinarian at Taman Safari Bogor who has worked in the field for 4 years. He is interested in primate medicine, and zoo animal & wildlife anesthesia. He is also Animal Welfare Team for Taman Safari Bogor.

A First Reported Case of Polyostotic Fibrous Dysplasia in Black Tree Monitor (*Varanus beccarii*) in Taman Safari Indonesia Bogor

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A male adult Black Tree Monitor lizard (*Varanus beccarii*) was presented with sudden swelling of the left front limb of the animal. On palpation, the area had hard consistency, and there was no change in temperature compared to the rest of the body. Radiographic examination of the limb revealed a radiopaque mass around radius and ulna, with the bones appearing to be thinning. The initial diagnosis was either pyomyositis or inflammation of the muscle with an abscess, leading to treatment with a minor surgical procedure to find and drain the abscess. Upon incision, no abscess was identified; instead, tissue enlargement was observed. The initial incision was then closed using sutures, and the animal was prescribed with Meloxicam (0.2 mg/kg), Ceftriaxone (20 mg/kg), Dexamethasone (intralesion 0.2 mg/kg, once). Over the three weeks prior to the procedure, additional masses had grown rapidly and started to appear in other parts of the animal's body such as on the chest, hind limb, and neck. Radiographic imaging was repeated to reassess the masses, and it shows in the radius ulna a severe osteolytic lesion with loss of bony details. Additional smaller masses were found in other bones such as the ribs, femur, and the hyoid bone. Because of the location and malignancy of the masses, it was decided to humanely euthanize the animal. Following post-mortem examination, the growth of masses were observed to originate from bone and became a sphere-shape, appearing white, homogenous, fibrous, firm in consistency, and fairly avascular. The tissue samples were collected and sent to a pathologist at PSSP Laboratorium, where they were diagnosed as Polyostotic Fibrous Dysplasia. Fibrous dysplasia is rare amongst reptiles, but may have hereditary properties. Currently, there is no effective treatment for Fibrous Dysplasia other than removal of the affected bone. More advanced and accurate diagnostic imaging, such as CT Scan, can help to diagnose this condition earlier so it can be treated early before it spreads.

Keywords: black tree monitor lizard, swelling, mass, fibrous dysplasia

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Epidemiological Situation of Dugong Stranding in the Andaman Sea of Thailand between 2019 and 2024

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Dugongs (*Dugong dugon*) are strictly herbivorous marine mammals that feed on seagrass and play an important ecological role in marine ecosystems. Dugong populations in Thailand are estimated at 240. They are distributed across both coastal areas along the Gulf of Thailand and the Andaman Sea, with the majority of the population living in the Andaman Sea. Between January 2019 and December 2024, 161 dugong stranding detections were recorded in the Andaman Sea region of Thailand. The sources of detection included government officers and the public, such as villagers, fishermen, and tourists. The temporal trends showed a seasonal pattern in the monsoon season relative to the non-monsoon season, particularly in 2023 and 2024. As the percentage of dugong stranding detections involving animals with reduced intake food showed an increase in underweight dugongs (<3% body weight); an increase in the number of emaciated stranded dugongs was also observed. This trend is likely related to the degradation of seagrass since 2019. We aim to investigate the epidemiological situation of dugong stranding to enhance our understanding of dugong stranding detection and management within the system. However, in order to comprehend the dugong stranding situation and to evaluate its causes—utilising the surveillance and monitoring system to develop solutions. This reporting system must clearly identify the gaps in the underlying causes of dugong strandings and their associated factors.

Keywords: Dugong stranding detection, Andaman Sea of Thailand, Epidemiology

Dr. Piyarat Khumraksa

Dr. Piyarat Khumraksa is a veterinarian at the Marine and Coastal Resources Research Center (Lower Andaman Sea), Department of Marine and Coastal Resources, based in Trang Province, Thailand. With over five years of experience, she specializes in the rescue, rehabilitation, and health monitoring of marine mammals and sea turtles, with a strong interest in conservation medicine and stranding investigations.

Retreat to Progress: Using Distance as a Reinforcer in Primate Introductions

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This case study explores the integration of Eastern black and white colobus monkeys (*Colobus guereza*) with L'Hoest's monkeys (*Allochrocebus lhoesti*) in a mixed species exhibit at Primate Kingdom in Singapore Zoo. The project aimed to support animal welfare, enhance guest experience, and promote education through dynamic interspecies displays. The integration involved carefully structured introductions, with food used as a positive reinforcer and distance as a negative reinforcer to increase interspecific interactions.

This use of distance consequently helped reduce escape-driven behaviour and supported gradual re-approach to the shared exhibit space. Over time, repeated daily introductions using both positive and negative reinforcement led to improved tolerance. Although affiliative behaviours were not observed, the animals successfully co-occupied the exhibit space without incident.

This integration highlights the complexity of interspecies dynamics in captivity. It also demonstrates the value of applying both positive and negative reinforcement to support animal agencies, build trust, and improve long-term welfare outcomes within mixed species exhibit design.

Sathia Ponnusamy

Sathia has been working in Singapore zoo for 8 years as an Animal keeper, He has worked closely with new world Primates, Colobine monkeys, lemurs, Tamarins & Baboons. His areas of interest are training and conditioning of the primates

Faridah Hanum Ramdali

Faridah has been working in Singapore Zoo for 2 years. She works closely with new world Primates, Colobine monkeys, lemurs, Tamarins & Baboons. Her areas of interest are enrichments & animal diets, of the primates.

The Role of *Ex Situ* Centers in Protecting Regional Wild Pig Species from ASF

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Southeast Asia (SEA) is extremely high in biodiversity, including 11 endemic wild pig species, of which 9 are threatened with extinction. While some SEA pig species have *ex situ* populations listed on ZIMS, many do not.

Ex situ conservation efforts should prioritise species restricted to few islands, with low in population, and absent from global zoos, such as the Mindoro warty pig, Palawan bearded pig, Togean babirusa, Sulawesi warty pig, and Bawean warty pig. However, given ASF's threat to all SEA pigs, *ex situ* conservation is crucial for all of them. ASFv has significantly increased extinction risk, but viable *ex situ* populations can preserve genetics and support population restoration.

While some species, such as the Visayan warty pig and Sulawesi babirusa already have substantial *ex situ* breeding populations, others have small, single-island, or no *ex situ* populations. With SEAZA institutions' growing capacity, it is an opportune time to establish and maintain *ex situ* populations within the region to support *in situ* conservation through breeding programs, restoration, and reinforcement.

Matt Ward
Matt is the executive director of the Talarak Foundation Inc. conservation NGO in the Philippines. Along with conservation of the Visayan warty pig, the Talarak Foundation have taken on all Philippine wild pig species as priority conservation targets in this time of heightened threat to these species. Matt is also a member of the IUCN Wild Pig Specialist Group, and represents Philippine wild pigs at regional meetings on ASF and conservation needs.

Imagining Paradise: Re-Creating Wildlife Habitats

Keryn Ng
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The concept of the new Bird Paradise is built upon the legacy of the Jurong Bird Park. Habitats are designed in the form of large walk-in aviaries with free-flying birds; other zones will be largely open-air spaces. These aviaries are designed to reproduce the natural environment of the biome they represent, so as to encourage the display of natural behaviours of the species within the collection.

Each exhibit features the diverse landscape found in the geographical regions of the habitat. Visitors will be able to experience the biotopes of tropical rainforest, marshy wetlands, dry forest and coastal forests worldwide.

Keywords: Zoo design, Wildlife attraction design, eco-tourism

Keryn Ng

Keryn is a Nature-based attraction designer with Mandai X, developing and designing Eco-tourism and wildlife consultancy projects worldwide. Having completing her Masters in Architecture in NUS. Her work focus for the past 10 years was developing this world class attraction from conceptualising, designing, construction and to the opening of the parks.

Uniting Forces to Save The Gibbons: A Multidisciplinary Alliance to Critically Address Small Ape Trafficking in Asia

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Although small apes, including gibbons and siamangs, are prohibited from international trade under CITES Appendix 1, they are being increasingly trafficked through the porous borders of Malaysia, Indonesia, Thailand, and India. This is exacerbated by weak cross-border coordination. Alarmed by this trend, the Save the Gibbons Alliance (SGA) was formed to establish a multi-stakeholder platform—bringing together scientists, *in-situ* and *ex-situ* conservationists, journalists, government agencies, and civil society organisations to address all aspects of the gibbon trafficking chain and drivers of demand. SGA aims to break barriers between disciplines and countries while synergising conservation, welfare, education, advocacy, and policy approaches to improve the protection of wild and confiscated gibbons. SGA plans to launch an international campaign that facilitates multi-sector knowledge-sharing, joint action for policy advocacy, and serves as a unifying tool with cohesive narratives to foster regional solidarity and ensure cross-border gibbon protection is sustained, informed, and inclusive. This campaign aligns with SEAZA's commitment to advancing wildlife and habitat conservation, fostering ethical animal welfare standards, and public education. SGA invites SEAZA members to collaborate with local authorities and grassroots organisations through this alliance to advocate against keeping gibbons as pets and to celebrate them with national pride in their native countries.

Keywords: gibbons, trafficking, regional collaboration

Koh Jieh Long

Koh is a Coordinator working with different stakeholders to facilitate cross-sector collaboration. His main interests include the intersection of primate conservation, research, and welfare; wildlife rehabilitation and release; and the evolution of foster care and adoption behaviour in primates.

Supporting Veterinary Care: The Role of Veterinary Nurses During Health Checks in California Sea Lions (*Zalophus californianus*)

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SeaWorld Yas Island Abu Dhabi (SWAD) manages a large population of California Sea Lions (*Zalophus californianus*), each undergoing biennial health checks under general anaesthesia (GA) to support early disease detection and ongoing health monitoring. While many institutions rely on voluntary physical exams, fully anesthetized assessments are less commonly performed—likely due to the demands of animal training, anaesthesia risks, technical complexity, and staffing requirements. These challenges emphasise the crucial role of veterinary nurses and technicians, who contribute significantly to procedural safety, clinical efficiency, and reduced veterinarian workload.

At SWAD, a commonly used sedation protocol includes Medetomidine (0.04 mg/kg), Butorphanol (0.2 mg/kg), and Diazepam (0.15 mg/kg) administered intramuscularly (IM). Sedation and dosage decisions are tailored by the veterinarians based on each animal's condition. Reversal agents are prepared in advance, Atipamezole (0.3 mg/kg), Naltrexone (0.2 mg/kg), and Flumazenil (0.02 mg/kg) are given IM post successful induction. Following intubation with size-appropriate endotracheal tubes, end-tidal CO_2 is continuously monitored using an EMMA™ Capnograph (Masimo, California, USA). Intermittent Positive Pressure Ventilation (IPPV) is delivered either manually or via a ventilator, with airway pressure maintained around 20 cmH_2O,, and not exceeding 30 cmH_2O. Sevoflurane is used for anaesthesia maintenance, typically under 6% concentration.

Thermal support is critical due to the risk of hypothermia in pinnipeds under GA. Heat pads and forced-air warming devices, (e.g., Bair Hugger™, 3M Company, Minnesota, USA) are used to maintain normothermia. Veterinary nurses and veterinary technicians assist with patient positioning for diagnostics (e.g., radiography), blood sampling (e.g., jugular or caudal gluteal veins), and overall monitoring.

During recovery, vital parameters—particularly $ETCO_2$—are closely monitored to ensure adequate respiration. Intermittent Positive Pressure Ventilation continues until spontaneous breathing resumes, and thermal support is maintained throughout recovery to facilitate smooth emergence from anaesthesia.

Keywords: physical exam, anaesthesia, California sea lions, veterinary nurse

Supporting Respiratory Recovery: Controlling Fungal Contamination in Nebulizer Equipment for Cetaceans

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Respiratory fungal infections, such as those caused by *Aspergillus* spp., represent a significant health concern in managed dolphin populations. Nebulization is a direct and effective method for delivering antifungal agents to the respiratory tract; however, inadequate disinfection of nebulizer equipment can compromise both treatment efficacy and animal safety. We highlight the importance of rigorous cleaning protocols to prevent cross-contamination during antifungal therapy.

At SeaWorld Yas Island, Abu Dhabi, one clinical case involving a bottlenose dolphin (*Tursiops truncatus*) diagnosed with a respiratory Aspergillus spp. fungal infection, nebulized antifungal therapy was initiated. Concurrently, a second case involving *Cunninghamella* spp.—a rare but aggressive fungal pathogen—highlighted the need for stringent disinfection control. Swab samples from nebulizer components were collected and cultured to evaluate the effectiveness of various disinfectants. Based on the findings, the facility's cleaning protocol was revised to minimise contamination risks and ensure consistent therapeutic delivery.

The updated protocol includes full disassembly of all nebulizer components, followed by thorough scrubbing using a 1:25 dilution of Safe4 Odourless Disinfectant Cleaner © (Safe Solutions, Winsford, England) with a minimum contact time of five minutes. Parts are then rinsed with distilled water and dried completely using a paper towel or hair dryer—avoiding air-drying, which may promote fungal growth. Dedicated nebulizers are assigned to individual animals, and staff are required to wear gloves and masks throughout the cleaning process. Nebulizer storage containers are disinfected with a 1:25 dilution of Dettol Antibacterial Antiseptic Disinfectant ©, (Soap and Chemicals Industrial & Trading Co., Sharjah, United Arab Emirates), which laboratory testing confirmed to be effective against fungal pathogens.

These findings reinforce that strict nebulizer hygiene is not only best practice but essential for the successful management of respiratory fungal infections.

Keywords: bottlenose dolphin, respiratory fungal infections, Aspergillus spp., Cunninghamella spp., disinfection, nebulizer

Yunnan Baiyao Powder Topical Administration on Wound Healing in Wildlife

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Yunnan Baiyao (YB) is a Chinese herbal supplement with documented hemostatic properties. Additionally, it has been reported to have anti-inflammatory, anti-bacterial, and wound-healing properties, prompting physicians and veterinarians alike to employ it in various hemorrhagic and pathological conditions. Despite this, literature regarding the use of the drug in exotic and wildlife medicine remains limited.

Based on previously noted effects of topically administered YB on wound healing, we performed a pilot testing on various species of animals within the zoo, including but not limited to: large felids (*Panthera tigris tigris, Panthera leo, Panthera pardus kotiya*), canids (*Lycaon pictus, Canis lupus familiaris*), ungulates (*Bubalus bubalis, Equus asinus, Sus philippensis*), primates (*Macaca nigra, Macaca nemestrina, Hylobates lar*), and lagomorphs (*Oryctolagus cuniculus*). Wound healing was effectively achieved across all these species, prompting the conduct of a more formal study to further evaluate the effectiveness of Yunnan Baiyao (YB) powder as an alternative topical wound treatment.

To support our pilot study, we examined YB's effects on wound healing time and wound morphological characteristics, including re-epithelialization, hemostasis, and inflammation in rats (*Rattus norvegicus*). Administration of topical YB resulted in significantly shorter wound healing times, reducing both the inflammatory response and the time to achieve hemostasis and wound closure. These results highlight the utility of YB as a viable alternative to other commercially available wound treatment medications for zoo animals. Pending further studies on other wound healing parameters and toxicity, YB can be included as an option in wound treatment protocols for wildlife.

Mico Adrian S. Apelario Ong

Mico is a Veterinarian in charge of the Mammalogy and Herpetology department in Avilon Zoo. His main interests include reptiles, large carnivores, and befriending every animal he encounters. He is also the head of the Veterinary Internship Program of Avilon Zoo.

Singapore Oceanarium's Approach to Bowmouth Guitarfish Reproductive Care and Management

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Listed as a critically endangered species on the IUCN red list, the global *Rhina ancylostoma* (Bowmouth guitarfish) population is threatened by overfishing, habitat loss, and low reproductive rates. In an effort to contribute to the conservation efforts for the declining population, the Singapore Oceanarium has been working on improving the species breeding and management plan, as well as the husbandry practices for the species. Nutrition is a key aspect of animal husbandry during their juvenile stage and is crucial for their health and development. Proper management is required in the selection of initial food types and the stimulation of good feeding habits in the bowmouth guitarfish pups. As they mature, diversifying their diet is paramount in ensuring a nutritious diet, and creative methods are implemented to encourage acceptance of new food types and prevent mono-diet habits. The Singapore Oceanarium has developed approaches to provide a species appropriate and nutrient rich diet, ensuring the pups' health and growth. This presentation offers insights into Singapore Oceanarium's husbandry practices towards the bowmouth guitarfish, and more importantly, sharing the strategies used to promote optimal health and growth through tailored feeding and nutrition plans.

Role-Based Approach in Aquarium Population Planning

Laurent Pong

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Singapore Oceanarium's Institutional Collection Plan (ICP) applies a role-based framework to guide sustainable marine population management, aligning with the Association of Zoos and Aquariums (AZA) standards and the IUCN/SSC Guidelines on the Use of *Ex situ* Management for Species Conservation (2014). Using the IUCN SSC Conservation Planning Specialist Group's ICAP workshop model, each species is assigned defined institutional roles—conservation, research, and education—based on natural history, demography, welfare, and habitat compatibility. This living, taxa-organized plan combines strategic priorities with reactive flexibility, ensuring transparent, science-based planning for long-term marine population sustainability.

Keywords: collection planning, population management

Laurent Pong

Laurent serves as Assistant Manager of Population Sustainability at Singapore Oceanarium, where he leverages his aquarium expertise to drive sustainable animal collection practices. Under the guidance of Salam Marikan, a seasoned expert in zoo population management, Laurent is facilitating a comprehensive review of the Oceanarium's species collection. This initiative aims to integrate holistic role-based zoo population management strategies into aquarium settings, fostering new perspectives and best practices in animal care and conservation.

Evidence-Based Collection Planning and Population Management: Longitudinal Analysis of Indian Zoo Populations to Strengthen Conservation-Oriented *Ex Situ* Programmes

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Collection planning and conservation breeding are among the key tenets of *ex-situ* conservation. Collection planning ensures that a zoo's species holdings are strategically aligned with conservation priorities, available resources, and institutional strengths, while conservation breeding focuses on the coordinated management of priority species to maintain viable and genetically healthy populations. Both depend on a clear understanding of population trends to guide effective planning. To provide an evidence base for both collection planning and conservation breeding in Indian zoos, we analysed 27 years (1995–2021) of inventory records from recognised facilities, covering 214 species from four vertebrate classes and 27 taxonomic orders. The data included births, deaths, acquisitions, transfers, and sex ratios for each species. Long-term trend analysis showed that while populations in 20 orders have increased, seven have declined, with the remainder stable. Population growth varied widely, with some taxa showing steady recruitment and others facing stagnation or decline. Mortality rates and survival probabilities also differed substantially between orders. We compared these demographic patterns with housing arrangements and species distribution across Indian zoos to identify potential drivers of population dynamics. The findings were indicative of small or restricted founder bases, gaps in pedigree records, unmanaged rescued or colour-morph individuals, fragmented, low-density holdings, and facilities that were not fully aligned with the ecological and behavioural needs of the species. For collection planning, these findings point to the need to rationalise species holdings using clear metrics such as effective population size, recruitment rates, geographic clustering, and enclosure suitability, ensuring that resources are directed towards species that can be maintained sustainably. For conservation breeding, they highlight the need to re-evaluate the current priority list using objective, conservation-driven criteria (such as IUCN's five-step *ex situ* decision process). They also underline the importance of strengthening genetic and demographic management and implementing structured, collaborative breeding plans under expert mentorship. Integrating such evidence-based approaches into both collection planning and conservation breeding will enable Indian zoos to shift from institution-focused management to a coordinated, network-wide strategy. This will allow all priority species to be managed as metapopulations that are sustainable and contribute directly to *in situ* species conservation.

Keywords: Collection planning, Population management, Conservation breeding, Metapopulation management, Ex situ–in situ integration, India

Life After the Nursery: Reintroducing a Hand-Reared Orangutan to His Own Kind

A Case Study from Gembira Loka Zoo

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This presentation shares a detailed case study of "NOA", a Kalimantan orangutan successfully hand-reared from infancy to his current age of three years. Initially abandoned by his mother and requiring intensive human care, NOA's development was shaped significantly by close human interaction, particularly during the COVID-19 pandemic, during which animal care teams provided continuous one-on-one nurturing. A special outfit was designed to be worn by NOA's caretaker, mimicking an orangutan mother, allowing him to learn to grip and climb from an early stage.

While hand-rearing ensured his survival, it also created unique challenges to return to its introduction with other orangutans. Early attempts to reintroduce NOA to adult orangutans were met with signs of stress and withdrawal, highlighting the complexities of transitioning a human-bonded primate to conspecific companionship. This case shares the reintroduction strategy developed to address these behavioural hurdles, including gradual visual contact, controlled proximity sessions, and positive reinforcement techniques.

Over time, NOA adapted to shared spaces and interactions, showing increasing independence, reduced stress behaviours, and successful social engagement with a more mature young orangutan companion. This case underscores the delicate balance between life-saving human intervention and fostering natural behaviours, offering insights into best practices for primate rehabilitation and long-term welfare in captivity.

Leonardo Niko Tirtono, MSc.

Leonardo Niko Tirtono is a curator at Gembira Loka Zoo, overseeing zoological operations and animal welfare. He holds a BSc in Zoology from the University of Bristol and an MSc in Zoology (Conservation) from Manchester Metropolitan University. Niko is passionate about wildlife conservation and dedicated to advancing best practices in animal care.

Case Study: Tail Amputation on a Tiger Due to Self-Injury at Saigon Zoo

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The case study report on an injury case involving an Indochinese tiger at Saigon Zoo during enclosure renovation. On December 2nd, 2024, staff discovered that an Indochinese tiger, currently in care at the Saigon Zoo, had lost a portion of its tail. The possibility of injury caused by the enclosure was ruled out. During the initial treatment phase, the wound showed positive signs of drying and healing. The animal did not lick the wound; there was no spreading of the injury, and the tiger continued to eat and behave normally. However, after 10 days of treatment, we observed self-inflicted biting at the tail tip, resulting in further tail loss and injuries to both hind limbs. The animal was anesthetized for a thorough health examination and wound treatment. This case has provided valuable experience in the managing open wounds in large wild animals under controlled care conditions. It also serves as a reminder of the potential negative impacts that enclosure renovations can have on the animals' mental health.

Keywords: tiger, case study, mental health, self-injury

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The Parthenogenesis of Komodo Dragon (*Varanus komodoensis*) at Lembang Park and Zoo

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Komodo dragons (*Varanus komodoensis*), the world's largest lizard and endemic to Indonesia, are listed as Vulnerable by the IUCN Red List due to the increasingly fragmented wild populations. Although Komodo dragons are maintained in various conservation institutions, successful breeding is rare. Notably, this species is capable of facultative parthenogenesis, enabling it to switch between sexual and asexual reproduction depending on male availability. Parthenogenesis is a reproductive process where offspring are produced without male fertilisation, which is uncommon among vertebrates.

Lembang Park and Zoo houses one adult female Komodo dragon named Teten, who has been in captivity since 2020 and has never been paired with a male. In September 2024, Teten laid 14 eggs; only three were in good condition. After prolonged observation, two eggs were confirmed viable and hatched successfully, with the juveniles growing healthily. This achievement reflects Lembang Park and Zoo's commitment to conserving protected and non-protected species, contributing meaningfully to broader conservation goals.

Given the limited knowledge on Komodo dragon parthenogenesis, this case provides valuable insight for the conservation community and SEAZA members, advancing understanding of this rare phenomenon.

Keywords: Komodo dragon, Parthenogenesis, Population Management

Arie Septiandi

Arie is an Animal Keeper working with reptiles, including Komodo dragons, at Lembang Park and Zoo. His main interests include animal life sciences and research. He also serves as Head Keeper of the Reptiles Department.

Captive Breeding Management of Double-Wattled Cassowary (*Casuarius casuarius*) at Lembang Park and Zoo

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The Double-Wattled Cassowary (*Casuarius casuarius*) is experiencing an alarming population decline due to habitat loss and hunting, prompting the captive management industry to prioritise its conservation. Limited knowledge of cassowary breeding behaviour necessitates greater research and understanding to improve reproductive success in managed care. This study aims to provide insights into optimal breeding conditions and timing, drawing from the successful captive breeding of the Double-Wattled Cassowary at Lembang Park and Zoo.

Keepers, who alternated shifts, collected data through direct observation to monitor courtship, breeding, and parental interactions. Observed breeding behaviours were consistent with those reported in theoretical literature. Factors contributing to breeding success included timing, nutrition, housing, and temperature management. Aggressive females were found to be more approachable during the breeding period, and cassowaries preferred sweet fruits alongside increased protein intake during this season. Environmental conditions recorded at Kabupaten Bandung Barat during the breeding period included a minimum humidity of 37% and a maximum of 97% in April, 39–97% in May, and 44–97% in June. Temperatures ranged between 21°C and 24°C. These conditions supported the successful hatching of one chick on 27 June, representing a positive step towards improving *ex situ* conservation outcomes for the species.

Keywords: Double-Wattled Cassowary, Breeding management, Captive breeding

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Hendra is an Animal Keeper working with birds, including the Double-Wattled Cassowary, at Lembang Park and Zoo. His main interests include animal life sciences and research. He also serves as Head Keeper of the Aves Department.

Age Estimation of Malayan Tapir Calves Based on Coat Colour Transition

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Accurate age estimation is crucial for the effective conservation, rehabilitation, and management of Malayan tapirs (*Tapirus indicus*), particularly for rescued or orphaned calves. At birth, these calves display a distinctive striped and spotted coat that provides camouflage in their forest habitat, gradually transitioning to the adult black-and-white coloration within a few months. Despite its potential as a non-invasive indicator of age, the timing and sequence of this coat colour change have not been systematically documented. This study aimed to establish a visual age estimation method by recording coat transition stages in eight captive-born calves monitored from birth to complete adult coloration. Four distinct stages were identified: onset of fading, peak fading intensity, loss of dorsal pattern, and full adult coloration. On average, fading began at 53 days old (range 47–62 days), reached peak intensity at 68 days (61–80 days), dorsal pattern loss occurred at 75 days (72–83 days), and full adult coloration was achieved at 95 days (90–106 days). Light residual patterns on the chest and ventral body persisted beyond this stage but were not considered significant. The consistency of these transition timelines suggests they can serve as reliable visual benchmarks for estimating the age of calves with unknown birth dates. This finding provides a practical, non-invasive tool that can enhance field assessments, rehabilitation planning, and conservation strategies for this endangered species.

Keywords: Malayan tapir, coat colour transition, age estimation, juvenile coat pattern, parental origin, wildlife rehabilitation

Donny Yawah

Donny Y., a Veterinarian in the Department of Wildlife and National Parks, Peninsular Malaysia has over a decade of experience in Malayan tapir conservation. He contributes to the Malayan Tapir Conservation Action Plan, participates in regional and national conservation forums, and integrates research findings into captive management and health monitoring.

Cerebral Xanthomatosis in a Captive Chinese Water Dragon (*Physignathus cocincinus*): A Case Report

Chia-Yu Kao[1], Wen-Ta Li[2], and Chieh Lo[1]

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In April of this year, a captive adult female Chinese water dragon (Physignathus cocincinus) presented with neurological signs, including lethargy, anorexia, ataxia, and stargazing posture. Blood examinations and radiographs revealed no significant abnormalities. Supportive treatment was administered, including antibiotics, B-complex vitamins, anticonvulsants, analgesics, and corticosteroids; however, no clinical improvement was observed, and the animal died two months later.

Gross and histological examinations revealed granulomatous inflammation with cholesterol clefts affecting the cerebral parenchyma, suggestive of cerebral xanthomatosis. Cerebral xanthomatosis causes compression of the cerebral parenchyma and thereby induces neurological signs and eventual death. Xanthomatosis has been reported in various reptile species. Currently, antemortem diagnostic methods of cerebral xanthomatosis are limited, and a definite diagnosis mainly relies on postmortem pathological examination. Although the etiopathogenesis of xanthomatosis in reptiles is not fully elucidated, xanthomatosis may be caused by or associated with potential factors such as nutrition, trauma, and endocrine disorders. Based on these potential factors, further discussion will focus on nutritional and environmental influences in the Xpark aquarium.

Keywords: Xanthomatosis, Chinese water dragon, cholesterol clefts, granulomatous inflammation

Chia-Yu Kao

Chia-Yu worked as quarantine vet at Taipei Zoo from 2020 to 2021. Then, he works at an aquarium, Xpark, until now.

Analyses of the Causes of Accidents Involving Red-Crowned Cranes (*Grus japonensis*) in Hokkaido, Japan

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Between 1976 and 2022, a total of 919 wild red-crowned cranes were rescued or found dead in Hokkaido, Japan. The number of cranes rescued or found dead has been increasing, and the area involved is also expanding, due to the recent population increase and habitat expansion. 52% of 919 cases involved young cranes under 3 years old. Of the 212 cases that occurred between 1976 and 1999, 31% were due to collisions with power lines, mainly by cranes congregating at winter feeding stations. However, in recent years, traffic accidents within the habitat have been increasing, accounting for 42% of 131 cases from 2020 to 2023. Other causes include collisions with trains, falls into slurry (livestock manure), entanglement in nets or fences on farms or fields, and injuries from territorial fights between cranes.

Kushiro Zoo is currently working on educational activities to reduce traffic accidents involving cranes, such as creating a video to raise awareness that red-crowned cranes on the road do not fly away. These analyses are being conducted jointly by Kushiro Zoo and Kushiro Nature Conservation Office, Ministry of the Environment.

Keywords: red-crowned crane, endangered species, Kushiro Zoo, Hokkaido

Hiroko Iima

Hiroko is the veterinarian of Kushiro Zoo, in Hokkaido, Japan. She treats rescued and captive red-crowned cranes, and also make prosthetic legs for cranes. She is also involved in research and outreach activities related to cranes. she hopes that even one fewer crane will have an accident.

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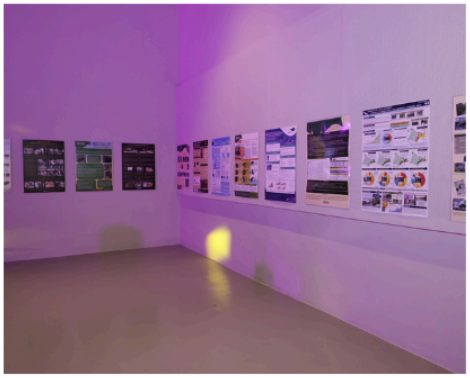
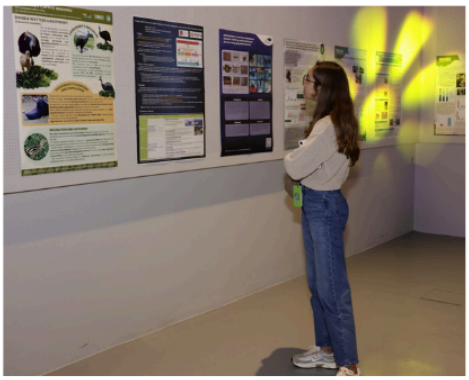
Conference Photos: Icebreaker









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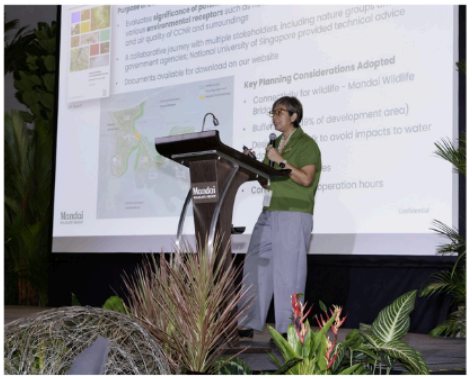

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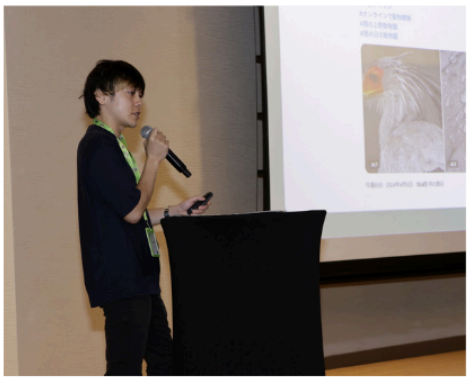

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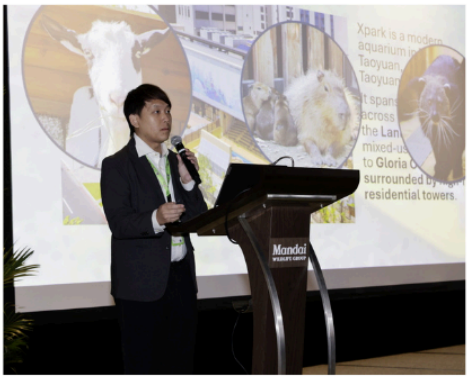

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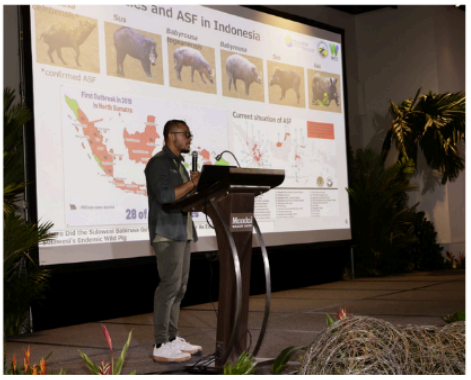

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