

Innovative Ecology Technology in Wildlife Research

A Special Interest Group at IWECC 2026

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Indian Wildlife Ecology Conference 2026



INNOVATING ECOLOGY: TECHNOLOGY IN WILDLIFE RESEARCH

The Second Indian Wildlife Ecology Conference (IWEC) 2026 was held at Ashoka University, Sonipat, from 10 to 12 July 2026. The conference brought together researchers, conservation practitioners, policymakers, and students from across India to exchange ideas, foster collaborations, and showcase advances in wildlife ecology through plenary lectures, symposia, panel discussions, Special Interest Groups (SIGs), and poster presentations.

As part of the conference, the Special Interest Group, “*Innovating Ecology: Technology in Wildlife Research*” was conceptualized and convened by Dr. Prachi Mehta (Wildlife Research and Conservation Society, Pune) and Dr. Malysari Bhattacharya (The Habitats Trust, New Delhi). The SIG was designed to explore the rapidly expanding role of emerging technologies in advancing ecological research and biodiversity conservation in India while fostering dialogue between researchers developing and applying these tools across diverse ecosystems and taxa.

To provide a structured framework for discussion, we identified six thematic areas that reflect the current frontiers of technology-driven wildlife research:

- Technology use in Population Ecology
- Genomics and Metabarcoding in Biodiversity Conservation
- AI-based Tools for Human–Wildlife Conflict Mitigation
- Bioacoustics for Population Monitoring
- LiDAR and GIS-based Technologies in Ecological Research
- Recent advances in Movement Ecology

We sent invitations to researchers and scientists at the forefront of technological innovation in wildlife science to contribute to the session by selecting one of these themes and presenting their work. We were very happy to receive an enthusiastic response, with 15 speakers representing a wide range of institutions and disciplines confirming their participation.

Each speaker delivered a concise five-minute presentation highlighting the application of technology within their research, the opportunities it has created for ecological investigations, the challenges encountered during implementation, and the practical lessons learned from field-based studies. Despite the brief format, the presentations collectively showcased the breadth and diversity of technological innovations currently transforming wildlife research in India.

The session highlighted how tools such as colour-banding, GPS and satellite telemetry, infrared camera traps, genomic sequencing, environmental DNA and

metabarcoding, LiDAR, artificial intelligence (AI), machine learning, bioacoustic monitoring, and advanced analytical approaches are revolutionizing conventional field ecology. These technologies are enabling more accurate monitoring of wildlife populations, improving our understanding of animal behaviour and movement ecology, strengthening habitat assessment, enhancing species detection and identification, and generating robust scientific evidence to inform conservation planning and management.

The SIG attracted an engaged audience of 67 participants representing universities, research institutions, government agencies, and non-governmental organizations. The lively discussions that followed the presentations reflected the growing interest within India's ecological community in integrating emerging technologies with field-based ecological research to address increasingly complex conservation challenges.

In keeping with IWECC's commitment to diversity, equity, and inclusion, the session brought together speakers representing diverse genders, geographical regions, institutions, career stages, research disciplines, and technological expertise. By facilitating interactions among researchers working across different taxa, ecosystems, and technological platforms, SIG 12 fostered interdisciplinary dialogue, encouraged knowledge sharing, and laid the foundation for future collaborative research initiatives.

Overall, SIG 12 demonstrated that technological innovation is rapidly reshaping the practice of wildlife ecology in India. While these emerging tools provide unprecedented opportunities to improve ecological understanding and conservation outcomes, the discussions also emphasized that their greatest value lies in complementing rigorous field-based research, ecological insight, and interdisciplinary collaboration. The session concluded with a shared recognition that integrating technological advances with traditional ecological approaches will be essential for addressing the increasingly complex conservation challenges facing India's biodiversity.

Acknowledgements

We extend our sincere gratitude to the organisers of the Second Indian Wildlife Ecology Conference (IWECC) 2026 for providing an outstanding platform to exchange ideas, foster collaborations, and learn in the inspiring environment of Ashoka University.

We gratefully acknowledge the invaluable support of Ms. Jui and Ms. Mansi from the IWECC Organising Committee, and Dr. Rajashekar Niyogi and Mr. Pradyut Rao from the Wildlife Research and Conservation Society (WRCS). Their meticulous coordination, and behind-the-scenes efforts were instrumental in ensuring the timely session and smooth execution of the Special Interest Group session. We thank Dr. Shivani, Dr. Manvi, Mr. Akshay Bhardwaj and the IWECC organising team for their wonderful support.

We are especially grateful to all the invited speakers for generously sharing their expertise, experiences, and perspectives on the application of emerging technologies in wildlife research. Their enthusiastic participation and thoughtful contributions were instrumental in making the Special Interest Group a stimulating and enriching forum for discussion.

Our special thanks to all the participants and audience members for their keen interest, active engagement, and insightful discussions throughout the session. Their participation greatly enriched the dialogue and contributed to the success of SIG 12, reaffirming the value of collaborative learning and interdisciplinary exchange in advancing wildlife research and conservation

Prachi Mehta and Malyasri Bhattacharya



INTRODUCTION TO THE SIG



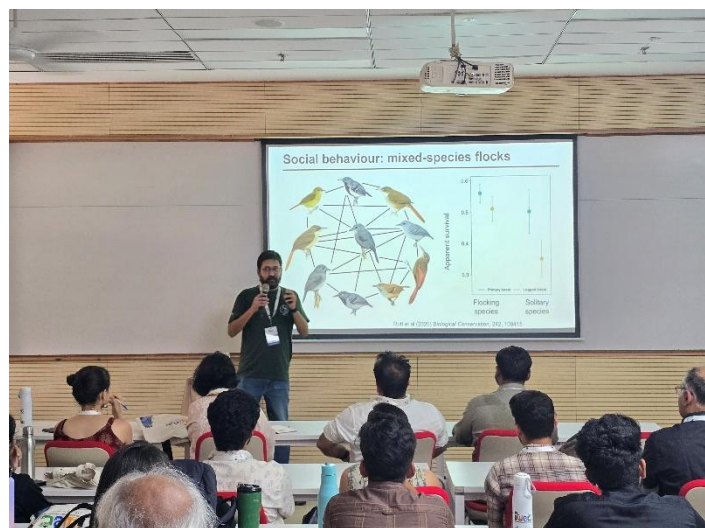
Dr. Prachi Mehta and Dr. Malyasri Bhattacharya introduced the SIG and described the objectives and about the importance of discussing use of technology in wildlife research and conservation. Thereafter, all speakers presented their work as per the given themes.

THEME 1: TECHNOLOGY IN POPULATION ECOLOGY

1. DR. UMESH SRINIVASAN, IISC-CES, BANGALORE

SOCIAL NETWORKS IN EASTERN HIMALAYAN MULTI-SPECIES BIRD FLOCKS: IMPLICATIONS FOR THE NATURE OF FACILITATION BETWEEN INDIVIDUALS AND SPECIES

Dr. Umesh highlighted long term field studies on mixed species bird flocks and their social behaviour in the Eastern Himalayas. It also demonstrated how social network analyses revealed patterns of inter individual associations among flocking bird species.



2. MR. ARNAB GUPTA, INDEPENDENT RESEARCHER

HABITAT PREDICTION WITH CHECKLIST EMBEDDINGS

Mr. Arnab presented the use of citizen science-based checklist embeddings and variational autoencoders to predict wetland habitats from eBird checklist data. It also demonstrated how species embeddings and feature importance analyses can support habitat classification, anomaly detection, and future ecological applications.



3. MR. DHYEY SHAH, SUSTAINABLE ECOLOGY FOUNDATION

DOCUMENTING AVIAN SUBSPECIES OCCURRENCES IN GUJARAT THROUGH RINGING

Mr. Dhyey talked about documenting avian subspecies occurrences in Gujarat through systematic bird ringing and morphometric measurements. It also highlighted the identification of subspecies using morphological traits and proposed future expansion through genetic sampling and broader geographic coverage.



THEME 2: GENOMICS AND METABARCODING IN BIODIVERSITY CONSERVATION

4. DR. UMA RAMAKRISHNAN NCBS, BANGALORE HOW LABORATORY DATA CAN SUSTAIN BIODIVERSITY

Dr. Uma highlighted the applications of conservation genetics and molecular ecology in understanding population dynamics, inbreeding, demographic history, and disease ecology. It also demonstrated how chemical ecology can provide valuable insights into tiger identification, age, sex, and potentially reproductive status.



5. MS. POOJA PAWAR NCF, BANGALORE CONSERVATION GENOMICS OF HORNBILLS IN INDIA

Ms. Pooja discussed how conservation genomics can be used to understand population trajectories, genetic diversity, and dispersal corridors in Indian hornbills. It also presented genomic studies on hornbill species, including reference genome assemblies, comparative genetics, and phylogeographic analyses.



THEME 3: AI-BASED TOOLS IN CONFLICT MITIGATION

6. MR. TIM VEDANAYAGAM ADVANTECH SAFE LIFE, TAMIL NADU: AI ELEPHANT EARLY WARNING SYSTEMS

Mr. Tim discussed and showcased a video on innovative AI-based Early Warning System that has significantly reduced Human–Elephant Conflict through autonomous, real-time monitoring and rapid alert mechanisms in critical conflict zones. Its successful deployment across multiple states, achieving zero elephant casualties in key railway conflict areas, demonstrated the transformative potential of AI-driven technology for wildlife conservation and infrastructure safety.



7. MR. DEV JACOBS PETER C IISER , TIRUPATI

BRIDGING TRADITIONAL KNOWLEDGE AND BIOACOUSTICS – AI ENABLED DETECTION OF WILDLIFE THREATS FROM GUINEA FOWL (NUMIDA MELEAGRIS) ALARM



Mr. Dev demonstrated how traditional ecological knowledge and bioacoustics can be integrated through AI-enabled detection of Helmeted Guinea Fowl alarm calls. It also

highlighted the potential of YAMNet-based real-time early- warning systems to support rapid, non-lethal responses to wildlife threats in forest-fringe communities.

THEME 4: BIOACOUSTICS IN POPULATION MONITORING, FOREST RESTORATION

8. MR. ADHITH M K IISER TIRUPATI

BIOACOUSTICS AND AI AS A LOW-COST TOOL FOR FOREST RESTORATION ASSESSMENT IN INDIAN LANDSCAPE

The presentation demonstrated the use of passive acoustic monitoring and AI-based BirdNET analysis as a scalable, low-cost approach for assessing restoration outcomes in Indian forest landscapes. It also highlighted how bird community composition, endemic species, and ecological guild activity can provide clearer indicators of habitat recovery following Lantana removal.



THEME 5: LiDAR AND GIS TOOLS IN LANDSCAPE RESEARCH

9. MS. ADWAITHA G IISER TIRUPATI

HOW WELL CAN HAND-HELD LIDAR DATA RECOVER VEGETATION PARAMETERS ACROSS A GRADIENT OF VEGETATION COMPLEXITY IN TROPICAL HABITATS?



Ms. Adwitha demonstrated the use of handheld LiDAR and Mobile Laser Scanning to generate detailed 3D representations of forest structure in tropical habitats. It highlighted the effectiveness of LiDAR in estimating vegetation parameters such as tree height, GBH/DBH, and canopy structure, while emphasizing its potential for long-term ecological monitoring.

THEME 6: ADVANCES IN TELEMETRY FOR MONITORING MOVEMENT

10. DR. BILAL HABIB WII, DEHRADUN

TRACKING THE WILD: TELEMETRY BASED INSIGHTS FOR WILDLIFE CONSERVATION AND LANDSCAPE ECOLOGY IN INDIA

Dr. Bilal showcased two decades of GPS telemetry studies across India, highlighting wildlife movement, habitat use, and behavioural adaptations in diverse landscapes. It also emphasized how high-resolution tracking can support conservation planning by revealing dispersal patterns, territorial behaviour, and responses to human dominated environments.



11. MS. SHIMONTIKA GUPTA WII, DEHRADUN

UNDERSTANDING THE ECOLOGICAL DRIVERS OF PRODUCTIVITY FOR A CRITICALLY ENDANGERED BUSTARD USING TELEMETRY AND ITS IMPLICATIONS FOR ITS CONSERVATION



MS. Shimontika provided valuable insights into the breeding ecology of the Critically Endangered Great Indian Bustard in the Thar Desert, highlighting relatively high annual productivity despite severe population decline using telemetry data. It emphasized that adult mortality is likely the key driver of decline and stressed the urgent need for expanded protected grasslands, conservation breeding, and targeted measures to reduce adult mortality.

12. Dr. Harish Prakash GITAM University, Andhra Pradesh

TRACKING FEATHERED CREATURES: HISTORY, CURRENT STATUS AND PROSPECTS FOR BIRD MOVEMENT STUDIES IN INDIA

Dr. Harish reviewed the history, current status, and future prospects of bird movement studies in India, highlighting advances in telemetry and bio-logging technologies. It also emphasized the growing importance of movement ecology in understanding migration, habitat use, ecosystem services, and conservation challenges across changing landscapes.



13. MR. MOHAMMED SERFAS KHAN, DAKSHIN FOUNDATION, BANGALORE

FOLLOWING THE FORAGERS: MOVEMENT ECOLOGY OF GREEN TURTLES IN THE LAKSHADWEEP ISLANDS

Mr. Serfas explored the movement ecology of green turtles in the Lakshadweep Islands, focusing on their foraging behavior and its impact on seagrass meadows. It also highlighted the use of cost effective GPS-LoRa radio telemetry and long term monitoring to track turtle movements and support seagrass conservation.



13. MR. SUNNY JOSHI WWF-INDIA, NEW DELHI

FROM SIGNALS TO SOLUTIONS: HOW SATELLITE TELEMETRY IS TRANSFORMING VULTURE CONSERVATION IN UTTARAKHAND

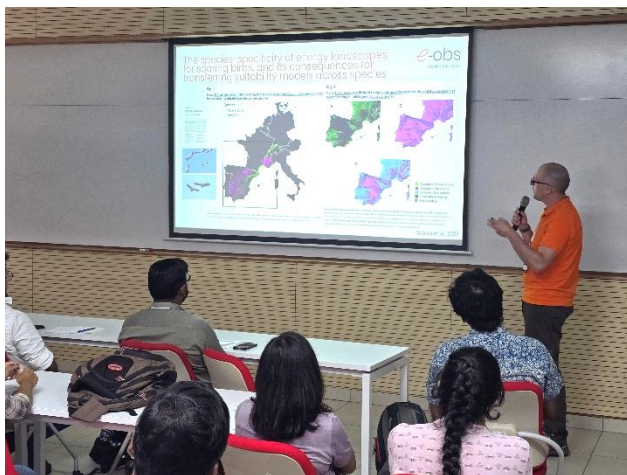
The presentation demonstrated how satellite telemetry can be used to track vulture movements, identify habitat-use patterns, and detect high-risk electrocution hotspots in Uttarakhand. It also highlighted the successful use of telemetry data to guide powerline insulation measures and reduce raptor mortality at critical carcass dumping sites.



14. MR. MARC BUENTJEN EOBS, GERMANY

USE OF E-OBS AND FIREFLY SOFTWARE TO ANALYSE MOVEMENT DATA

The presentation highlighted how bio-logging can bridge animals, landscapes, and conservation decision-making by providing detailed ecological insights. It also demonstrated the application of advanced tracking technologies and machine learning in studying wildlife movement, corridor effectiveness, and carcass detection using vultures as sentinels.



DISCUSSION

- The Special Interest Group Meeting concluded on a highly inspiring and productive note, having successfully showcased the diverse applications of cutting-edge technologies in ecological research and wildlife conservation.
- The presentations demonstrated how interdisciplinary approaches, ranging from AI and machine learning to genomics, bioacoustics, LiDAR, GIS, and telemetry, can generate actionable insights for addressing complex conservation challenges.

- There was a lot of interest among the participants on the knowledge shared and connections established during the SIG.
- We hope to take this discussion forward in form of a written document.
- **A highly engaged and attentive audience at the SIG**



