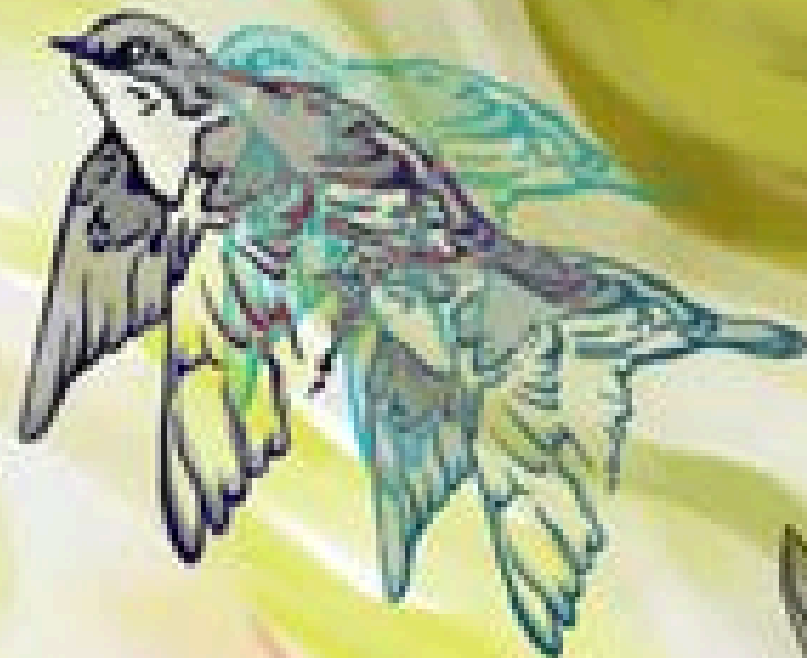


EMERGING BIOACOUSTICIANS' DAYS



4th



16-18 JUIN

UNIVERSITÉ MARIE ET LOUIS PASTEUR

32 RUE DE L'OBSERVATOIRE, BESANÇON, FRANCE



WELCOME WELCOME WELCOME

The idea of organizing days bringing together young researchers in bioacoustics was born in 2021. After three years of work, the first Emerging Bioacousticians Days took place in June 2023 in Saint-Étienne, the second edition held in 2024 in Brest and the third took place in Vernon, Normandy. This year's fourth edition takes place in Besançon, Bourgogne-Franche-Comté.

Over the past decades, research in bioacoustics has experienced significant growth. Bioacoustics is a scientific discipline at the interface between physical acoustics and animal biology.

Originally stemming from the study of animal behavior, bioacoustics has diversified and remains profoundly multidisciplinary today. It draws upon various scientific fields such as biology, mathematics, physics, psychology, linguistics, computer science, and engineering.

The Emerging Bioacousticians Days aim to highlight the richness, diversity, and quality of the work produced by young researchers in bioacoustics. The convivial and constructive atmosphere fostered during this conference will help promote interactions among young researchers and encourage interdisciplinary dialogue.

ORGANISING COMMITTEE

The organizing committee for the 4th Emerging Bioacoustician Days consists of members from the ALBA association (Association Ligérienne de Bioacoustique). This dedicated team is responsible for planning and executing the event, ensuring a successful and enriching experience for all participants. The organizing committee for the 4th Emerging Bioacoustician Days consists of members from the ALBA association (Association Ligérienne de Bioacoustique). This dedicated team is responsible for planning and executing the event, ensuring a successful and enriching experience for all participants.

President : Samantha Aguilon,

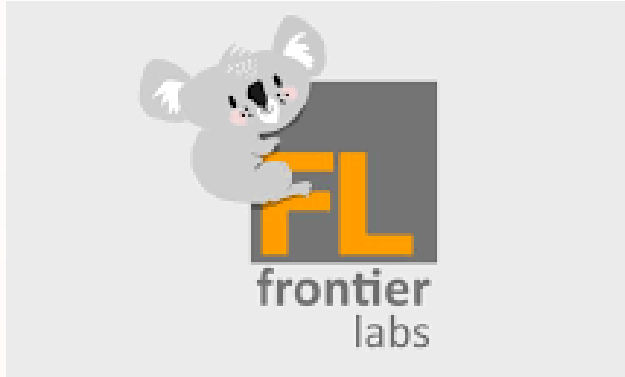
Vice-president : Arthur Touchais,

Treasurer : Aude de Witasse-Thézy,

Committee members : Fanny Aguilera, Marion Tiberghien, Corentin Bodson, Sarah McCafferty, Navyanth Kusampudi, Aarini Ghosh, Prabhjeet Singh, Axelle Duchamp



SPONSORS SPONSORS SPONSORS



PROGRAM FOR THE WEEK

Time	Monday 15th June	Tuesday 16th June	Wednesday 17th June	Thursday 18th June
08:00		Breakfast <i>Restaurant Petit Bouloie</i>	Breakfast <i>Restaurant Petit Bouloie</i>	Breakfast <i>Restaurant Petit Bouloie</i>
09:00		Oral session <i>Amphitheater</i>	Oral session <i>Amphitheater</i>	Oral session <i>Amphitheater</i>
09:40			Coffee break	
10:00			Workshop RDV: <i>Amphitheater</i>	Coffee break
10:20		Coffee break		
10:40		Oral session <i>Amphitheater</i>		
11:00				Oral session <i>Amphitheater</i>
12:40		Lunch <i>Restaurant Petit Bouloie</i>	Lunch <i>Restaurant Petit Bouloie</i>	Lunch <i>Restaurant Petit Bouloie</i>
14:00			PLENARY SESSION Jeremy Froidevaux <i>Amphitheater</i>	PLENARY SESSION Vijay Ramesh <i>Amphitheater</i>
15:00	Pre-event (fr) <i>Amphitheater A - Metrology building</i>	Coffee break	Coffee break	Oral session <i>Amphitheater</i>
15:20		Oral session <i>Amphitheater</i>	Oral session <i>Amphitheater</i>	
16:20	Coffee break		Ending speech <i>Amphitheater</i>	
16:40	Pre-event (fr) <i>Amphitheater A - Metrology building</i>	Poster session <i>Maison des étudiants</i>		General assembly <i>Amphitheater</i>
17:20				
18:00				
19:30	Regional / International dinner <i>Maison des étudiants</i>	Dinner <i>Restaurant Petit Bouloie</i>	Dinner <i>Restaurant Petit Bouloie</i>	
21:00			Gala	



TUESDAY 16TH

Time	Theme	Speaker	Title
08:00	Breakfast: <i>Restaurant Petit Bouloie</i>		
09:00	Marine and Aquatic Bioacoustics	Valentin Bordoux	Hearing every voices: an open-source audio-video array for solving the fish sound attribution bottleneck
09:20		Marie-Lou Buisson	Combining passive acoustics, machine learning, and telemetry to understand the behavior of Scorpaena spp.
09:40		Sheila Di Battista	Catfish calls and when to find them: Acoustic characterization and phenology in European catfish (<i>Silurus glanis</i>)
10:00		Elisa Lamberti	Whistle variation between clusters of common dolphins (<i>Delphinus delphis</i>) in the NE Aegean Sea, Greece
10:20		Margherita Medina	Comparative Analysis of Whistling Acoustic Behaviour of <i>Stenella coeruleoalba</i> and <i>Delphinus delphis</i> in the Northeastern Aegean Sea
10:40	Coffee break 20'		
11:00	Vocal Production, Structure and Behavioral Function	Lorine Grangy	Vertical Space use and Call Emission height in Mandrills
11:20		Léo Maucourt	The burrow's involvement in males' sexual parades in the blue petrel: does the burrow's characteristics influence females' preference?
11:40		Anna N Osiecka	Vocal rhythms as an information channel
12:00		Ceyda Özdemir	Too Much Tongue! Novel Acoustic Behaviour of a California Sea Lion (<i>Zalophus californianus</i>) Through Its Complex Vocalization
12:20		Vanessa Rüegg	Vocal ontogeny in the facultatively social yellow mongoose (<i>Cynictis penicillata</i>)
12:40	Lunch: <i>Restaurant Petit Bouloie</i>		
14:00	PLENARY SESSION, <i>Amphitheater</i> - Jeremy Froidevaux		
15:00	Coffee break 20'		
15:20	Bioacoustics applications, AI Recognition and Biodiversity Monitoring	Julie Augustin	Determinants of mosquito sounds: separating species-specific effects from environmentally driven variations - implications for AI species recognition
15:40		Corentin Bernard	Impact of spatio-temporal recording resolution on ecological indicators in bird passive acoustic monitoring
16:00		Daniel Haider	Fine-scale F0 contour extraction for elephant rumbles using infrasonic-adapted time-frequency representations
16:20		Jaromir Kunzelmann	5 years of PAM – Learnings from the “Agro4esterie” Project
16:40		Ben McEwen	Active Learning for Bioacoustics
17:00		Cassandre Treyvaud	From echolocation to automatic identification : in which cases can we trust machine learning software to identify European bats?
17:20	Poster session: <i>Maison des étudiants</i>		
18:00			
19:30	Dinner: <i>Restaurant Petit Bouloie</i>		



WEDNESDAY 17TH

Time	Theme	Speaker	Title
08:00	Breakfast: Restaurant Petit Bouloie		
09:00	Bioacoustic Signal Processing and Machine Learning	Laetitia Confuron	Use of Convolutional Neural Networks for detecting the individual signature of the ‘Cry’ vocalization emitted by the thick-tailed Bushbaby (<i>Otolemur crassicaudatus</i>).
09:20		Léa Bourget	Acoustic Characterization of Buzzing Sounds in European Bumblebees
09:40	Coffee break 20'		
10:00	Workshop: Maison des étudiants		
12:40	Lunch: Restaurant Petit Bouloie		
14:00	PLENARY SESSION, <i>Amphitheater</i> - Vijay Ramesh		
15:00	Coffee break 20'		
15:20	Ecoacoustics, Agriculture and Anthropogenic Change	Matthieu Fraticelli	Listening to Flowing Water: Auditory Perception of Water sounds in Natural Environments
15:40		Jeanne Legros	Impact of urbanisation and noise pollution on intra and inter-individual variability in song production
16:00		Léa Mariton	Assessing the impact of agriculture practices on bird communities using ecoacoustics
16:20		Minguet Raphael	Evaluating the influence of agricultural practices on the stopover potential of orchards for Pied Flycatchers during post-nuptial migration using Passive Acoustic Monitoring and BirdNET
16:40		Linnea Marla Pankoke	Unsupervised detection and classification of biological and anthropogenic sounds in long-term underwater recordings at the Dogger Bank, central North Sea
17:00		Olivier Phan	Cross-medium soundscape analysis in the Venetian Lagoon: a preliminary work
17:20	General assembly - <i>Amphitheater</i>		
18:00			
19:30	Dinner: Restaurant Petit Bouloie		
20:30			
21:00-01:00	Gala : <i>Maison des étudiants</i>		



THURSDAY 18TH

Time	Programme	Speaker	Theme
08:00	Breakfast: <i>Restaurant Petit Bouloie</i>		
09:00	Acoustic Monitoring, Localization and Sensor Networks	Maud Biscarat	Localization of Biophonic Sources in Noisy Environments using a Spherical Microphone Array
09:20		Jules Colas	Modeling Acoustic Detection Space for Large-Scale Monitoring of the Rock Ptarmigan in Complex Terrains
09:40		Amelie Laute	Can Distributed Acoustic Sensing (DAS) be used to detect mid-frequency marine mammals?
10:00		Lucas Voirin	Localizing sounds in the forest: a Bayesian approach with uncertainty in recorder position
10:20	Coffee break 20'		
10:40	Social Communication and Information Processing	Guilherme Augusto-Alves	Effects of intruder arrival on the individual and chorus vocalization dynamics in the Brazilian tree frog, <i>Boana albomarginata</i>
11:00		Emmy Baray	Perception of trill vocalizations in the African striped mouse: Influence of social context and receiver sex
11:20		Lucie Barluet de Beauchesne	Aversive behavioural responses of killer whales to sounds of longfinned pilot whales
11:40		Borah Doli	Coordination and communication of cooperative offspring care behaviour (babysitting) in meerkats
12:00		Mathilde Martin	When cohesion breaks down: acoustic structure and information encoded in meerkat lost calls
12:20		Aude Richard	The Role of Vocalisations in Grooming Interactions in Meerkats (<i>Suricata suricatta</i>)
12:40	Lunch: <i>Restaurant Petit Bouloie</i>		
14:00	PLENARY SESSION , <i>Amphitheater</i> - Cécile Guérineau		
15:00	Artistic session	Tanja Böhme	Rhythm ´n blue
15:20		Simon Targowla	Talking to extraterrestrials: Acoustic communication in creepers (<i>Leptonychotes marshallii</i>) on the planet Niflheim
15:40		Valentin Brochet-Fernandez	What is knowing an animal by sound? An ontological turn in Anthropophonocene
16:00		Robin Weissmann Farbos	Tackling noise pollution in protected natural areas through an interdisciplinary approach
16:20	Ending speech - <i>Amphitheater</i>		
17:20			



INVITED SPEAKERS

JÉRÉMY FROIDEVAUX

✉ jeremy.froidevaux@univ-fcomte.fr

Professor (associate)

Chrono-Environnement laboratory,
University of Marie and Louis Pasteur

📍 Besançon, France

What's the buzz about? Bioacoustic AI for automated insect pollinator detection and monitoring

While the importance of pollinators in maintaining wild, ornamental, and crop plant communities is widely acknowledged, there is clear evidence of widespread declines across Europe. However, the magnitude of these declines remains poorly quantified for many species due to the lack of scalable monitoring approaches.

Recent advances in bioacoustics and artificial intelligence (AI) are opening new pathways toward scalable, multimodal biodiversity monitoring approaches. I will present the BBeeDeep project which aims to develop a bioacoustic toolbox for automated detection and classification of pollinators, initially focused on bumblebees and with perspectives for extension to other groups.

The project has two main objectives: (i) build a robust open-access reference library of buzzing sounds from pollinator species, enriched with detailed biological metadata, and (ii) develop, train, and evaluate AI algorithms for automated detection and classification of species and behaviour from acoustic recordings.

In this keynote, I will present the workflow for sound acquisition and annotation, recent advances in models for buzz detection and species/behaviour identification, and case studies illustrating how model outputs can be used to derive meaningful ecological insights. Finally, I will discuss how acoustic AI tools can form part of broader multimodal monitoring strategies for pollinator biodiversity assessment.





INVITED SPEAKERS



VIJAY RAMESH

✉ vr292@cornell.edu

Postdoctoral Fellow

Center for Avian Population Studies,
Cornell Lab of Ornithology

📍 Ithaca, New York, USA

How can conservation bioacoustics help track and monitor biodiversity in a globally changing world?

Over the last decade, my work has relied on using conservation tools and technologies, including bioacoustics, to obtain fundamental insights into natural history, to monitor conservation interventions, and to work with policy makers to track threatened species.

In this plenary, I will discuss examples of how passive acoustic monitoring can successfully be used to understand the impacts of ecological restoration on the recovery of bird species. I will highlight how species vocalizations and their timing can be used to test fundamental hypotheses of species behavior.

I will discuss how state-of-the-art deep learning models, alongside rigorous human validation, can be used to monitor threatened species and shape conservation policy.

I aim to finally share lessons learned on how we can leverage and use rapidly developing conservation bioacoustics tools for effective biodiversity monitoring.



INVITED SPEAKERS

CÉCILE GUÉRINEAU

✉ cecileguerineau35@gmail.com

Research Fellow

Department of Comparative
Biomedicine and Food Science,
University of Padova

📍 Padova, Italy

Listening Through Dogs' Ears: Perception, Localization and Emotional Reactions to Sounds

We will go back through my PhD journey exploring auditory perception in dogs and its implications for animal welfare and acoustic enrichment. Understanding how dogs perceive sound is essential for improving their welfare, yet behavioural studies on basic auditory abilities remain limited.

Through a series of studies using adaptive staircase methodologies, we investigated hearing sensitivity and sound localization abilities in dogs. These experiments revealed broader ultrasonic sensitivity and greater variability in localization performance than previously reported, while also highlighting perceptual learning effects emerging through repeated exposure and testing.

The talk will also present research on dogs' behavioural responses to different acoustic environments, including aversive sounds, classical and relaxing music, dog-directed speech, and positive conspecific vocalizations. While negative sounds triggered avoidance, calming music promoted more relaxed behaviours, particularly in dogs familiar with such auditory environments. Importantly, the findings underline that acoustic enrichment should provide animals with the possibility to control their exposure to sound, rather than imposing it.

Overall, this journey illustrates how refining behavioural methodologies can deepen our understanding of canine auditory perception and support more effective, welfare-oriented acoustic enrichment practices.



WORKSHOPS

SETTING UP AN OBSERVATORY

During the excursion, Loïc Angonin, Carole Bégeot, Jérémy Froidevaux, Eva Gril et Camille Tabary will present their research at the forest observatory, spanning a broad range of disciplines, from bark beetle trapping programs and acoustic sensor deployments to meteorological monitoring. The visit will also provide insights into the broader geological context of the Jura Mountains, which shape the ecological processes observed in the Chailluz Forest today.

What to bring: 🥾 Hiking shoe 🧥 Rain gear 🩳 Long trousers (tucked into socks: tick precaution)

DEVELOPING ART-SCIENCE PROJECTS

This workshop aims to introduce you to various methods of bridging the gap between science and the arts. It will present examples of arts-science projects in France and discuss how researchers can promote them. Mushi, an artist, will present her work and explain how her artistic and naturalistic sensibilities merge in these projects. Daniel Cadot, a PhD student at CESCO, will introduce you to his thesis project by facilitating a group discussion about soundscapes and their integration into theatrical staging.

What to bring: 🧠 your imagination 📓 a notebook and a pen to write your ideas

OPEN SCIENCE AND DATA MANAGEMENT IN BIOACOUSTICS

How can we efficiently store, organize, share, and reuse the ever-growing volume of acoustic data collected in bioacoustics? In this workshop, members of the OSmOSE team, Elise FOUIN and Pauline AUDRAS will introduce key concepts, tools, and best practices for acoustic data management and open science.

Through discussions and hands-on activities, participants will explore the challenges and opportunities associated with large acoustic datasets and discover how collaborative platforms can support transparent, reproducible, and FAIR research practices.

What to bring: 💻 your laptop



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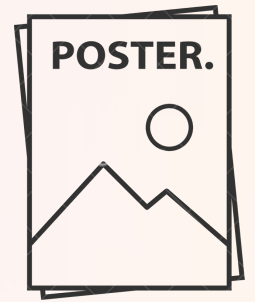
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MARINE AND AQUATIC BIOACOUSTICS

TUESDAY 16TH

Hearing every voices: an open-source audio-video array for solving the fish sound attribution bottleneck

Valentin Bordoux¹, R.M. van der Ven¹, J. Arhens¹, A.J. Murk¹
(1) Wageningen University

Monitoring marine biodiversity remains a persistent challenge due to the vast scale and inaccessibility of many aquatic environments. Current monitoring still relies heavily on invasive, geographically limited methods, such as fishery-dependent sampling and visual surveys. While Passive Acoustic Monitoring (PAM) has emerged as a cost-effective, non-invasive alternative for long-term observation, its application to fish communities remains significantly underdeveloped compared to its use for cetaceans and terrestrial taxa.

Recent research underscores the untapped potential of fish acoustics. Although only 1,252 species are currently documented as soniferous, phylogenetic analyses indicate that nearly two-thirds of ray-finned fish species, potentially exceeding 20,000, are likely capable of sound production. Despite this, 96% of known fish species remain unexamined. The core obstacle is "species attribution": reliably linking a sound to its source. Confirming sound sources in situ is technically demanding, while aquarium-based studies are often costly, time-consuming, and limited by unnatural behaviors that suppress sound production.

To address this gap, we have developed a multimodal sensor array that synchronizes a hydrophone network with a 360° video system. Adapting methods from terrestrial ambisonics, we generate spatial energy maps that are overlaid with visual detections across a full 360° field of view. This enables the direct association of acoustic signals with observed individuals and behaviors. We present results from a prototype deployment in the Netherlands, utilizing deep-learning algorithms developed for the automated detection of both acoustic and visual events within large datasets.

This work aims to produce a reproducible framework and reuse will be facilitated by the publication of the hardware blueprints alongside a detailed pipeline of open-source software. By providing tools to move beyond the 4% of fish taxa currently examined, we aim to accelerate the development of global fish acoustic reference libraries and position PAM as a cornerstone for monitoring marine biodiversity and ecosystem health.

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MARINE AND AQUATIC BIOACOUSTICS

TUESDAY 16TH

Combining passive acoustics, machine learning, and telemetry to understand the behavior of *Scorpaena spp*

Marie-Lou Buisson¹, Claudia Restrepo-Ortiz¹, Jérôme Bourjea¹, Marc Besson², Johann Mourier¹, Frédéric Bertucci¹, Anaïs Laurieux¹

(1) UMR MARBEC, Université de Montpellier, CNRS, IFREMER, IRD, Sète, France

(2) Sorbonne Université, CNRS, Biologie Intégrative des Organismes Marins, BIOM, Banyuls-sur-Mer, France

Monitoring cryptic species using traditional non-invasive survey techniques remains highly challenging. However, many fish species produce sounds that can be exploited for ecological monitoring. In particular, species of the genus *Scorpaena* are known to be highly vocal, producing the characteristic “/kwa/” sound. This distinctive signal appears well suited for the detection and passive acoustic monitoring of this family. Thus, we propose an innovative methodology based on passive acoustics and telemetry to better understand the behavior of *Scorpaena* spp under conditions of high tourist activity and environmental change.

Between June and September 2025, twenty acoustic telemetry receivers equipped with temperature sensors were deployed in the Bay of Sainte-Catherine, within the Gulf of Lion, to assess fine-scale movements of seven *Scorpaena* spp. In parallel, sixteen hydrophones recorded ambient sound in the same area for one minute every ten minutes. These recordings revealed the recurring presence of the “/kwa/” attributed to *Scorpaena* spp, highly detected and sometimes produced in chorus. Therefore, because manual quantification proved extremely time-consuming, a machine learning algorithm was developed to automatically detect and classify these calls.

This algorithm achieved robust performances, with both recall and precision exceeding 80%, and thus enabled the quantification of vocal activity. Preliminary results reveal clear temporal patterns in this activity, with higher vocal activity during the night, often resulting in chorus. The spatial distribution of this acoustic activity was subsequently examined in relation to the occurrence of two marine heatwaves and variations in noise pollution throughout the study period. Additionally, spatio-temporal variations of these vocalizations were investigated in connection with a few individual departures detected through acoustic telemetry.

Overall, this approach highlights the potential of combining passive acoustics, telemetry, and automated detection to better understand the ecology of cryptic vocal species and to assess their responses to ongoing environmental change.

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MARINE AND AQUATIC BIOACOUSTICS

TUESDAY 16TH

Catfish calls and when to find them: Acoustic characterization and phenology in European catfish (*Silurus glanis*)

Sheila Di Battista^{1,2}, Valentin Cavoy³, Virginie Diouloufet², Julien Dublon², Romain Roy³, Frédéric Santoul⁴, Samuel Westrelin², Marilyn Beauchaud¹, Vincent Médoc¹

(1) ENES, CRNL, Université Jean Monnet - Saint-Etienne, CNRS, Inserm, Saint-Etienne, France

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(3) EDF R&D, LNHE - Laboratoire National d'Hydraulique et Environnement, 6 Quai Watier, Chatou 78401 Cedex, France

(4) Laboratoire Evolution et Diversité, Biologique (EDB), Université Paul Sabatier Toulouse III, 31400 Toulouse, France

Acoustic signals mediate essential behaviours in fishes, yet most ray-finned species remain untested for sound production. The European catfish *Silurus glanis*, one of the largest freshwater fishes and a widespread alien predator in western and southern Europe, has not previously been evaluated for vocalizations.

We used passive acoustic recorders in a eutrophic lake during late spring and autumn-winter. Using a weight-of-evidence framework, we attributed a set of pulsed, low-frequency calls to *S. glanis*. We then applied machine-learning classifiers to automatically detect those calls across all recordings.

The species produced single pulses and complex overlapping multi-pulses; single pulses formed two clusters by duration and amplitude, with an average spectral centroid near 200 Hz, providing the first acoustic characterization of the species. Automated detection revealed strong seasonal differences in call rate, high in spring, low in autumn-winter, and no diel pattern. Temporal structure explained most variation, and calling also co-varied with wind, rainfall, dissolved oxygen, and temperature.

These results establish *S. glanis* as a soniferous species and show that passive acoustic monitoring with automated detection provides a practical, non-invasive approach. Characterizing this repertoire also lays the foundation for developing acoustic tools to deter catfish from sensitive habitats, helping protect endangered native fishes.

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MARINE AND AQUATIC BIOACOUSTICS

TUESDAY 16TH

Whistle variation between clusters of common dolphins (*Delphinus delphis*) in the NE Aegean Sea, Greece

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Common dolphins (*Delphinus delphis*) exhibit fission-fusion population dynamics, and can build complex social bonds, which can influence behaviour and vocalisations within groups. Since this species relies on vocalisations for communication and predation, it is important to investigate how their social relations can influence their acoustics.

This research aims to study the differences in the whistles between different social groups of the *D. delphis* population in the marine region around Samos Island, Greece. Association analysis by gregariousness in SOCPROG was used to perform Social Network Analysis.

The results showed 5 different clusters (modularity = 0.529, overall strength = 2.847), ranging between 13 to 18 individuals, and one singleton. To avoid redundancy in the acoustic data, the recordings with cluster overlap were removed. A total of 1059 whistles recorded between 2017 and 2023 were analysed to obtain start, end, delta, maximum and minimum frequency, and duration. Clusters 1 to 5 presented respectively 1, 97, 6, 794 and 161 whistles. Because of the single whistle, Cluster 1 was excluded from the analysis. A pairwise comparison was used to investigate differences between the clusters. A logistic regression was performed on each cluster to identify the variables describing whistle tendencies. Cluster 2 featured long whistles with narrow delta frequency and low end frequency, Cluster 3 had whistles with narrow delta frequency and lower end frequency, the whistles of Cluster 4 demonstrate low minimum frequency, high end frequency and wide delta frequency, Cluster 5 had short whistles with high minimum frequency and narrow delta frequency.

The results indicate variation in the vocalisations across clusters, providing evidence that the whistles differ significantly among separate social groups. This study reinforces the need for further investigation on how social relationships shape vocal behaviour and highlights the importance of bioacoustics in assessing population dynamics and habitat use.

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MARINE AND AQUATIC BIOACOUSTICS

TUESDAY 16TH

Comparative Analysis of Whistling Acoustic Behaviour of *Stenella coeruleoalba* and *Delphinus delphis* in the Northeastern Aegean Sea

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Stenella coeruleoalba and *Delphinus delphis* are highly social marine mammals that rely on vocalizations for numerous essential life functions, including communication, navigation, and feeding. Among the different call types they produce, whistles are narrow-band, frequency-modulated signals mainly used to maintain group cohesion and facilitate coordination. Differentiating these calls between the two dolphin species can be challenging due to the overlap in their frequency ranges, as well as the variability caused by geographical location, behavioral and social context.

The present study investigates the whistling acoustic behaviour of *S. coeruleoalba* and *D. delphis* subpopulations in the northeastern Aegean Sea, Greece, aiming to assess species-specific patterns and potential variations driven by group size, behaviour, and calf presence. A total of 3,874 whistles were analyzed (1,838 from *S. coeruleoalba* and 2,036 from *D. delphis*) by measuring minimum, maximum, and delta frequency, as well as delta time.

When analyzing the whole dataset, all whistle parameters were found to vary significantly across the two dolphin species (Kruskal-Wallis test, $p < 0.05$) and between the behaviour categories (feeding, traveling and socializing; Kruskal-Wallis test, $p < 0.05$). In contrast, group size and calf presence showed an overall weaker effect with only some of the parameters being significant. Since the previous results suggested species-specific acoustic patterns, different Generalized Linear Models were then implemented by species. For both species, socializing behaviour displayed a pattern of lower minimum, maximum and delta frequency, and lower delta time compared to the other behaviour categories. Regarding the effect of group size, the results did not indicate a clear pattern, but for *S. coeruleoalba* a weak significance combined with calf presence was observed.

These preliminary results provide a valuable baseline to further investigate species-specific communication strategies and their ecological relevance, potentially providing information on habitat use and management strategies for these species.

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VOCAL PRODUCTION, STRUCTURE AND BEHAVIORAL FUNCTION

TUESDAY 16TH

Vertical Space use and Call Emission height in Mandrills

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In densely forested environments, the vertical dimension of habitat use is a crucial factor influencing the production and reception of acoustic signals. This study explores the relationship between vertical space utilization and vocal behavior in the mandrill (*Mandrillus sphinx*), a species known for its complex social structure.

Over a 7-month period, we conducted 155 focal observations on 99 individuals of various ages within a free-ranging population in Parc de la Lékédi, Gabon, in order to quantify the daily time budget spent across different forest strata. Additionally, we documented the specific emission heights of more than 1,000 vocalizations belonging to three different call types: grunts, yaks, and crows.

Our analysis reveals that mandrills are predominantly terrestrial, spending 77% of their daily activity period on or near the ground. While the majority of vocalizations align with this terrestrial bias, preliminary analyses indicate a strategic shift for specific long-range signals: crowing and yak calls seem to be emitted from higher positions compared to grunts. These observations are supported by complementary propagation experiments which demonstrate that higher emission points significantly enhance the transmission efficiency of these specific call types.

These results suggest that mandrills could selectively utilize vertical positioning to overcome the acoustic constraints that rule over the propagation of their vocalisations. By highlighting how emission height is modulated to optimize signal reach, this research provides new perspectives on the adaptive communication strategies of large-group primates living in heterogeneous forest environments.

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VOCAL PRODUCTION, STRUCTURE AND BEHAVIORAL FUNCTION

TUESDAY 16TH

The burrow's involvement in males' sexual parades in the blue petrel: does the burrow's characteristics influence females' preference?

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Blue Petrels (*Halobaena caerulea*) are long-lived, monogamous seabirds. Pairs bond for life and they lay a single egg per year, without any possibility of replacement clutch. This is why mate choice is decisive for their fitness. During the breeding season, Blue Petrels gather in dense colonies where bachelor males dig a burrow (composed of an access tunnel and an incubation chamber) to which they will be lifelong faithful. The burrow protects them from predation and temperature variations. Bachelor males sing from inside their burrow, probably to attract females in flight. These calls may play a crucial role in mate choice, as their acoustic traits contain information on the physical characteristics of the callers related to qualities. We hypothesised that burrow's characteristics have an influence on the call propagation and play a major role in attracting females.

To test this hypothesis, propagation and attractiveness experiments were carried out in a colony of Blue Petrels, located on Verte Island (Kerguelen archipelago). The propagation experiment consisted in broadcasting males' calls from inside burrows and re-recording them at different distances. The attractiveness experiment consisted in broadcasting males' calls from inside artificial (to control room's depth and size) burrows and counting attracted females.

The results of the propagation experiment suggest that temporal and frequency parameters degrade in different ways over the distance depending on the burrow's characteristics. The results of the attractiveness experiment indicate that shallow-depth, small-volume burrows attract significantly more females. In addition, we looked to the resonant properties of the burrow and found that small-volume burrows resonate at a frequency close to the third harmonic of males' calls (around 1kHz). Our analysis is the first step to understand the burrow's role in sexual parades, but we can yet suggest that the burrow's characteristics do have an influence on the females' preference.

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VOCAL PRODUCTION, STRUCTURE AND BEHAVIORAL FUNCTION

TUESDAY 16TH

Vocal rhythms as an information channel

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Passively listening to animals can reveal a great deal about them — from species identity to emotional and physiological states of the caller — yet identifying what information is encoded and how it is represented in a given vocal signal is neither obvious nor universal. While bioacoustic research has traditionally focused on spectral parameters, rhythmic organisation offers a complementary and largely unexplored dimension of signal organisation.

This talk will explore rhythm as a potential information coding channel in complex vocalisations, drawing on case studies from both songbirds and seabirds of very different vocal repertoires and ecologies. We will examine how calls and songs can be grouped into rhythmic categories — such as isochronous (steady beat), rallentando (gradually slowing), or arrhythmic (irregular patterns), what describes their rhythmic organisation, and finally what these rhythmic patterns might reveal about the behavioural and biological contexts of the three focal species. This talk aims to inspire a wider interest in rhythm as a source of information and an important modality of communication.

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VOCAL PRODUCTION, STRUCTURE AND BEHAVIORAL FUNCTION

TUESDAY 16TH

Too Much Tongue! Novel Acoustic Behaviour of a California Sea Lion (*Zalophus californianus*) Through Its Complex Vocalization

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One of the most investigated questions in biology and cognitive science concerns the evolutionary origins of human speech. In humans, voluntary control over the vocal tract is well-documented; however, the evidence on non-human mammals remained limited. Through their capacities for respiratory control, vocal-learning, and trainability, pinnipeds have emerged promising comparison models. According to the source-filter theory, formants particularly F1, F2, and F3 are shaped by articulators such as tongue, jaw, and lips and are received as vowel-like sounds.

The current study documents the articulatory modulation on adult female California sea lion "Ronan" at Long Marine Laboratory, Santa Cruz. During the "fry" call, Ronan modulated tongue position, lip configuration and jaw opening without specific training for these behaviors. Vocal tract modulations were tracked using DeepLabCut across 97 fry, 62 bark, and 33 burp calls. Formants were extracted using Python and Praat. Linear mixed model used to assess the independent contribution of each articulator to formant frequencies.

The preliminary results showed, all articulators were highly significant on formant frequency modulations. Jaw opening had the strongest predictor for F1, whereas tongue position dominated for F2. Although F3 was significantly predicted by tongue and jaw, the contributions of all the articulators were relatively weak. Vowel analysis revealed a predominance of mid-front vowel qualities (/ɛ/, /e/), linked to horizontal tongue elongation and jaw opening. Vocal tract extension by laryngeal lowering dominated in bark calls on F2, with extent of lowering approximately twice as great as in burp, while jaw opening was primary in burp on F2. These findings, beyond providing the first vocal tract measurements, suggest that the muscular tongues of the target species may extend feeding motor control via the hyoid bone and laryngeal skeleton to vocal articulation, representing latent pre-adaptations for vocal diversity.

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VOCAL PRODUCTION, STRUCTURE AND BEHAVIORAL FUNCTION

TUESDAY 16TH

Vocal ontogeny in the facultatively social yellow mongoose (*Cynictis penicillata*)

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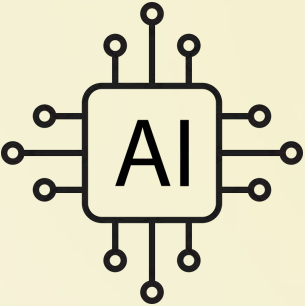
The social complexity hypothesis predicts that vocal communication is more complex in group-living species with greater opportunities for social interaction than in solitary-living ones. Facultatively social species with fluctuating social structures provide a unique system for identifying how social factors shape vocal repertoire complexity and its ontogeny on both an intra- and interspecific level.

We study vocal development in yellow mongooses (*Cynictis penicillata*), as they are a socially flexible species whose individuals transition between solitary living and small family groups. The objective of this research is to understand vocal ontogeny across life-history stages, particularly in relation to social context, revealing insight into which social factors may shape vocal variation. Unlike obligately social species typically studied, yellow mongooses experience lifelong variation in social complexity such as group size, sibling composition, and interaction rates. We assess how call types emerge and whether individuals raised in more socially complex environments develop more complex vocal repertoires, integrating analyses of adult vocalisations with ontogenetic trajectories. We have observed a larger call repertoire than so far expected in yellow mongooses. Preliminary results reveal a discrete call type used across multiple contexts, call combinations, and a shift in call types across life-history stages, indicating vocal flexibility.

Our study system allows us to examine vocal developmental trajectories and offers novel insight into how fluctuating social complexity are selected and therefore add to the emerging body of research on the evolution of complex communication across non-human species.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Determinants of mosquito sounds: separating species-specific effects from environmentally driven variations - implications for AI species recognition

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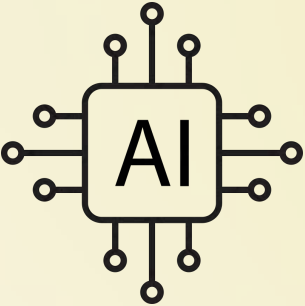
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Several technologies have been developed for the monitoring and control of insect vector species. Many of them aim to use mosquito wingbeat frequency in the form of sound or opto-acoustic measurements to identify mosquito species, often through the training of AI classification models. However, these models often struggle to be accurate in real-life conditions, as the training data rarely captures the variability range of different species across many individual and environmental conditions, or does not explicitly control for it. Here, we use lab recordings of mosquito sounds to evaluate the impact of several environmental and life history factors on the mean frequency of the first harmonic of mosquito sounds.

We recorded 475 individuals of 15 species in several environmental conditions, varying in temperature and humidity, while we also characterized the effect of body size (wing length), sex and age on the frequency of wingbeat sound at the among-individual level. Variances at the within-individual and within-species level varied consistently, as the repeatability of the trait was 0.411 and 0.466, respectively. However, when we controlled for morphological and environmental effects, the proportion of between-individual variance decreased, while the between-species component increased (repeatabilities: 0.267 and 0.630). This suggests that species-specific signals in the sound are more robust once factors introducing variances due to real life conditions are involved in the models. Sex and temperature both had a significant effect on mosquito sound: an increase in temperature led to an increase in wingbeat frequency. In addition, the random slope analysis showed that response to temperature differ between species, with strong between-species differences, especially for males. Therefore, advancing AI species recognition requires that biotic and environmental variables be either explicitly integrated into classification models or sufficiently represented in training data to reflect real-life variability.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Impact of spatio-temporal recording resolution on ecological indicators in bird passive acoustic monitoring

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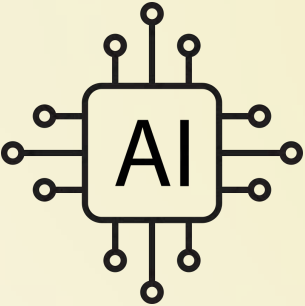
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Passive Acoustic Monitoring (PAM) has emerged as a promising tool for collecting ecological indicators. PAM projects typically involve deploying a set of autonomous recording units in target areas for a defined period. Deployment protocols require decisions on two important aspects: the spatial and temporal resolution of the recordings. Spatial resolution refers to the number of monitoring sites within the area of interest and how they are distributed. It is limited by the number of available recording units, and therefore by the overall project budget. Temporal resolution refers to the frequency and duration of the recordings. It is constrained by the recording device's data storage capacity and energy autonomy. Recording schedules are commonly duty-cycled, for example 1 minute of recording every 15 minutes. Increasing temporal resolution generally requires more frequent maintenance visits to replace batteries and SD cards. Moreover, both spatial and temporal resolution directly affect data volume, and therefore the computational cost associated with the analysis. These deployment choices are often determined with the aim of maximizing the quantity of data given practical constraints, yet the impact of spatial and temporal resolution on the estimated ecological indicators remains difficult to assess.

In this work, we investigated this question using data collected through the TABMON project (Towards a Transnational Acoustic Biodiversity MOnitoring Network). As recorders, we used BUGG microphones powered by solar panels and transmitting data via a 4G connection, allowing continuous 24-hour recordings. Data were collected over one year across 27 areas in Spain, France, the Netherlands, and Norway, with each area sampled by 2 to 5 recorders. All recordings were analyzed using BirdNET to generate detections of bird species. We used this comprehensive dataset to examine the effects of spatial and temporal downsampling on various ecological indicators at each site, such as species richness, seasonal phenology, and daily activity patterns.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Fine-scale F0 contour extraction for elephant rumbles using infrasonic-adapted time-frequency representations

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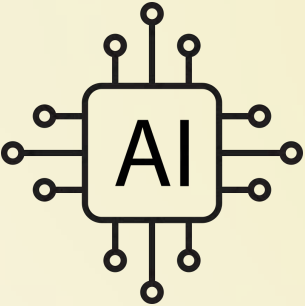
Accurate annotation of fundamental frequency (F0) contours is central to bioacoustic analysis of tonal vocalizations, but remains difficult when signals are noisy, spectrally complex, or lie in unusual frequency ranges. The rumbles of African savanna elephants (*Loxodonta africana*) are a representative example of such a situation: their F0 can be as low as 15 Hz, exhibit subtle modulation patterns, and is often overlapping or masked by infrasonic background noise. Indeed, we found that existing algorithms perform poorly in this regime, and suitable tools for manual annotation are lacking.

We address this problem with two main contributions. First, we present a custom infrasonic-adapted time-frequency representation, which resolves frequencies down to 5 Hz with gradually decreasing bandwidths, making rumble F0 contours clearly visible and naturally analyzable. Second, based on this representation we develop a three-stage contour extraction pipeline. The first stage tracks the spectral peaks of the first harmonic (F1), which is typically the most prominent component of a rumble. In the second stage, users can manually inspect and correct the extracted F1 contours by clicking directly on the representation images in a GUI. In the third stage, a refinement algorithm derives the final F0 trajectory from the F1 prior by maximizing harmonic coherence at a higher time resolution. This yields fine-scale F0 contours that retain the numerical precision and consistency of automatic extraction while allowing lightweight manual supervision.

We use this method to analyze modulation patterns in our rumble dataset and to guide a DDSP-inspired rumble synthesis model. With suitable adaptations of the underlying time-frequency representation, the same pipeline has already been successfully applied to other vocalizations, including cheetah chirps.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

5 years of PAM – Learnings from the “Agro4esterie” Project

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The Agro4esterie project promotes agroforestry in four cantons of Western Switzerland. Agroforestry integrates trees and shrubs into farmland and is expected to benefit biodiversity, yet empirical evidence from newly established systems in temperate regions remains limited. To assess biodiversity responses, passive acoustic monitoring (PAM) targeting birds and Orthoptera was conducted over five years. Recordings were collected regularly at 21 monitoring sites using AudioMoth recorders.

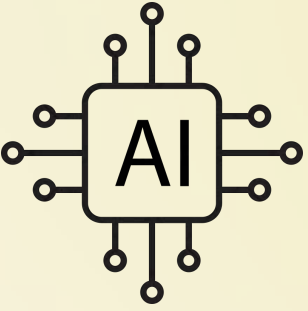
Subsequent analyses explored deep-learning classifiers for Orthoptera and compared Orthoptera monitoring methods based on manual field observations versus manual annotation of PAM recordings. In addition, BirdNET detections were used for occupancy modelling to assess the occurrence of priority bird species and landscape-level effects on bird communities.

The work on deep-learning for Orthoptera classification highlighted challenges related to training data and model performance, but also illustrate the potential of these approaches for future large-scale acoustic monitoring. The Orthoptera method comparison suggests that PAM can complement traditional field surveys and that diverse vegetation strips may positively influence orthopteran diversity. Results from the bird occupancy modeling indicate an overall positive trend in priority bird occurrence in newly established agroforestry systems, although responses varied among species.

This synthesis presents first insights from PAM monitoring within the Agro4esterie project and discusses ecological findings together with methodological challenges and opportunities for applying acoustic monitoring in agroforestry biodiversity assessments.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Active Learning for Bioacoustics

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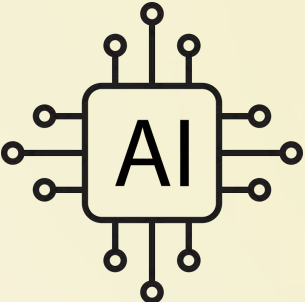
A fundamental challenge across bioacoustics domains (terrestrial and marine) is the annotation of unlabelled data. Passive acoustic monitoring systems generate significant amounts of data, but only a small portion can be feasibly annotated by expert human annotators. Since model performance depends heavily on the quality and quantity of labelled data, this raises the question: Given vast amounts of raw acoustic data and limited annotation resources, which data should be prioritised for labelling?

Active learning (AL) is a critical strategy for scaling bioacoustic monitoring. AL is an iterative method of data selection, annotation and model training. Fundamentally, AL aims to optimise model performance using less labelled data, thereby minimising annotation requirements. We discuss the key challenges and considerations when applying AL to passive acoustic monitoring at scale including domain shift, imbalance, computational cost, annotation complexity and evaluation.

Here we review these challenges and the landscape of AL methods available to practitioners, contrasting data selection objectives with adjacent tasks like model validation and distributional coverage. AL design involves tradeoffs that are difficult to benchmark in isolation. To address this, we present BaseAL, an open framework for evaluating AL methods under realistic bioacoustic conditions. We describe the development of BaseAL and its use in the Active Learning for Bioacoustics BioDCASE data challenge. The challenge is designed to drive methodological advances, while remaining accessible to newcomers to the field.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

From echolocation to automatic identification : in which cases can we trust machine learning software to identify European bats?

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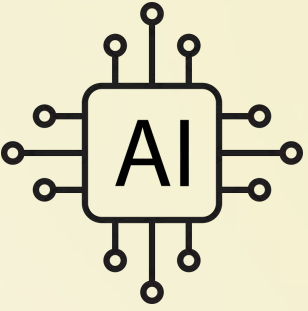
Bats are nocturnal and cryptic species, hence difficult to study. Passive acoustic monitoring offers an efficient, non-invasive method. The large quantity of data produced makes manual identification difficult and time-consuming; automatic tools are needed to detect and identify species. Despite providing confidence score to each detection, it can produce misidentifications, particularly among closely related species. Manual validation therefore remains essential, especially when the software is used outside the conditions for which it was originally trained for.

Here, we investigate the performance of Tadarida, a tool originally developed for a citizen science project to study French bat population trends. To that aim, we tested several variables that could influence its identification success in two different contexts : (1) on the individuals counts of cave-dwelling bats (*Miniopterus schreibersii*) at cave entrance, species for which the acoustic niche overlaps with other common bat species, and (2) on monitoring bat activity in a very noisy environment (coastal and offshore, MIGRATLANE project) for which Tadarida was not trained. To address this, we manually validated a stratified sample of recordings to identify the conditions under which misidentifications occur.

We found that environmental variables in caves affect sound quality and confidence index value : *Miniopterus schreibersii* produces unusual calls if there is dense vegetation near the entrance and if there are too many emerging bats, thus leading to failure in acoustic counting. In the offshore context, preliminary results showed that Tadarida's performance is lower than inland, with noise often misidentified as bats on offshore structures. Using two case studies, we demonstrated that automatic acoustic identification of bats coupled with partial manual checking of data is key to understanding the sources of errors and therefore obtaining a robust dataset. Such large data set will improve our understanding of bat ecology and conservation.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Use of Convolutional Neural Networks for detecting the individual signature of the ‘Cry’ vocalization emitted by the thick-tailed Bushbaby (*Otolemur crassicaudatus*)

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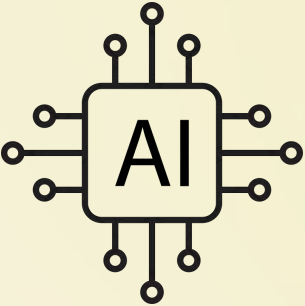
Introduction: The thick-tailed bushbaby (*Otolemur crassicaudatus*) is a nocturnal strepsirrhine primate found in southern and eastern Africa. Although its general ecology has been documented, significant gaps remain regarding its social dynamics and vocal communication. In this species, acoustic signals constitute the primary channel of social cohesion and territoriality. The social call “cry” plays a central role in individuals recognition and enables long-distance inter-individual communication. However, the specific acoustic signatures of this call remain unknown. A detailed study of this vocalization therefore represents a crucial step toward understanding the species’ sociality and behavioral ecology.

Methods: This study is based on a dataset of 2,189 hours of recordings, collected using both passive and active acoustic monitoring devices at the Lajuma Research Centre in South Africa. Although the identity of callers is known for part of the dataset, the main challenge lies in the automatic detection and characterization of individual signatures across the entire dataset. A deep learning approach, including the use of convolutional neural networks and transfer learning tools such as BirdNET, will be explored to extract and structure the acoustic information contained in “cry” vocalizations.

Results: This presentation will introduce the methodological approach developed to extract individual acoustic features, along with preliminary results. The characteristics of the vocalizations will be related to biological and ecological variables (sex, age, body mass, habitat type) in order to explore the determinants of acoustic variation in “cry” calls in *Otolemur crassicaudatus*.

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BIOACOUSTICS APPLICATIONS, AI [● REC] RECOGNITION AND BIODIVERSITY MONITORING TUESDAY 16TH

Acoustic Characterization of Buzzing Sounds in European Bumblebees

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The global decline of insects, particularly key pollinators like bumblebees, is of critical ecological concern and has become a pressing conservation issue. Bumblebees are indeed considered to be one of the most productive and impactful keystone pollinators in temperate and alpine climates because of their morpho-physiological adaptation to cold environments and specialized buzz-pollination strategy. This functional trait makes them essential pollinators for many wild taxa, such as Bilberry (*Vaccinium myrtillus*), and cultivated crops like Solanaceae. Their central importance in contributing to ecosystem functions emphasizes an urgent need for accurate, efficient, fast and cost-effective population monitoring to mitigate future declines and develop adaptive conservation measures. However, visual monitoring of insects is notoriously difficult, and traditional scientific monitoring techniques are often time-expensive and resource-intensive.

In this context, passive acoustic monitoring (PAM) methods represent a compelling non-invasive approach to overcome current spatio-temporal limitations and could fulfill the urgent need for improved monitoring of pollinator populations. For now, the study of European bumblebees' acoustic features remains limited, although pioneering research has begun addressing this gap.

Building on the BumbleBuzz project (2023-2025), which attempted to discriminate bumblebees species and behaviour based on their buzzing sounds, this presentation will outline the methodology and preliminary results of a Master's thesis designed to: (i) characterize the acoustic parameters of flight and pollination buzzes for major European bumblebee species, (ii) explore how these acoustic signatures relate to individual biological traits, including sex, caste, body size, and wing condition, and (iii) identify the biotic factors driving sonotype diversity across altitudinal gradients to better understand their ecological functionality. This study uses a dataset collected across France and the UK within the framework of the BBeeDeep project, an initiative focused on developing frugal AI models for the automated classification of bumblebee species based on their acoustic signatures.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Listening to Flowing Water: Auditory Perception of Water sounds in Natural Environments

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Water is a vital ecological resource whose acoustic signature shapes natural soundscapes, yet the sensory mechanisms by which humans perceive and interpret these liquid sounds remain poorly understood. This research investigates how humans detect and discriminate sounds produced by running-water in ecologically-valid environments, and which auditory cues support these abilities.

Across two complementary studies, we combined large-scale field recordings, psychophysical experiments, and auditory modelling to address this issue. Natural soundscapes were recorded in Mediterranean riparian forests under a wide range of conditions, including variations in river facies, hydrodynamic state, vegetation structure, moment of day and season. In the first study, listeners performed a basic detection task to assess the ability to perceive the presence of water within these natural scenes.

In the second study, listeners completed an oddity-discrimination task to assess the ability to perceive changes in river hydrodynamics associated with variations in discharge, flow velocity, and local facies. Behavioral results show that water perception is strongly constrained by physical factors such as distance to the water source, and by ecological factors, including seasonal and environmental variability. Both detection and discrimination performance can be accounted for by a set of diagnostic auditory cues computed at the output of cochlear and modulation filters. Loudness played an important role. In addition, sound-texture statistics reflecting temporal-envelope sparsity (skewness and kurtosis) and cross-channel or cross-band coordination at the output of cochlear and modulation filters consistently predict listeners' judgments.

By extending the psychoacoustic study of sound textures initially developed for controlled laboratory sounds to highly variable natural soundscapes recorded in forested habitats, this work demonstrates that common mechanisms underlie both the detection of water and the perception of hydrodynamic change, and suggest that humans are equipped with perceptual mechanisms allowing them to monitor water acoustically in complex environments.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Impact of urbanisation and noise pollution on intra and inter-individual variability in song production

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Urbanisation and pollutions are known to disturb organisms at many levels such as phenology, behaviour or morphology. While most studies investigate differences in mean phenotypes between city and forest or along pollution gradients, recent studies explored phenotypic variation and have highlighted that both intra-individual and inter-individual variability increased in urban habitats, cities being more heterogenous than forests, with patches of various microhabitats. If more and more studies investigating phenotypic variation between habitat are being published, the study of variability along gradients within cities are still scarce.

In a previous study, we found that great tits, but not blue tits, increased their song maximum frequency in response to noise. In the present study we explored the role of urbanisation and noise on intra and inter-individual variation on great tit and blue tit song minimum and maximum frequencies. Between 2022 and 2024 we recorded birds in three pairs of city-forest in western France. Intra and inter-individual variation on maximum and minimum frequency were first compared between forest and city using multivariate mixed models and then studied along a noise gradient inside each habitat using double hierarchical generalized linear mixed models.

Our results suggest that great tits are more variable at both intra and inter-individual levels in cities than in forest consistent with the expectations that in more heterogenous habitat, organisms tend to be more variable. Noise, had the opposite effect on intra-individual variability, with individuals being less variable when noise increased. In both habitats, inter-individual variation was not affected by noise. This study points out the need of investigating more on phenotypic variability along gradients and not only between habitats to better understand underlying processes promoting variability and effects of urbanisation.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Assessing the impact of agriculture practices on bird communities using ecoacoustics

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Since 1962 and the publication of Rachel Carson's book "Silent Spring", the threat posed by intensive agriculture to the abundance and population trends of birds has been extensively documented. Practices that are more respectful of biodiversity are needed, and it is essential to evaluate their effectiveness. Traditionally, to do so, data collection has been carried out by human observers in the field, who conducted point counts. However, this method is time-consuming and allows birds to be observed only for a limited time at each site. In comparison, passive acoustic monitoring (PAM), combined with deep learning tools, could enable monitoring on much larger temporal and spatial scales, although this approach remains to be tested in agricultural landscapes.

The objective of this study is to use ecoacoustics to determine whether bird acoustic communities are influenced by agricultural practices at the landscape scale.

To this end, we collected data from 20 agricultural areas across France during the spring, between 2023 and 2025. In each area, recordings were made over several days at multiple sites located in landscapes with varied agricultural practices. The collected acoustic data were processed using BirdNET, an automatic classifier of bird vocalisations (convolutional neural network). Since validating a subset of detections is crucial to avoid any bias, this step must be carried out carefully by experts to allow for the adjustment of BirdNET's confidence thresholds according to each species. Because acoustic data differ from occurrence data, further reflections are needed to determine how to define an acoustic community and how to perform statistical analyses on this data without knowing the detectability of the target species.

Through this study, we aim to demonstrate that ecoacoustics is a promising monitoring method in agricultural landscapes, provided that the methodological challenges associated with collecting vocalisation data are taken into account.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Evaluating the influence of agricultural practices on the stopover potential of orchards for Pied Flycatchers during post-nuptial migration using Passive Acoustic Monitoring and BirdNET

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Migration represents a critical bottleneck in the life cycle of long-distance migratory species. During this period, individuals rely on multiple stopover sites to restore energy, essential for migratory performance and survival. In Europe, agricultural practices are a major driver of bird declines, yet most studies focus on the breeding period, and the relationship between agriculture and migratory species remains poorly understood. The irregular and unpredictable use of stopover sites poses a major monitoring challenge, requiring high-resolution spatiotemporal data. Passive Acoustic Monitoring (PAM), combined with BirdNET, offers a promising solution.

We assessed the potential of apple orchards as stopover sites for the pied flycatcher (*Ficedula hypoleuca*), a long-distance migratory species known to use orchards during migration. We investigated whether PAM and BirdNET could characterize migratory passage, detect variation among orchards, and evaluate the influence of orchard management on these patterns. Continuous recordings were collected from 5 August to 5 October across 18 orchards in southern France, classified into two management categories based on landscape features and management intensity.

Our results show that PAM and BirdNET reliably capture both the timing and intensity of migratory passage, revealing local differences in habitat use. Pied flycatchers arrived earlier in less intensively managed orchards, suggesting landscape-scale habitat selection by early individuals. However, average activity density over the migration period did not differ between management classes, despite considerable variability among orchards, indicating that the ecological factors driving habitat use were not fully captured by these categories. Notably, migration was more synchronized across low-intensity orchards, likely reflecting more stable temporal resource availability. This study highlights the potential of PAM and BirdNET to monitor migratory passages and explore habitat selection during stopover. It provides new insights into how agricultural landscapes, such as apple orchards, can support migratory birds, offering valuable tools for conservation and management strategies.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Unsupervised detection and classification of biological and anthropogenic sounds in long-term underwater recordings at the Dogger Bank, central North Sea

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Passive acoustic monitoring (PAM) has become a standard method in marine biodiversity research, since marine mammals rely heavily on the production and perception of sounds. Detecting different sound events and quantifying their spatial-temporal patterns can provide ecologically valuable insights into vocalising animals and anthropogenic noise sources. The Dogger Bank, largest sublittoral sandbank in the North Sea, is known to be a favourable foraging area for cetaceans, including minke whales and white-beaked dolphins. Yet, long-term data on the occurrence of marine mammals and anthropogenic activities in this area remain scarce.

In this study, PAM data collected at two locations at the Dogger Bank from February to June 2024 were analysed to identify the main contributors to the marine soundscape and to explore spatio-temporal patterns in their acoustic presence. Manual analysis of such long-term underwater recordings is not always feasible, yet, automated algorithms that simultaneously detect anthropogenic, biological, and abiotic sounds are still rare. Therefore, we apply a deep learning approach developed by Parcerisas et al. (2024) that automatically detects and clusters all potentially relevant pronounced acoustic events in a largely unsupervised manner.

Initial results show that 85% of the clusters analysed are homogeneous. The data reveal a diverse soundscape, particularly between late April and early June, comprising various biological sounds, including minke whales and, most likely, white-beaked dolphins, as well as a considerable amount of anthropogenic noise, primarily from ships, airguns and sonar. Sonar signals were detected predominantly in the first half of the day between 02:00 and 13:00, whereas dolphin vocalisations seem to occur more frequently in the second half of the day between 15:00 and 02:00. These findings provide an important overview of the main components of the soundscape around the Dogger Bank and serve as a valuable basis for more detailed, sound-specific analyses.

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ECOACOUSTICS, AGRICULTURE AND ANTHROPOGENIC CHANGE



WEDNESDAY 17TH

Cross-medium soundscape analysis in the Venetian Lagoon: a preliminary work

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The Venetian Lagoon is a 550km² shallow coastal lagoon located at the North-West of the Adriatic Sea. It is a patchwork of multiple habitats from salt marshes to seagrass meadows, as well as a biodiversity hotspot protected by 3 EU Directives, while in the meantime, faces a strong anthropogenic pressure: Venice hosts almost 6M tourists per year due to the precious history and cultural influence, its airport is a massive transportation hub welcoming more than 11M passengers per year, and cargos shipping to the industrial ports of Venice and Chioggia handled 26M tons of goods in 2025.

This complex ecosystem has been well studied ecologically in the last decades but only few ecoacoustic studies have treated this topic while focusing mostly on the Lido inlet area. Transitional systems such as the Venetian lagoon pose additional challenges for acoustic monitoring and we expect to highlight strong spatiotemporal patterns.

Here we introduce an ambitious cross-medium framework to characterize spatial and temporal variations of the Venetian Lagoon soundscapes both out of the water and underwater soundscapes and evaluates the propagation and potential effects of anthropogenic noises in the macrohabitats of the lagoon. As preliminary work, we identify a first distance gradient toward one navigation channel and acoustically monitor the different soundscapes along it. Our objectives are the following: (i) to evaluate and quantify the sound propagation of the boat noises within the same water body and macrohabitat, (ii) to identify the common characteristics and differences among the soundscapes to leverage a potential acoustic signature of one ecosystem of the lagoon using machine learning techniques and in regards to the many ecological studies of the area, (iii) to validate this framework and generalize this setup on a wider zone in the lagoon.

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ACOUSTIC MONITORING, LOCALIZATION AND SENSOR NETWORKS

THURSDAY 18TH

Localization of Biophonic Sources in Noisy Environments using a Spherical Microphone Array

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Acoustic monitoring of soundscapes is increasingly being used for ecosystem monitoring. It has the advantage of being minimally invasive and requiring minimal human cost. Indeed, Passive Acoustic Monitoring (PAM) devices can be effectively deployed in the environment and autonomously record the soundscape. Through these recorders, a large number of samples are collected. These monophonic signals are processed to characterize the soundscape. Given the volume of data collected, approaches for automatic sound event detection and classification have emerged, such as BirdNET. However, these methods are highly sensitive to the quality of the collected recordings, particularly to their SNR (Signal-to-Noise Ratio). During field recordings, the SNR is degraded in the presence of geophonic noise, when sources are distant, or when other species are vocalizing at the same time and on the same frequency.

Besides, capturing soundscapes using a Spherical Microphone Array allows for the recording of multichannel signals and array processing. By processing these recordings using beamforming techniques, it is possible to determine the angular location of the sound sources and to extract cleaned signals corresponding to the directions of the sources. Spherical Microphone Arrays (SMA) present the advantage to perform rotationally invariant beamforming techniques, meaning that all directions are enhanced uniformly regardless of the array's orientation. Spatial filtering improves the detectability of the sources and facilitates their classification.

In this work, the supervised analysis of noisy soundscapes with spatial filtering is presented. After performing SH beamforming on multichannel signals, one steers in 12 directions, extracting directional signals with 12 non-overlapping beampatterns. Therefore, 12 directional spectrograms are produced and analyzed, enabling the detection of masked sources at lower volume. The duration and frequency band of each sound event are acquired. The localization of sound sources is obtained with beamforming on the corresponding time-frequency tiles using the CLEAN-SC deconvolution algorithm, which is robust to noisy environments. This method is tested through soundscape simulations and is applied to a recording of a natural soundscape.

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ACOUSTIC MONITORING, LOCALIZATION AND SENSOR NETWORKS

THURSDAY 18TH

Modeling Acoustic Detection Space for Large-Scale Monitoring of the Rock Ptarmigan in Complex Terrains

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The POIA project (Espèces Arctico-Alpines) investigates the Rock Ptarmigan, a vulnerable alpine bird whose population is declining due to climate change, anthropogenic pressure, and habitat fragmentation. Due to the species' elusive nature and the logistical challenges of their remote habitats, passive acoustic monitoring using autonomous recorders has been implemented to capture male vocal activity during the breeding season, providing a non-invasive and scalable alternative.

Between 2021 and 2022, a large-scale acoustic monitoring campaign was conducted using 80 autonomous recorders distributed across the Alpine massif. The primary objective was to extract activity indices to estimate individual abundance over time. While advanced signal processing was successfully applied to detect vocalization and discriminate between individuals, the alpine environments, where topography and atmospheric conditions significantly modify sound propagation, introduces strong variation in the detection space of each recorder. Accurately modeling this detection space is critical for interpreting vocal activity data, particularly given the high variability in vocalization detection observed across different measurement sites.

This work presents a numerical tool designed to compute and map acoustic detection space in complex environments by solving the parabolic wave equation. We demonstrate its application across the 80 measurement points and provide an analysis of how local topography influences detection space. Furthermore, we discuss the impact of additional environmental variables (background noise levels, wind conditions, and ground impedance) on acoustics indices. Our findings highlight the critical role of these factors in refining acoustic indices for reliable population assessments.

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ACOUSTIC MONITORING, LOCALIZATION AND SENSOR NETWORKS

THURSDAY 18TH

Can Distributed Acoustic Sensing (DAS) be used to detect mid-frequency marine mammals?

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Distributed Acoustic Sensing (DAS) is increasingly used in marine bioacoustics, particularly for detecting very low-frequency signals such as those produced by large baleen whales. However, its potential for monitoring vocalisations from mid-frequency marine mammals remains largely unexplored. Expanding the usable frequency range of DAS would significantly increase its value for monitoring and mitigation applications.

This study investigates the feasibility of using DAS deployed on subsea telecommunications Fibre Optic (FO) cables to detect mid-frequency signals of various marine mammal species, including humpback and killer whales. We evaluate detection performance as a function of signal frequency, source distance, and incidence angle relative to the cable.

We consider two complementary datasets. The first comes from a controlled experiment conducted in Trondheimsfjord, Norway, where an autonomous underwater vehicle (AUV) travelled along an existing FO cable while broadcasting a library of acoustic signals including marine mammal vocalisations. This dataset allows us to estimate detection sensitivity across known ranges, angles, and frequencies. The second comes from a short FO cable of smaller diameter deployed in a pilot test offshore in Singapore. Although no biological sounds were transmitted in this second experiment, the dataset provides an important comparison from a much thinner FO cable than in the Trondheimsfjord, a factor that is expected to impact sensitivity to higher-frequency acoustic signals.

The results provide early insights into the practical detection limits of DAS for marine mammal monitoring beyond the currently studied low-frequency regime. In the long term, improving DAS capability for mid-frequency sounds could enable large-scale passive monitoring using existing FO infrastructure. Such systems may eventually support near-real-time animal localisation, enabling applications such as vessel collision avoidance and broader population monitoring.

This work was partially supported by the Research Council of Norway under grant number 309960 and through the joint NTNU-SINTEF organisation 'Gemini Senter for Maritim Kommunikasjon' (GMK).

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ACOUSTIC MONITORING, LOCALIZATION AND SENSOR NETWORKS

THURSDAY 18TH

Localizing sounds in the forest: a Bayesian approach with uncertainty in recorder position

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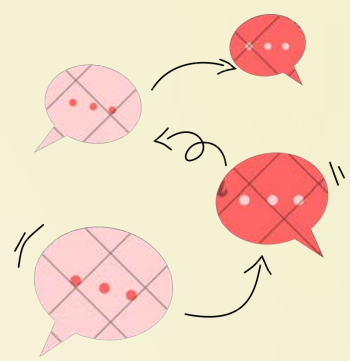
Acoustic localization of animal sounds can provide valuable fine-scale spatial information from passive acoustic monitoring data. Although several hardware solutions are now available, methodological developments are still needed to facilitate their adoption by field ecologists. In forest environments, key technical challenges include accurate estimation of recorder positions and time differences of arrival (TDOA), due to GPS uncertainty and signal degradation.

In this study, we developed an acoustic localization workflow based on two Bayesian models. The first model estimates recorder position while explicitly accounting for GPS uncertainty. The second model estimates sound source position while incorporating uncertainty in TDOA estimation. We evaluated the workflow using both computer simulations and field experiments.

Our results show that accounting for GPS uncertainty reduces localization error. Under forest conditions, we achieved a mean localization error below 5 m. Although further refinements are needed, this work provides a user-friendly acoustic localization method for ecological applications in forest environments.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

Effects of intruder arrival on the individual and chorus vocalization dynamics in the Brazilian tree frog, *Boana albomarginata*

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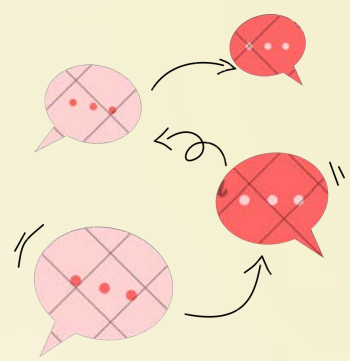
The advertisement call is the most conspicuous and commonly produced vocalization in frogs. It is mainly linked to reproduction, since males use it to attract females for mating. It also plays a key role in regulating male-male interactions. Through this call, males can evaluate the physical traits of nearby rivals. We tested the plasticity in calling behavior of the Brazilian treefrog *Boana albomarginata* in response to the simulated arrival of males (playback experiment) with either higher or lower competitive potential, in two different social contexts: (I) males calling alone; (II) males calling in natural choruses.

When assessing males calling alone, we observed that males exhibit territorial behavior toward any intruding male at their calling site by increasing call rate, call response rate, and emission of territorial calls, independent of the rival's competitive status. Nevertheless, the intensity of the response was higher when males were presented with the longer-duration call stimulus (corresponding to competitive intruders) and was positively associated with the focal male's body size. These findings suggest that male-male interactions integrate information about both the opponent's traits and the caller's own condition.

For choruses, we evaluated only the overall chorus call rate because it was difficult to distinguish individual responses. Our results showed that the chorus call rate was not affected by the broadcast stimuli. Additionally, the interaction between experimental period (pre-, during, and post-stimulus) and chorus density (low- and high-density choruses) did not explain variation in chorus call rate. This study provides comprehensive insights into how spectral and temporal call properties mediate male-male interactions in *B. albomarginata* and suggests that the arrival of a male affects the calling behavior of individuals calling alone. However, when males are interacting within a structured chorus, the arrival of an additional male does not alter the acoustic dynamics of the group.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

Perception of trill vocalizations in the African striped mouse: Influence of social context and receiver sex

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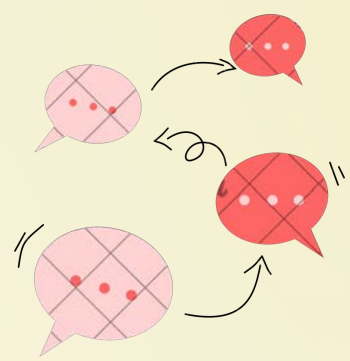
While rodents serve as the primary models in biomedical and physiological research, the complexity of their social communication remains paradoxically poorly understood. The African striped mouse (*Rhabdomys pumilio*) provides an ideal study model due to its remarkable social complexity. Indeed, this species exhibits a cooperative system, including paternal care and communal assistance in offspring rearing and nest building. As observed in other cooperative species, it is in such social systems that complex acoustic communication emerges. This dynamic also appears to be present in the African striped mouse, whose repertoire of seven distinct call types, produced differentially depending on social contexts, likely allows for the fine regulation of interactions. Among these signals, "trills" are distinguished by their unique acoustic structure. Produced by both sexes in either aggressive or courtship contexts, they illustrate a modulated use of the vocal repertoire according to the social environment.

This study aims to determine whether the perception of these trills varies based on the sex of the receiver and the social context of emission (aggressive vs. sexual). We test the hypothesis that these signals convey specific contextual information, triggering differentiated behavioral responses. A playback protocol on wild individuals was implemented to broadcast 5-second trill sequences from three social contexts: male-male aggression, female-female aggression, and male-female courtship. Neutral calls from the same emitters serve as controls to assess the specificity of the response to trills. Behavioral parameters (attraction, avoidance, vigilance) and acoustic characteristics of the stimuli (rhythm, modulation) are analyzed.

While analyses are ongoing, we predict a marked attraction of females toward courtship trills, whereas trills from aggressive contexts are expected to induce avoidance or vigilance behaviors, with significant variations between the receiver and emitter sexes. This study will enhance our understanding of how social information is transmitted and perceived in wild rodents.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

Aversive behavioural responses of killer whales to sounds of longfinned pilot whales

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Interactions are common among marine species which use sound as the primary form of communication, yet the role of acoustic signals in mediating these interactions remains poorly understood. Long-finned pilot whales (*Globicephala melas*) are attracted to killer whale (*Orcinus orca*) sounds, leading to antagonistic interactions.

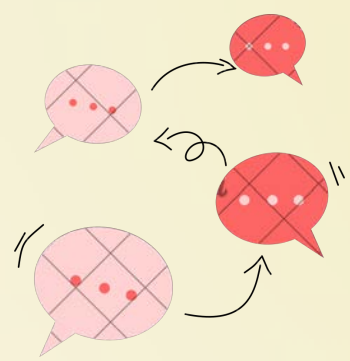
To test whether these interactions are acoustically mediated in both directions, playback experiments (n = 15) using pilot whale and control sound stimuli were conducted on eight killer whales equipped with multi-sensor tags.

The tagged whales exhibited an avoidance response to pilot whale sounds, evidenced by fast, directed movement away from the sound source and increased cohesion and alignment of group members. Calling rate often increased initially, followed by a pronounced decrease.

These findings demonstrate that killer whales, the oceans' apex predators, respond to acoustic signals of pilot whales and likely perceive their presence as a threat, similar to naval sonar. This study provides important insights into the complexity of cetacean behaviour and acoustic mechanisms shaping multi-species community dynamics.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

Coordination and communication of cooperative offspring care behaviour (babysitting) in meerkats

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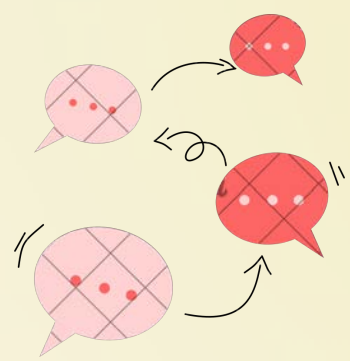
In group-living animals, coordination is essential for maintaining cooperation and depends on effective information flow within social units. Understanding how communication shapes collective behaviour is key to explaining the evolution of sociality.

In this study, I investigate the communicative mechanisms underlying the coordination of pup care behaviour in the cooperatively breeding Kalahari meerkats (*Suricata suricatta*), by examining how acoustic, visual and spatial information contribute to the coordination of babysitting behaviour. I carried out full-group collaring by deploying biologging-collars equipped with audio, GPS and accelerometer recorders on all individuals across multiple meerkat groups. These data provide the opportunity to capture all vocalizations produced by babysitters and non-babysitters, as well as their movements during babysitting periods. Additionally, I also conducted playback experiments to examine how foraging individuals adjust their vigilance, movement decisions and return probability in response to acoustic cues from the supposed babysitter.

Preliminary results indicate that vocal cues produced by babysitters elicit strong behavioural responses and potentially play a key role in the coordination of babysitting. By linking individual-level vocal, spatial and visual behaviour to group-level patterns of babysitting, this study provides insight into how meerkats integrate multimodal information to coordinate offspring care and more broadly illustrates how communication supports stable cooperation in animal societies.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

When cohesion breaks down: acoustic structure and information encoded in meerkat lost calls

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Meerkats (*Suricatta suricata*) are small carnivores living in cohesive family groups in the Kalahari Desert. As in other group-living species, individual safety against predators depends on maintaining group spatial unity, particularly during collective movements, when temporarily separated individuals are vulnerable. Meerkats are highly vocal and communicate using a wide range of calls across diverse social and environmental contexts. When separated from their group, individuals have been observed to emit lost calls to elicit responses from conspecifics. However, these calls have not yet been formally described, nor has their acoustic structure, informational content, or functional role in separation contexts been investigated.

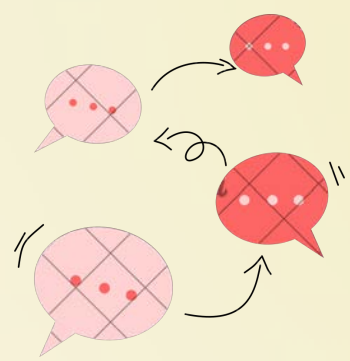
We recorded vocalisations from 20 wild subordinate meerkats (both sexes, >10 months old) in an experimental setting involving temporary group isolation of a focal individual (translocation experiments conducted in early 2025 at the Kalahari Research Centre, South Africa), using a collar-mounted audio tag and a shotgun microphone.

We identified three types of lost calls produced in repeated bouts, which appeared to occur in a consistent sequential order. Their acoustic structure further suggested a gradual increase in arousal, reflected in an upward shift of energy toward higher frequencies and the emergence of nonlinear phenomena. Although substantial inter-individual variation in vocal production was observed during homing, individuals were generally more vocal during the initial phase of the experiment. Call production was associated with vigilance (bipedal posture) and movement (walking or running). Life-history traits (sex, age, prior navigation experience, and familiarity with the territory) and homing success did not explain variation in calling rate, nor did lost calls appear to facilitate reunion in the final phase.

This study provides the first description of meerkat vocal behaviour in separation contexts and contributes to a broader understanding of how vocal communication may encode internal states and support cohesion dynamics in social animals.

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SOCIAL COMMUNICATION AND INFORMATION PROCESSING

THURSDAY 18TH

The Role of Vocalisations in Grooming Interactions in Meerkats (*Suricata suricatta*)

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In social animal species, communication, the exchange of information between conspecifics, is essential for the establishment and regulation of social interactions. Among these species, meerkats (*Suricata suricatta*) are small carnivores inhabiting the semi-arid savannahs of southern Africa that live in cohesive family groups of up to 50 individuals. As in many mammals, meerkats engage in allogrooming, a behaviour that serves both health-related purposes (e.g., parasite removal) and key social functions, such as strengthening social bonds and regulating dominance relationships within the group. Although meerkat acoustic communication has been extensively described, little is known on how vocalisations are used during allogrooming.

The aim of this study was to characterise the vocalisations produced during allogrooming and to assess whether they contribute to the modulation of grooming dynamics, including initiation, maintenance, pausing, termination, and role changes (groomer, groomee, or mutual grooming). A total of 259 grooming sequences involving 95 wild meerkats (47 females and 48 males from five groups) were video- and audio-recorded between June and September 2025 at the Kalahari Research Centre, South Africa. For each grooming sequence, vocalisations were manually labelled and assigned to call types, and information on grooming roles and behavioural events was extracted from video recordings.

Analyses revealed six call types emitted during grooming; however, these have also been previously described in other contexts and do not appear grooming-specific. Vocal production showed high variability across sequences in both call rate and call types. No clear pattern indicated that meerkat vocalisations could influence grooming dynamics. Instead, meerkats may rely on other cues, such as tactile interactions, body posture, and movements (e.g., approach and withdrawal). Overall, this study contributed to a better understanding of meerkat acoustic communication and provided insights into the role of vocalisations in social bonding among both related and unrelated individuals in group-living mammals.

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ARTISTIC SESSION

THURSDAY 18TH

Rhythm 'n Blue

Tanja Böhme¹

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Language is the medium through which identity and individuality are constructed. Language enables us to express thoughts and place them within a communal framework. By giving animals a voice through innovative bioacoustic techniques, I challenge the dividing line between humans and animals in my artistic practice. What happens when animals suddenly gain a voice? In her posthumanist discourse, philosopher Rosi Braidotti calls on us to redefine the human (bios) and to integrate ourselves into the zoé-egalitarianism. Zoe thus ranges across the biotic and abiotic spectrum from bacteria and animals to geological structures and technology. The capacity to think and produce knowledge is no longer viewed as 'the exclusive prerogative of humans alone, but is distributed across all living matter and [...] self-organizing technological networks'.

The sudden experience of animals speaking not only raises ethical and philosophical questions but also highlights the political dimension associated with the act of speaking. Who speaks, who has the floor, and who remains silent? These questions expose power structures within our society. In a fragile world that increasingly demands a shift in thinking, scientists, artists, and philosophers are lending their ears to other beings. This interdisciplinary work encourages us to rethink our own humanity and to reposition our empathy and responsibility toward the Earth and all its inhabitants.

In my project Rhythm 'n Blue, I collaborated with the Alfred Wegener Institute in Bremerhaven and marine biologist Fredrik Christiansen from Aarhus University in Denmark. I incorporated their scientific data into a video-sound-installation which highlights the vulnerability of our oceans in times of climate change. --> <https://vimeo.com/939171464?fl=ip&fe=ec>

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ARTISTIC SESSION

THURSDAY 18TH

Talking to extraterrestrials: Acoustic communication in creepers (*Leptonychotes marshallii*) on the planet Niflheim

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In 2050, I joined a spaceship crew on a mission to colonise the ice planet Niflheim. After a four-year journey, we finally arrived and met the native inhabitants. The nickname “creepers” quickly became popular among the crew, although their self-designation remains unknown. Within the scientific community, we prefer the name *Leptonychotes marshallii*, given in honour of our expedition leader, Kenneth Marshall.

As a PhD student in bioacoustics, my role is to study the acoustic communication system of creepers. They produce more than 60 distinct vocalisations, ranging in duration from milliseconds to more than a minute, and spanning frequencies from 50 Hz to nearly 50 kHz. Creepers often combine several different vocalisations to form more complex acoustic sequences. We have also observed that different populations across the planet appear to exhibit distinct dialects. The mechanisms of vocal production, the evolutionary history of these dialects, and the functions of this complex communication system at the interface of three propagation media (air, water, and ice) remain key questions to be addressed.

Using underwater passive acoustic monitoring and playback experiments, we have, for the first time, described the creepers' vocal repertoire and identified the potential biological functions of several vocalisations and acoustic sequences. These results are critical for improving our understanding of the creepers' biology. Ultimately, I hope that this knowledge will contribute to the protection of this extraterrestrial species while ensuring the safe and sustainable colonisation of the planet Niflheim.

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ARTISTIC SESSION

THURSDAY 18TH

What is knowing an animal by sound? An ontological turn in Anthropophonocene

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Our occidental cultures can be described as visual cultures, regarding the hegemony of this sens on the others. In naturalistic as well as in scientific practice, we understand and differentiate living beings one from the other by looking at anatomical details, recognizing visual patterns, or even killing and dissecting creatures to access the unseen – a testimony of this will to objectify living beings.

But with the rising of bio/ecoacoustic as scientific disciplines, sound is slowly taking a bigger place in the way we describe what is a living being. In the other hand, the technological development of smaller and accessible recording tools leads to the popularization of audio-naturalism. We are analyzing ecological diversity through sound and gathering vast amount of fieldrecording on platform such as Xeno-Canto. Parabolic antennas and microphones are now side by side with binoculars and camera trap on the fieldwork kit.

Nevertheless, even with a greater attention to sound non-humans are making, it seems that scientific communities are still timorous to detach from the paradigm of seeing and it's objective advantage. We can identify birds by the sound they make on site, but we still didn't have any identification key using other sens than seeing: for example, even the ones created to determine bats from their ultrasonic patterns are using visual key, transforming the invisible sound into a visible spectrum.

As part of my PhD in anthropology, I'm asking the question of what is knowing an animal by sound, what are the particular relations that took place when sound is involved. Using two different fieldwork, one regarding the "active-passive controversy" in chiropterologist community, the second with audio-naturalists trying to record non-humans in a polluted "anthropophonocene", I'll discuss on how that question can helps us to understand better naturalist and scientific practice. Grounded in art-science approach, I'll use drawings and recordings from my fieldworks as a restitution.

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ARTISTIC SESSION

THURSDAY 18TH

Tackling noise pollution in protected natural areas through an interdisciplinary approach

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In the context of the biodiversity crisis, protected areas appear to be one of the main solutions. Although there is no clearly established definition of this concept, the aim of these areas is to protect biodiversity in two complementary ways: directly, by limiting human pressures, and indirectly, by influencing the relationship between humans and nature. In this respect, noise pollution could undermine their effectiveness, as it has been shown to affect both ecosystems and the connections we as humans can forge with them. However, as this source of pollution has long been overlooked, there are still few studies that quantify it and examine its consequences on protected ecosystems.

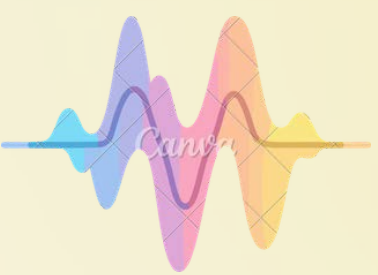
Thus, using the SONOSYLVA database – resulting from a participatory science protocol enabling the recording of over 100 protected forests in mainland France and Corsica over several years – we aim to answer the following questions:

- (1) How much noise pollution is there in protected forests?
- (2) Is it possible to observe impacts on acoustic communities ?
- (3) Is it possible to observe impacts on human perception ?

This project is based on the conviction that research should not be limited to the production of knowledge, but must also question the modes of existence of it. This is all the more important given that the natural sciences, heirs to a rationalist tradition, have contributed to the 'de-animation' of living beings and have been implicated in the progress that has led to the current crisis. It is therefore time to explore other ways of investigating, and interdisciplinarity constitutes a fertile field of experimentation. The challenge lies less in questioning the core of the scientific method than in questioning the ways in which research questions are formulated and results interpreted. Thus, the aim of this project is also to contribute to the development of new epistemologies.

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POSTER SESSION

TUESDAY 16TH

Is visual experience needed to judge physical strength from the voice?

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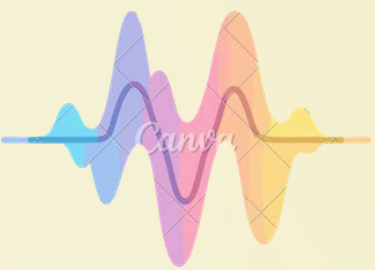
Can humans judge physical strength from the voice without visual experience? To determine whether this capacity may be an experience-independent evolutionary adaptation, versus acquired by visually matching bodies to voices early in development or throughout life, we tested nearly 200 blind and sighted adults who rated the physical strength of male and female vocalizers relative to their own from aggressive roars.

Results reveal that congenitally blind individuals assess relative strength as accurately as sighted listeners, indicating this fundamental cross-modal capacity is experience-independent. Conversely, listeners with acquired blindness performed significantly worse, suggesting that losing previously established visual-acoustic calibrations disrupts person perception. Sex emerged as a primary driver of perceptual accuracy. Male voices were systematically perceived as stronger, but male-male dyad assessments yielded the highest perceptual ambiguity, potentially reflecting evolutionary acoustic "bluffing" in competitive contexts.

Finally, while blind listeners did not systematically underestimate their own strength, they exhibited larger error magnitudes when incorrectly assessing relative strength, highlighting the role of vision in fine-tuning perceptual scales. Ultimately, we hypothesise that the ability to perceive another's strength by listening to their voice stems from an innate predisposition, which is calibrated by visual experience and facilitated by sex recognition.

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POSTER SESSION

TUESDAY 16TH

Shedding light on the impact of solar farms on birds in forests

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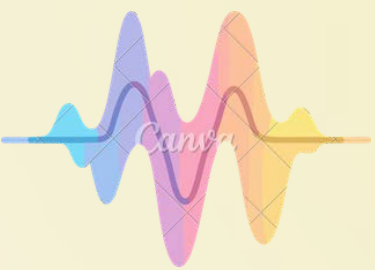
In the face of the climate crisis, renewable energy represents a key alternative to fossil fuels by contributing to the reduction of greenhouse gas emissions. Among these, solar energy is currently experiencing significant growth, including in natural habitats. However, this raises questions about its potential impact on biodiversity. In this context, the aim of the Envoltaïque SE project is to determine the impact of solar farms located in wooded areas on bird communities.

We examined whether the vocal activity of target species differs according to the characteristics of solar farm (inter-row distance, area and age). Data were collected using passive acoustic monitoring at 15 solar farms between march and august (2024, 2025), each paired with two controls (edge and natural habitat), for a total of 45 sites. A key challenge lies in exploiting acoustic detections from automatic identification (BirdNET). A standardized manual verification protocol was applied, enabling the construction of logistic regression curves that model identification reliability as a function of the confidence threshold, ensuring data robustness while minimizing validation effort. Then, the validated data has been integrated into generalized linear mixed models (GLMMs) to assess species response to solar farms characteristics while accounting for the hierarchical data structure.

This work provides a replicable methodological framework for passive bioacoustics in applied contexts and offers first preliminary insights into the interactions between solar infrastructure and birds within forests. Ultimately, identifying key parameters of solar farms that could influence bird populations is intended to guide the design and management of such infrastructures towards practices that better support biodiversity.

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POSTER SESSION

TUESDAY 16TH

Changes in song in response to urbanization and interspecific competition

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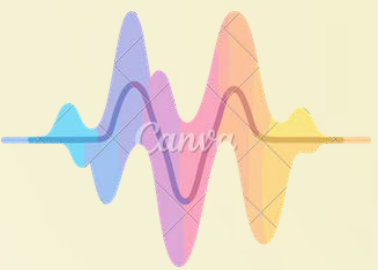
Urbanization profoundly alters natural environments by imposing diverse and often intense ecological constraints on species. These constraints can affect organisms at multiple levels, from phenotype to demography, and influence both intra- and interspecific interactions, either by intensifying or mitigating them. Among these constraints, noise pollution represents a particular ecological pressure, reducing the available acoustic niche for certain species and potentially altering their vocal behaviors.

This study aims to investigate how urban noise and interspecific competition jointly influence song types in two tit species, using recordings collected over four years across diverse environments, including urban and forest habitats. To this end, we employed an unsupervised automated approach to classify songs. Raw recordings were first annotated to generate embeddings, i.e., high-dimensional vector representations, using a convolutional neural network (CNN) capable of extracting fine and complex acoustic features. These vectors were then projected into two dimensions using UMAP, a nonlinear dimensionality reduction method designed to compress information while preserving acoustic variation. The reduced data were subsequently grouped into similarity-based clusters using HDBSCAN, enabling the identification of distinct song types.

This approach made it possible to highlight song types associated with habitats differing in levels of acoustic pollution and in degrees of interspecific competition. These results suggest that urbanization and the presence of competing species can influence the structuring of vocal repertoires, and that AI represents a promising tool for detecting and classifying such variations in a reproducible and objective manner.

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POSTER SESSION

TUESDAY 16TH

Dynamic of acoustic sequences in meerkat pups *Suricata suricatta*

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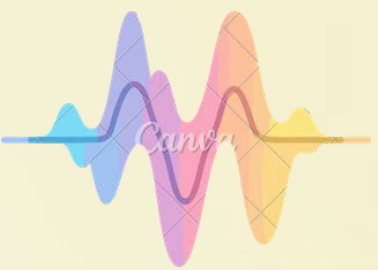
In animal species in which early-stage offspring rely on adults for food provisioning, conflicts over resource allocation arise between offspring and caregivers, who must decide whether to consume the food themselves or allocate it to a juvenile. In this context, begging behavior is assumed to be mediated by honest signals reflecting offspring nutritional needs. In cooperative breeding meerkats (*Suricata suricatta*), pups start foraging with the group at around 4 weeks of age and emit repetitive begging calls that prompt group members to provision them with prey items. While previous studies characterized the different begging call types, their contexts of production and the influence of call rates on helper generosity, comparatively little is known about variability in their acoustic structure and how its modulation affects pup feeding rates.

In this study, we investigated temporal variation in the acoustic features of wild meerkat begging calls by collecting video and acoustic data on 20 pups from five wild groups during group foraging in the Kalahari Desert (South Africa). Using videos, we identified begging sequences between successive provisioning events and measured various acoustic parameters (i.e, temporal, frequency and spectral features, on Praat and Soundgen) for each high-quality begging call in a sequence. To assess a potential relationship between begging call acoustic structure and pup hunger state, variation in these features was analyzed as a function of the duration of the begging sequence, as well as size and number of prey items previously obtained by the pup.

We discussed our results in terms of how motivation is encoded in meerkat begging vocalizations, how helpers decode this information, and its impact on food provision in relation to competition amongst littermates and adult-offspring conflict. Overall, this study enhanced our understanding of the role of acoustic signals in social interactions in cooperative social systems.

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POSTER SESSION

TUESDAY 16TH

Validation of Passive Acoustic Monitoring in wild chimpanzees: a tool for evaluating the complexity of their combinatorial communication system

Francesco Zambianchi¹, Esa A. Ahmad², Adrian Soldati^{3,4}, Klaus Zuberbühler^{2,5,6}, Catherine Hobaiter^{5,6}, Pawel Fedurek^{1,7}, Cedric Girard-Buttoz^{1,8}

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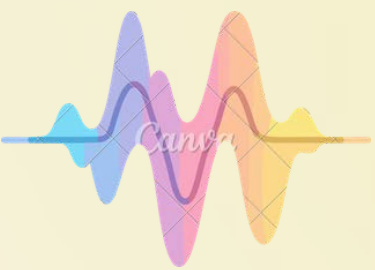
While vocal learning is key to the acquisition of human language, non-human primate vocal production appears to develop in substantially less flexible ways. Recent studies in wild chimpanzees, however, have revealed unprecedented flexibility at a higher level of organization: vocal sequences. To understand how chimpanzees learn to produce vocal sequences, longitudinal documentation of their diversity, structure, and usage across multiple groups and populations is essential. Given that only a limited number of wild groups can be observed directly, indirect acquisition of data through passive acoustic monitoring (PAM) devices is required.

We are conducting validation of PAM data from eastern chimpanzees from two habituated communities, Waibira and Sonso, in the Budongo Forest, Uganda. During resting and foraging periods we deploy five PAM devices at distances from 20m to 340m, simultaneously recording vocalizations at close range (8-15m). We are developing AI algorithms for automated data extraction. Using these models, we will determine the extent to which call type and caller identity remain identifiable at increasing distances, allowing us to define optimal device placement strategies for future studies.

Our study will establish a methodology for systematic monitoring of chimpanzee vocal usage across populations, serving as a benchmark for comparative research on primate communication and conservation efforts aiming to monitor species diversity and abundance. Our work provides a critical foundation for understanding chimpanzee vocal repertoire diversity and combinatorial systems and contributes to elucidating the evolutionary origins of language.

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POSTER SESSION

TUESDAY 16TH

Underwater Noise in the Marine Strategy Framework Directive: From Monitoring to Impact Assessment

Julie Le Coz¹, David Dellong¹, Myriam Lajaunie¹
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The European Marine Strategy Framework Directive (MSFD) aims to establish a comprehensive framework in order to achieve and maintain Good Environmental Status (GES) of marine waters across Europe. Among its eleven descriptors, Descriptor 11 specifically addresses the introduction of energy into the marine environment, with a particular focus on underwater noise. This descriptor has become a key area of concern due to the increasing intensity of anthropogenic activities at sea and their potential impacts on marine ecosystems.

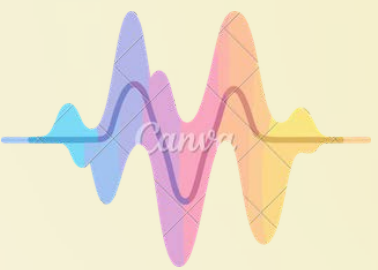
Within this context, the Service hydrographique et océanographique de la Marine (SHOM) contributes as a technical and scientific stakeholder, providing expertise in underwater acoustics. The role of SHOM is to support the development and implementation of harmonized methodologies for monitoring and assessing acoustic pollution at regional and European scales. This includes participating in ongoing discussions on indicators, impact thresholds for marine fauna, and monitoring strategies required to evaluate environmental status under Descriptor 11.

While significant progress has been made in defining metrics and data acquisition frameworks, a major challenge remains: the quantification of the actual impacts of underwater noise on marine fauna. This critical step involves bridging the gap between acoustic pollution and biological responses, an area where scientific uncertainties are still substantial. Methodological choices, data availability, and variability across species and habitats all contribute to the complexity of this task.

This poster aims to provide a comprehensive overview of the MSFD framework, including its key objectives and stakeholders for descriptor 11. It presents the current state of discussions at the European and regional levels, highlights SHOM's contributions to the MSFD process, and outlines the key scientific and operational challenges associated with the assessment of underwater noise pollution. Particular attention is given to ongoing efforts to move from monitoring towards risk-based assessment, a necessary step to support effective marine environmental management and policy decision-making.

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POSTER SESSION

TUESDAY 16TH

Eleven years of passive acoustic monitoring of harbour porpoises and small delphinids off Calais port

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(2) CMNF, Coordination Mammalogique du Nord de la France

In the context of increasing maritime traffic between Calais and Dover, the Port of Calais undertook a major expansion project ("Calais Port 2015"). The Strait of Dover, in the English Channel has been identified as a prime location for harbour porpoises. A passive acoustic monitoring (PAM) was designed to assess harbour porpoises acoustic activity near the port before, during and after the expansion project. A total of eleven years of passive acoustic data were collected using Cetacean Porpoise Detectors (C-PODs; Chelonia Ltd. UK) distributed across two authorised monitoring sites (Walde and CA4).

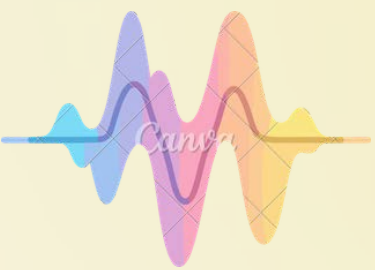
First of all, Detection Positive Minute (DPM) was the metric used to analyze the distribution, seasonality and diel pattern of click trains from harbor porpoises and also dolphins. Then Feeding Buzzes Ratio (FBR), the proportion of feeding buzzes among all detected clicks was used to identify foraging activity around the two sites for both species. The analyses revealed: (1) a strong seasonality in harbour porpoise detections, (2) a decline in harbour porpoises acoustic detections during the last four years, although foraging activity appears unaffected and (3) an increase in delphinids detections since 2021.

The expansion of the Port of Calais has profoundly altered the sedimentary relief in the study area, likely leading to changes in the habitat of marine mammals. The decline in harbour porpoise detections should be interpreted in the context of the increase in the regional grey seal population since 2021 (predation), the more recent rise in dolphin presence in the area (predation and/or food competition) and the decline in porpoise strandings observed over the past several years.

Together, these results provide new insights into the local and regional responses of small cetaceans to large-scale coastal development

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POSTER SESSION

TUESDAY 16TH

Rumble Activity Detector (RAD): an elephant acoustic early-warning system

Jure Železnik¹, Daniel Haider¹, Angela Stöger²

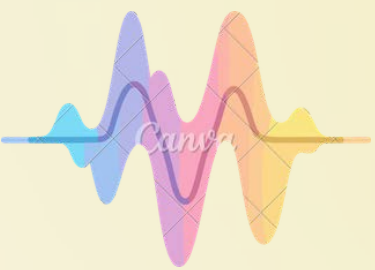
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Human-elephant conflict is an increasing challenge in many African regions, where encounters can cause crop and property damage, injury, and death for both people and elephants. To help mitigate this conflict, we propose the Rumble Activity Detector (RAD), a low-cost acoustic early-warning system designed to detect elephant presence in real time through the rumble, their most common low-frequency call type. RAD is a field-deployable IoT device that continuously monitors the soundscape, identifies candidate elephant rumble call type, saves the detected audio clips, and immediately sends them to all users in a group chat, together with a spectrogram as evidence. This creates a practical human-in-the-loop workflow: the device performs first-stage screening, while users can quickly verify detections and decide on an appropriate response. By focusing on detections rather than storing long continuous recordings, the approach reduces data storage requirements and minimizes the need for specialist manual analysis. Our current prototype is based on a Raspberry Pi Zero 2 W and runs a lightweight BC-ResNet-3 classifier with INT8 quantization and ONNX Runtime inference. The model is trained on an annotated dataset of approximately 5,500 African savanna elephant (*Loxodonta africana*) rumble recordings collected over more than 20 years across captive, semi-captive, and wild conditions, and is tuned to infrasonic acoustic features relevant to elephant rumbles. We will field-test the system in the Zoo Vienna, as well as in Zimbabwe and South Africa under different environmental and operational conditions. Designed to be affordable, low-maintenance, and easy to use, RAD aims to support local communities, wildlife managers, and researchers, and offers a scalable pathway for translating bioacoustics research into practical conservation technology.

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POSTER SESSION

TUESDAY 16TH

The oblivion that will befall us: Description of the advertisement calls of two frogs from the northern Colombian Andes and the loss of their habitat

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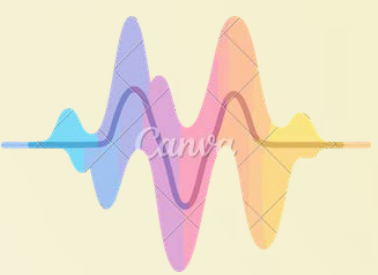
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Acoustic documentation is crucial for understanding natural history attributes and for the monitoring and conservation of species, as it provides effective management strategies. However, anthropogenic pressures resulting from landscape transformation, driven by livestock farming, extensive agriculture, and timber extraction, represent direct threats to biodiversity. Here, we describe for the first time the advertisement calls of *Gastrotheca dunni* and *Rhinella nicefori*, two species endemic to the northern Central Cordillera, Antioquia, Colombia. In Colombia, the call of *G. dunni* is the fifth documented for the genus, while that of *R. nicefori* is the eighth known for the genus in the country and the first recorded within the *Rhinella festae* group. The recordings were made at Llanos de Cuivá (an azonal páramo at 2,700 m elevation), as part of an initiative by Corporación Salvamontes Colombia to conserve remnants of Andean Forest in the northern Andes region. However, the habitat where the calls were documented was destroyed shortly thereafter, making these acoustic records historical evidence of both species at that locality. We highlight the urgent need to implement conservation strategies that seek to balance human activities while mitigating their negative impact on biodiversity and remaining habitats, in order to ensure species survival and ecosystem integrity.

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POSTER SESSION

TUESDAY 16TH

Is my song still attractive to you? analysis of zebra finches courtship song throughout the pairbonding process

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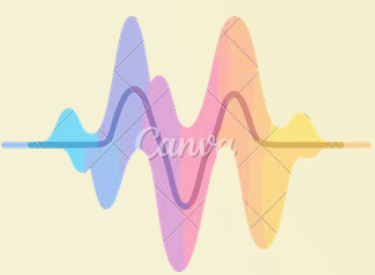
Zebra finches (*Taeniopygia castanotis*) are gregarious songbirds that exhibit life-long monogamous tendencies. Both sexes produce calls, but only males are capable of singing. Male songs can be classified as non-courtship songs, which do not target a specific individual, and courtship songs, which are produced while directly facing a female. Interestingly, these songs continue to be produced even after pair bonding, suggesting a role beyond courtship. Although these song types are not audibly distinguishable to the human ear and differ only minimally in spectrograms, females show a stronger attraction to courtship songs. Moreover, finches exhibit preferences for specific acoustic features, which are thought to serve as honest signals of male fitness.

In this study, we aim to investigate whether courtship song features are altered by the pair-bonding process. First, we will experimentally determine female song preferences across a range of male courtship songs. To do this, females will be exposed to playback stimuli while we assess their approach behaviour and vocal responses (calls). Subsequently, females will be placed in a mixed-sex group setting, allowing them to choose a partner from among the males whose songs they were previously exposed to. In this context, we will assess whether females whose behavioural responses indicate a stronger preference are more likely to pair with the male whose song they preferred most. Finally, during courtship and after pair bonding has occurred, we will assess variations in the spectral, temporal, and sequential features of male song. This approach will allow us to evaluate whether pair bonding alters courtship songs and whether females, if re-tested, change their song playback preferences.

Overall, this research will provide insights into how a monogamous species evaluates potential mates, the effects of pair bonding on communication between partners, and the functions of zebra finch courtship songs

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POSTER SESSION

TUESDAY 16TH

Virtuosity in songbirds : When bill size matters

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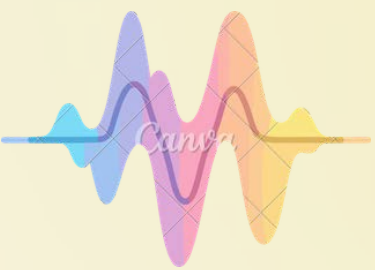
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Acoustic communication in songbirds is involved in events such as mate-searching or territory defense and is subject to strong selective pressures. Its evolution reflects the dynamics of speciation to which it contributes, resulting from adaptations to different ecological niches, particularly changes in the size and shape of the bill. Similarly to previous studies on the subject, we observed a trade-off between the trill rate (i.e., the speed of note production) and the frequency bandwidth. This is illustrated by a negative correlation between maximal trill rate and bandwidth, and vice versa, thereby defining a limited acoustic space bounded by maximal performance.

Our study, based on an extended dataset of over 8,000 recordings from approximately 1,000 different species of Passeriformes, allows us to generalize these conclusions, previously formulated only for a few species or clades. These results support the hypothesis of phenomena more closely related to physiology than to phylogeny. Indeed, we found that the distance to maximal performance (i.e., vocal deviation) appears to be positively correlated with morphological traits such as bill shape/size and body mass. This suggests that shared morphological constraints in Passerines drive acoustic constraints, regardless of the shared evolutionary history.

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POSTER SESSION

TUESDAY 16TH

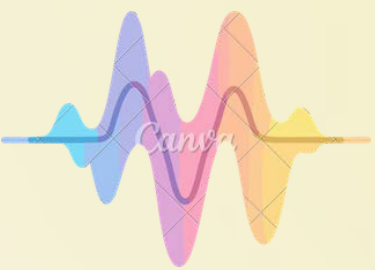
Acoustic originality : finding and investigating distinctive and low-occurrence soundscapes throughout mainland France and Corsica

Lorenzo Dubois¹, Sylvain Hupert¹, Jérôme Sueur¹
(1) CESCO - MNHN, France

Ecological originality, traditionally rooted in phylogeny, identifies distinctive and rare functional or evolutionary traits often overlooked by standard diversity metrics. This study proposes expanding this concept to soundscapes using Sonosylva, a large-scale passive acoustic monitoring database, comprising millions of recordings across 110 protected forests in mainland France and Corsica. Sonosylva provides a national scale sample of forest's soundscapes, offering an unprecedented opportunity to investigate soundscape originality at a national scale. To manage the computational challenges of this massive dataset, deep-learning algorithms such as BirdNET, Naturebeats, and Perch were used to extract audio features through high-dimensional audio embeddings. Then, a clustering pipeline using k-means was implemented and optimised via grid search and various performance metrics to determine the most effective models and the optimal number of clusters (k). Finally, a distance-based analysis was performed to outline original cluster of soundscapes. Throughout this workflow, while model performance were looked at, a strong emphasis was put into interpretability for further ecological research. The next phase of this project is to establish a systematic annotation protocol to translate acoustic originality into ecological insights.

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POSTER SESSION

TUESDAY 16TH

Ready, set, sing! Pre Phonatory Audiovisual Asynchrony in the Rhythmic Songs of Indri indri

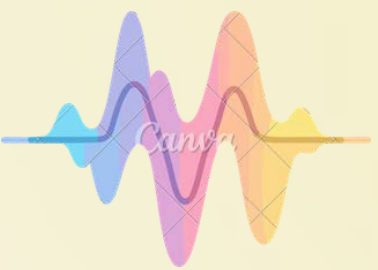
Luce Roux¹, Flavie Eveillard, Daria Valente, Valeria Torti, Marco Gamba

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Humans actively prepare the vocal tract prior to phonation, generating a measurable audiovisual asynchrony between anticipatory articulatory movements and the onset of sound. The timing of this prephonatory preparation ranges from tens of milliseconds to several seconds, depending on the neural and anatomical structures involved, and reflects predictive motor processes that are fundamental to rhythmic organisation in vocal behaviour. In singers, prolonged preparatory movements suggest a critical role for vocal tract anticipation during demanding vocal performances. Evidence for comparable mechanisms in non-human primates remains limited. Pre-phonatory preparation of the vocal folds has been observed in rhesus macaques, accompanied by activation of intrinsic and respiratory muscles. Madagascar's endemic Indri indri lives in family groups and produces elaborate vocal displays, including coordinated group songs characterised by multiple, stable rhythms. As one of the most phylogenetically distant singing primates relative to humans, the indri represents an ideal model to investigate prephonatory movements and audiovisual asynchrony in their songs.

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POSTER SESSION

TUESDAY 16TH

Sounds like breeding – using passive acoustic monitoring to evaluate breeding status of avian populations

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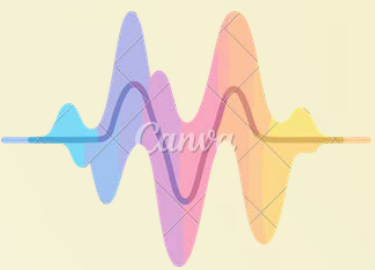
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Point counts are currently the main method used to monitor avian populations. It allows community composition determination, abundance estimates, and even breeding status attribution, which are key indicators for public policies supporting biodiversity protection. However, they typically rely on two sessions and thus depend on the species being present and detectable (either visually or acoustically) at that time. This is one of the reasons why new methods, such as Passive Acoustic Monitoring (PAM), are developing. PAM allows greater temporal and spatial coverage, as well as storable and reanalyzable data. Inferring species presence or phenology using PAM is well-supported in literature. Conversely, informing about habitat functionality (i.e., breeding sites) can be very time-consuming and is not yet standardized.

In this study, we collected data on 20 forest-habitat sites in the southeast of France during the ENVOLtaïque project. A breeding index from PAM recordings is developed, based on the French breeding index, with a reproducible semi-automated method. Song detections for 17 common species are generated by Chirpity and validated manually. PAM breeding status (ranging from “possible breeders” to “probable breeders”) are assigned to each species for a given site. They are then compared to those obtained from two 10-min point counts. As PAM has a greater temporal detectability, we expect to assign more “probable breeders” from acoustic recordings as we are less likely to miss vocalizations. If this were confirmed, it would support the importance of including PAM in studies such as impact assessments. This could, in turn, allow better consideration of birds in conservation policies and thus improve their protection and that of their breeding sites.

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POSTER SESSION

TUESDAY 16TH

Developing India's First Bat Call Reference Library.

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Bats are the most widely known group of animals that use echolocation. They emit high-frequency ultrasonic pulses to detect prey and navigate at night. Each genus and species has distinct signatures, patterns and frequencies. India, as a geographical location, is highly diverse in its habitats and species distribution. It is home to more than 135 species of bats, and yet, acoustic-based research on bat species in India is fairly new. For better acoustic-based research, a quality bat library would serve as a great tool for increasing efficiency.

A well-defined Call library exists for the USA, Europe, Latin America and parts of Africa and South-East Asia, but none exists for India. Due to a lack of an established, accessible call library, most bat-acoustic research in India uses active capturing methods for species identification. Active collection methods can also potentially exclude species that are rare and elusive. Collection of call data is possible through passive call collection. We have collected active & passive bat calls from different locations across India, annotated them using our own research and other references of bat acoustics from India, and fed them to a machine learning software to train it to identify the data and suggest species identification. Once completed, this Call Library can enable more passive bat-acoustic research in India.

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POSTER SESSION

TUESDAY 16TH

A large-scale crowd-sourced annotated acoustic dataset of Indian fauna

Syeda Tabassum Tasfia¹, Prabhjeet Singh²
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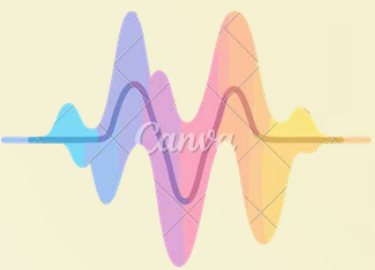
Vijay Ramesh¹, Sameer Singh², Paul Pop³, Pooja Choksi⁴, Prabhjeet Singh^{4*}, Sarika Khanwilkar⁵, Sonal Teotia⁶, Pralhad Burli², Kadambari Devarajan², Ashwin A⁷, Amisha A Nakhwa⁸, Bittu K Rajaraman¹⁶, Mohammad Abdus Shakur⁹, Rohan Baishya¹⁰, Nishant Bhagwat², Siddharth, Biniwale², Chiranjib Bora¹¹, Swathi C S¹², Nibedita Chakraborty¹³, Senan D'Souza¹⁰, Elrika D'Souza⁸, Ram Dayal Vaishnav¹⁴, Kadambari Deshpande¹⁵, Aavika Dhanda¹⁰, Abhishaek G⁸, Aarini Ghosh¹⁶, Rajkamal Goswami¹⁰, Abhinav K N⁸, Nidhichand K P¹⁷, Gururaja K V¹⁸, Vandana Kannan¹⁹, Vijay Karthick⁸, Mayuri Kotian²⁰, Harsha Kumar¹², Punnen Kurian¹⁷, Malavika Madhavan²¹, Komal Meena²², Ayesha Mohammad Maslehuddin²³, Pravara Mourya², Madhushri Mudke¹⁰, Pradeeshwar R J²⁴, Rohit R S Jha²⁵, Kavya Ramesh⁸, S Sangeeth Sailas²¹, Taksh Sangwan²⁶, Siddharth Sankaran²⁷, Ryan Satish²⁸, Anusha Shankar¹², Cimila Sibichen¹⁷, Ramit Singal², Gaurav Singh²², Navneet Singh²⁹, Iqbal Singh Bhalla³⁰, Navaneeth Sini George³¹, Meghana Srivathsa²⁵, Pavithra Sundar³², Syeda Tabassum Tasfia^{2#}, Alayna Trejo³³, Yana V Rasheva²⁹.

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(#Lead presenter, *Co-presenter)





POSTER SESSION

TUESDAY 16TH

A large-scale crowd-sourced annotated acoustic dataset of Indian fauna

Syeda Tabassum Tasfia¹, Prabhjeet Singh²

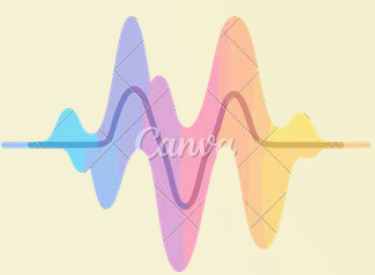
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In light of the widespread phenomenon of rapid biodiversity loss on a global scale, there is an urgent need for coordinated conservation efforts and systematic monitoring across vast geographical regions. Conservation technologies such as acoustic monitoring in conjunction with deep learning offer the potential to efficiently monitor wildlife across space and time. However, we are unable to depend on automated recognition approaches for a considerable portion of biodiversity in tropical regions because we lack sufficient acoustic templates to accurately train deep learning algorithms. This perpetuates data deficiency and gaps in conservation insights in regions that have historically been under-represented. For this dataset project, we took a novel participatory approach, enlisting researchers, conservation practitioners and nature enthusiasts to create a unique, open-access, crowd-sourced dataset of acoustic annotations for biodiversity in India, spanning various taxonomic groups. The dataset comprises 3,311 minutes of 'strongly labelled data' (bounding boxes or annotations for species vocalisations) and 2,504 minutes of 'weakly labelled data' (indicating species presence within audio files, lacking bounding boxes), totalling 518 species across 25 of India's 36 states and union territories. Alongside presenting an overview of the dataset, we also discuss the exercise, strengths, and challenges of a participatory approach to biodiversity monitoring from the Global South.

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POSTER SESSION

TUESDAY 16TH

Bioacoustic as an interface between scientific monitoring and local knowledge around Lac de Guiers (Sénégal)

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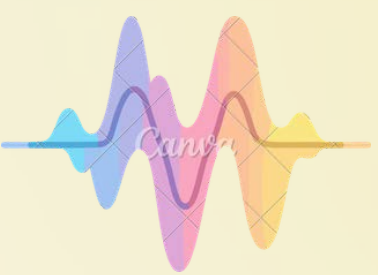
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Bioacoustics is a novel approach to biodiversity monitoring with audio as a medium of knowledge. It opens new pathways for sharing the scientific research actions and impact with public communities. Living labs, which are structures that leads transformative approach of action-research based on participative science, are venues for exploring such new pathways. In two living labs around the Lac de Guiers, local fishers voiced their concerns over the depletion of fish stocks in the lake. In addition to ongoing experimental fishing, passive acoustic monitoring was deployed over several locations and timeframes in order to assess its ability to bring complementary knowledge of the lake's ecosystem. The great amount of data generated was dealt with two different approaches : (a) using selective manual annotation and (b) visualisation of acoustic characteristics using false color spectrograms (FCS). The principle of FCS is to associate color canals to different acoustic indices values, building a color image of long duration recordings. The combination of annotation analysis and FCS visuals led to discoveries in the lake biodiversity and brushed the acoustic identity of the lake, with soundscapes showing strong disparity between the lake and its surroundings. Findings over audio recordings and visualisations were shared with local fishers in a living lab event, creating a medium of discussion and interpretations over expert knowledge. Local knowledge was key to properly interpret the collected data and build a solid background for futures references of the lake biodiversity status. We present here how bioacoustic is employed as a medium between scientists and local fishers to build common grounds and knowledge of the lake's ecosystem.

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POSTER SESSION

TUESDAY 16TH

Characterizing soundscape diversity in urban green spaces under contrasting artificial light at night (ALAN) regimes with unsupervised clustering

Yoann Roulet¹, Ayman Hamaichat¹, Xavier Dauvergne¹,
Sébastien Gallet¹, Jean-Philippe Babau²

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(2) *Laboratoire LabSTICC, Université de Bretagne Occidentale*

Artificial light at night (ALAN) can have harmful effects on ecosystems, whether on fauna or flora, on behavior or physiology. In particular, it can alter food webs, migratory flows and reproductive behavior. It has been shown that there are changes in physiology even at very low levels of intensity and in behavior even with red or warm white light. Thus, to reduce these impacts, it is recommended to prioritize lighting only where and when needed. The effects of part-night lighting have mainly been tested at species level, on few taxa and contexts and they do not appear to reduce the harmful effects, and may even have more negative effects than full night lighting. It is necessary to explore these light pollution reduction actions on other taxa and at community level in green urban areas (GUA).

The aim of this study is to evaluate the effects of part-night lighting by methods used to assess ecosystems diversity but not in the context of ALAN's effects studies: passive acoustic monitoring. Study took place in 18 French GUAs. Half of them were illuminated by public lighting until 23:00 at the latest and the other half throughout the night. On each site, each month, from April to August, more than 120 hours of audible sounds were continuously recorded.

Turning off public lighting should reduce the activity of crepuscular and diurnal fauna and thus reduce the acoustic diversity. However, these metrics must be the same between GUAs before public lighting is turned off. To identify soundscape profiles across sites and lighting regimes, raw acoustic recordings will be processed through an unsupervised machine learning clustering algorithm applied directly to the wav files. This approach will allow us to detect emergent acoustic communities without a priori assumptions, and to assess whether part-night lighting systematically shifts GUAs toward distinct soundscape clusters compared to full-night lit sites.

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