

Veelkleurig geluid

SoundScape Ecologies



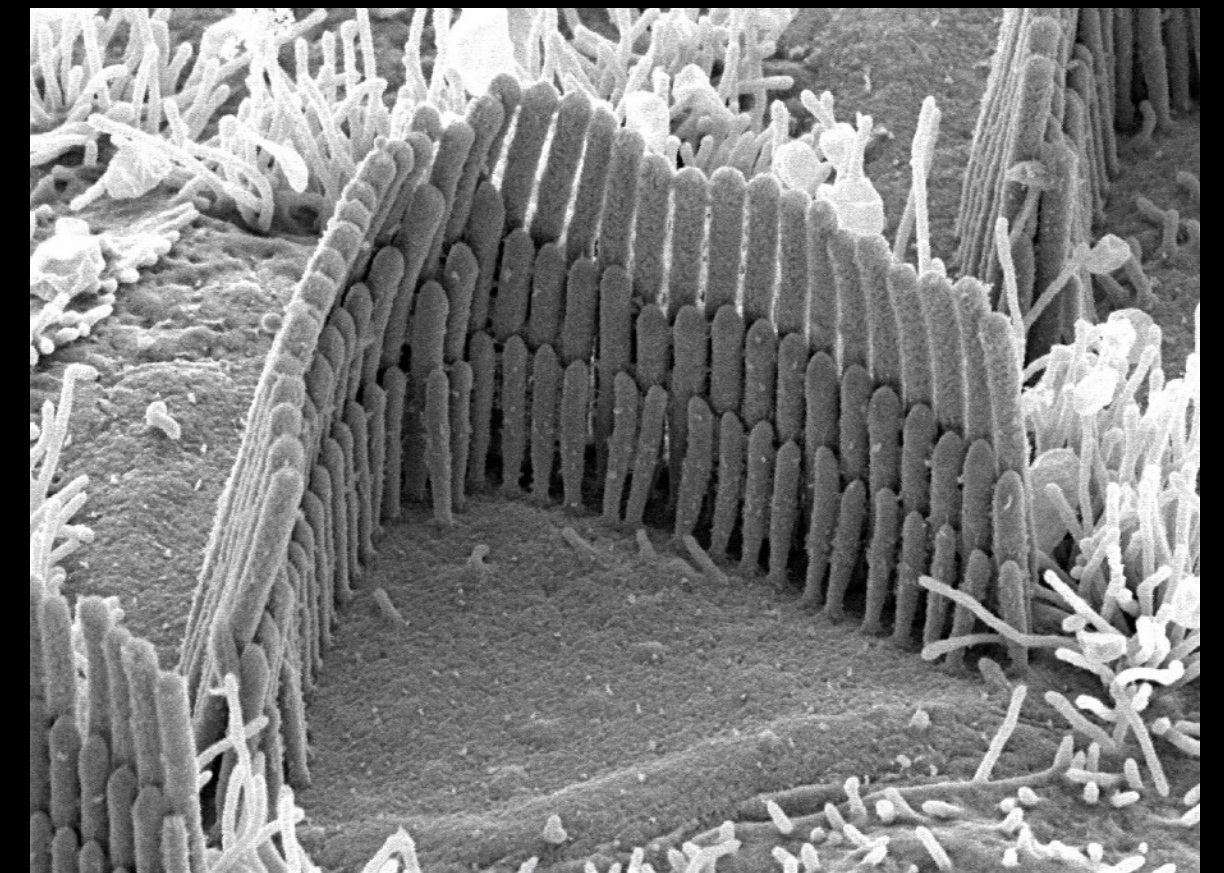
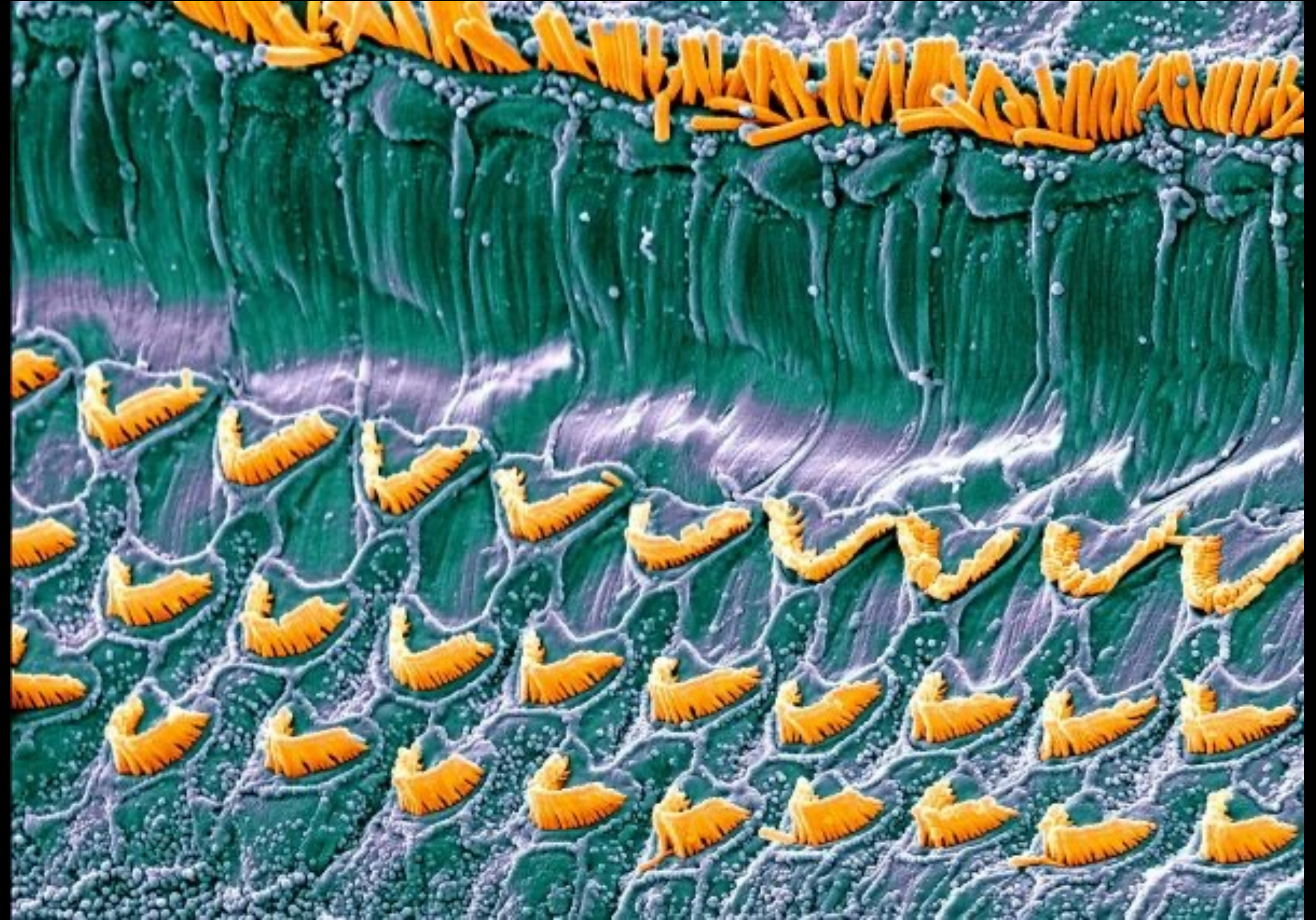
- NiBi 2024

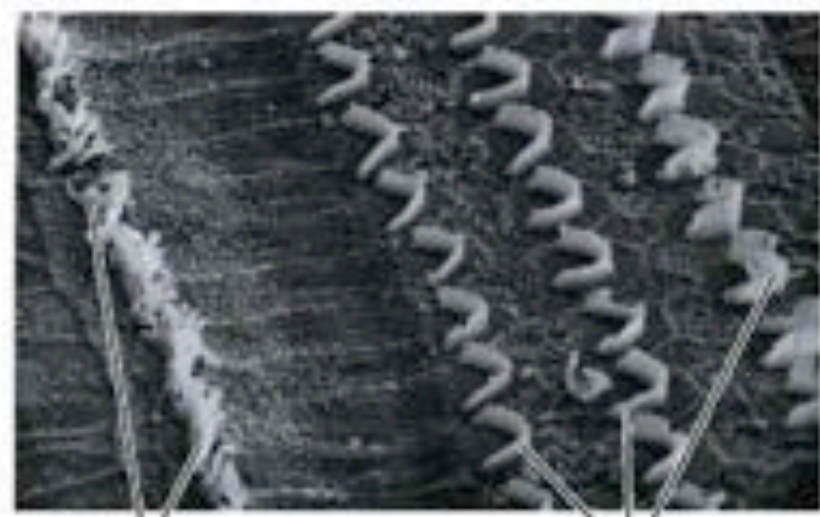
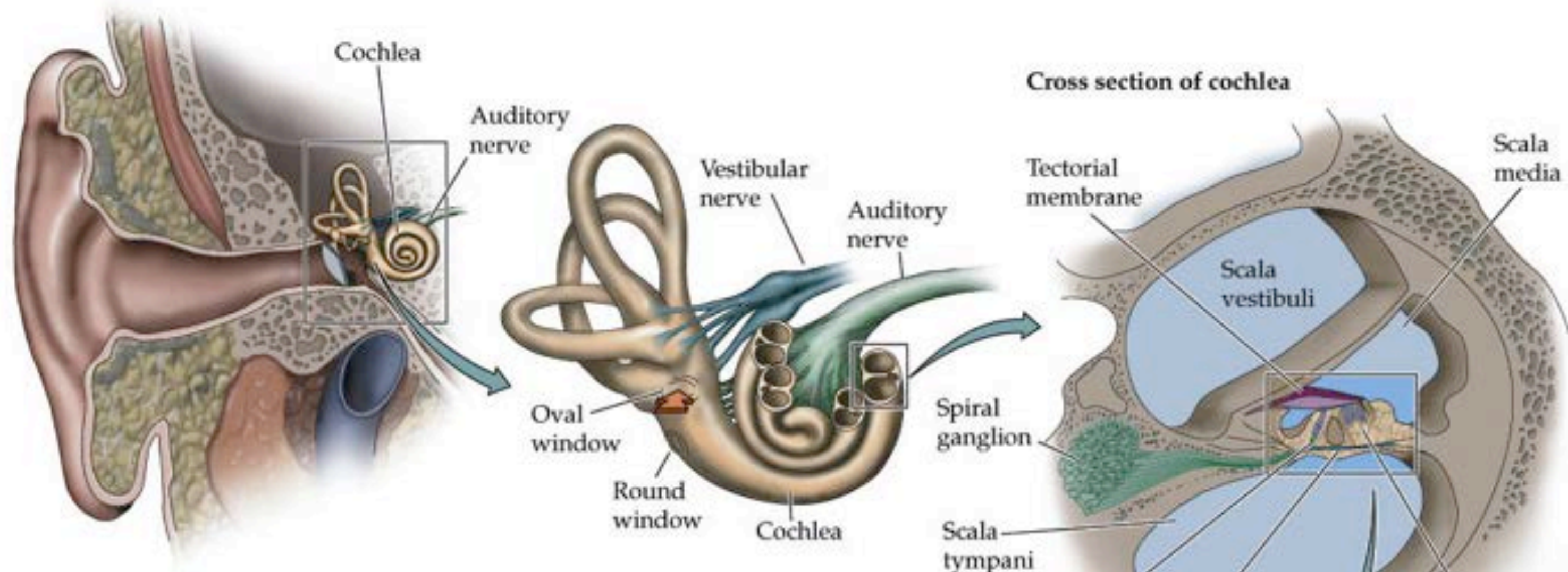
Than van Nispen • HKU, Hogeschool Kunsten Utrecht

Than

- Biologist 🌱
- Composer / 🎵
Sonic Interaction Designer
- Lecturer researcher at
HKU • Music & Technology
- Art, Ecology & Technology

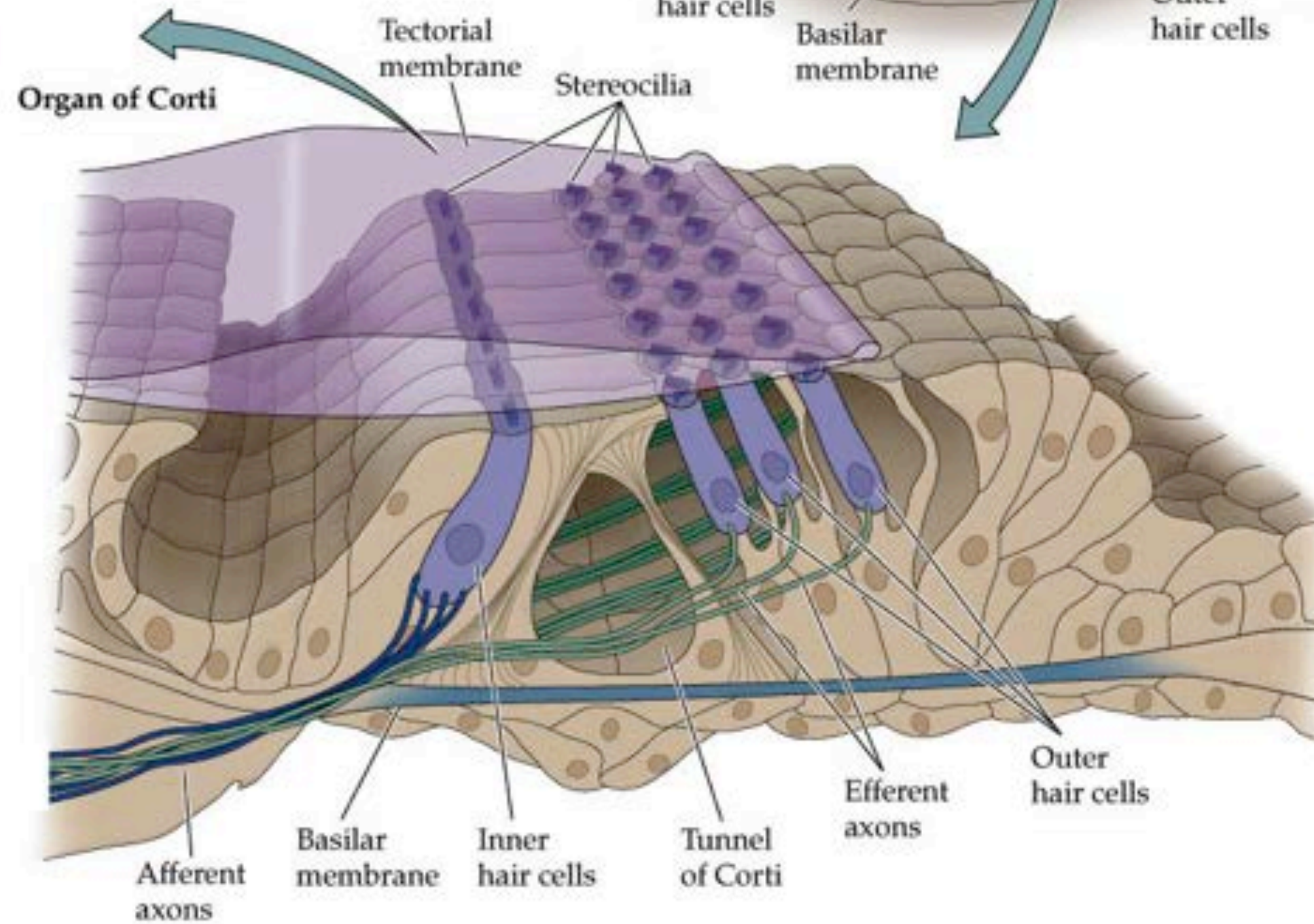


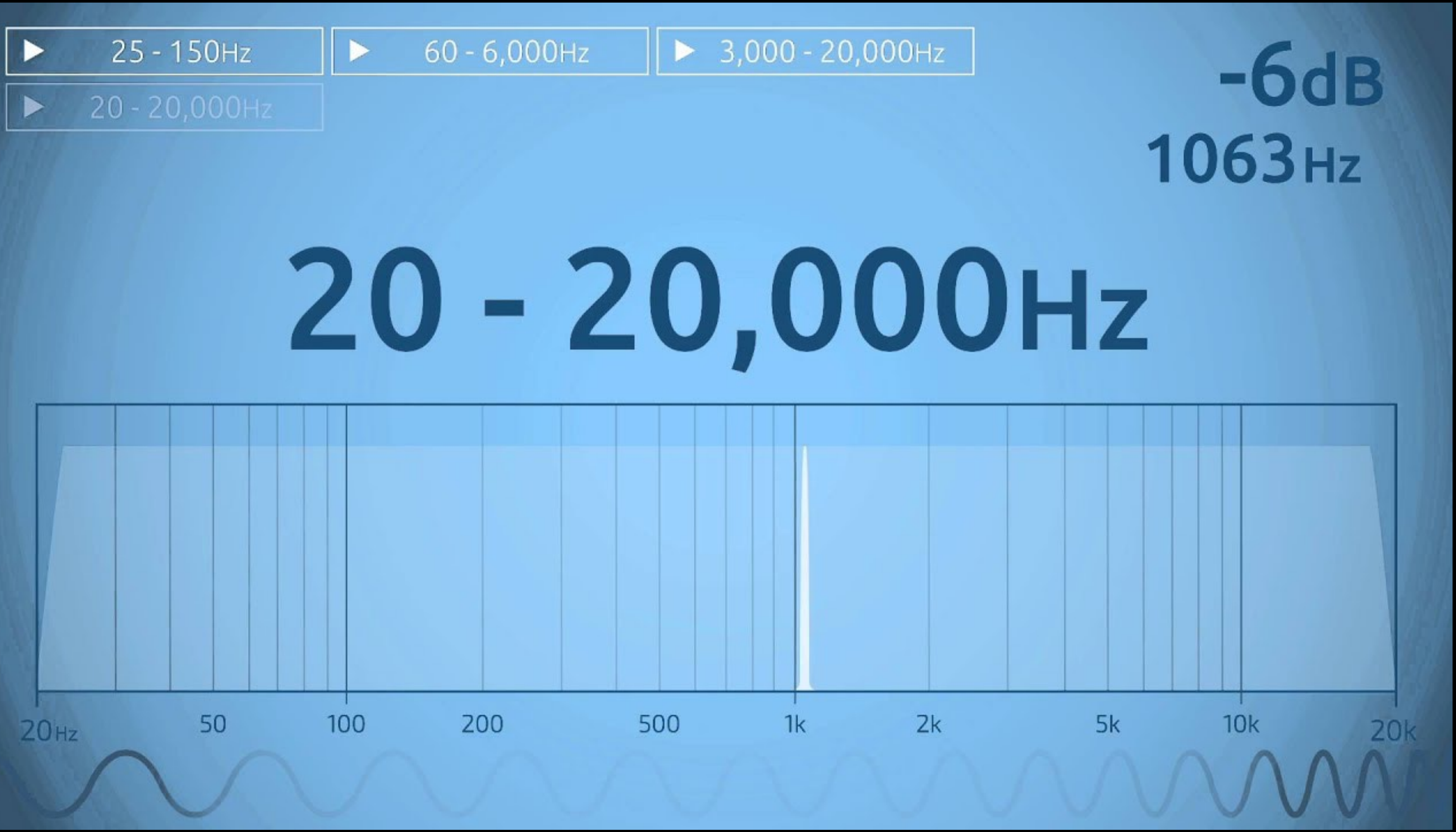




Stereocilia of inner hair cells

Stereocilia of outer hair cells



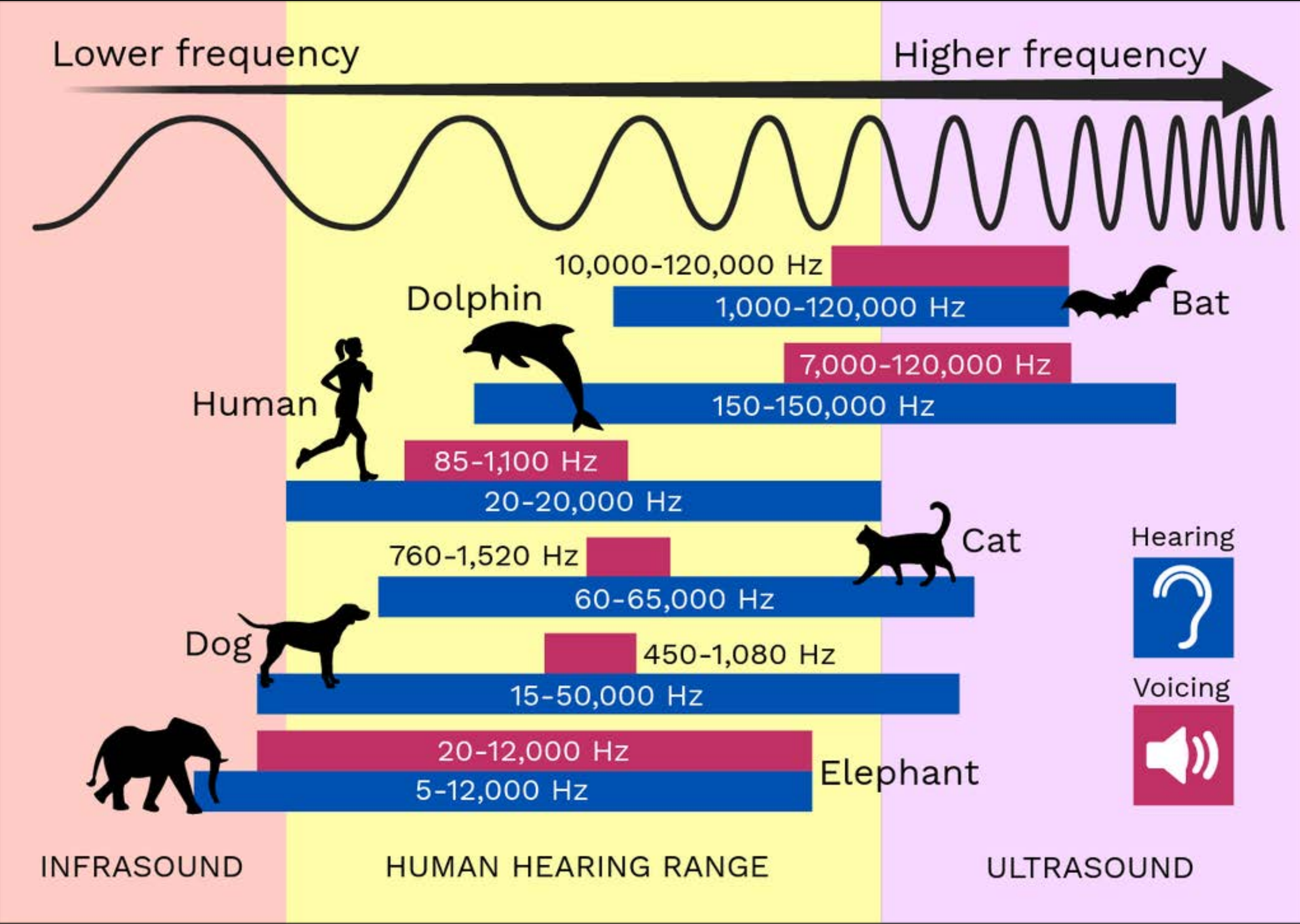


Signal frequency: 891 Hz



www.youtube.com/adminofthisite

(longer: <https://youtube.com/watch?v=qNf9nzvnd1k>)



<https://theory.labster.com/hearing-range-dbs/>

Veelkleurig geluid in de natuur

Than van Nispen – docent onderzoeker, HKU Hogeschool voor de Kunsten Utrecht

Werkvorm:
interactieve lezing

iL3

De natuur zendt ons een rijke hoeveelheid aan informatie. Een van de kanalen die wij kunnen waarnemen is die van geluid. Zo hoor je bijvoorbeeld of het ochtend is, of je een paraplu wil pakken en waar je je eigenlijk bevindt. Een bos in Nederland klinkt anders dan een zomerse kust in Zuid-Frankrijk. Maar hoe herken je dat en wat vertellen de dieren en andere natuurgeluiden eigenlijk aan elkaar en aan ons? Er is nog zo veel te horen wat we (nog) niet expliciet herkennen. Van het hoorbaar gemaakte ultrasone geluid waar vleermuizen mee communiceren en jagen, tot het ontcijferen en begrijpen wat andere dieren dan de mens nou eigenlijk delen.

In deze interactieve lezing over Soundscape Ecologies ga je in een vogelvlucht door het klinkende landschap van de natuur en bespreken we het domein van bio acoustics, exploreren we akoestische niches en leer je over hoorbare veiligheid en recente ontwikkelingen waarbij biodiversiteit gemonitord kan worden via geluidstechniek.

Natuurlijk ga je in deze workshop ook even naar buiten om onze vers opgedane kennis te ervaren en krijg je suggesties voor onderdelen voor lesprogramma's om elementen te koppelen zoals evolutionaire niches, zintuigen en waarneming, gedrag en ecologie.

Wil je zelf al wat eerder wat ervaren? Ga dan alvast eens op pad met de Merlin Bird id, of de BirdNet app! en neem een kijkje op xeno-canto.org!



Naar buiten met oa
<https://birdnet.cornell.edu/>
<https://merlin.allaboutbirds.org/>

Soundscape Ecology

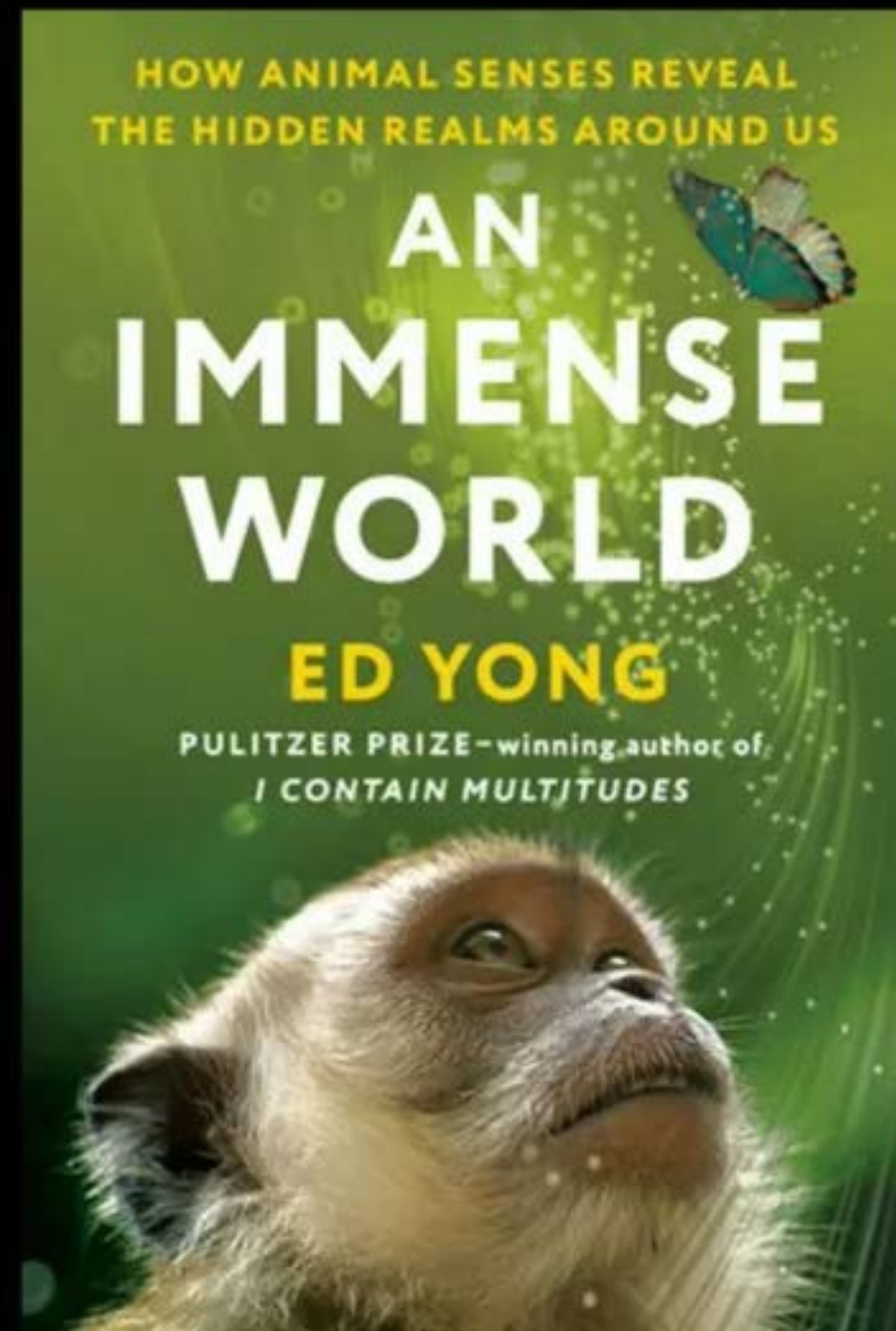
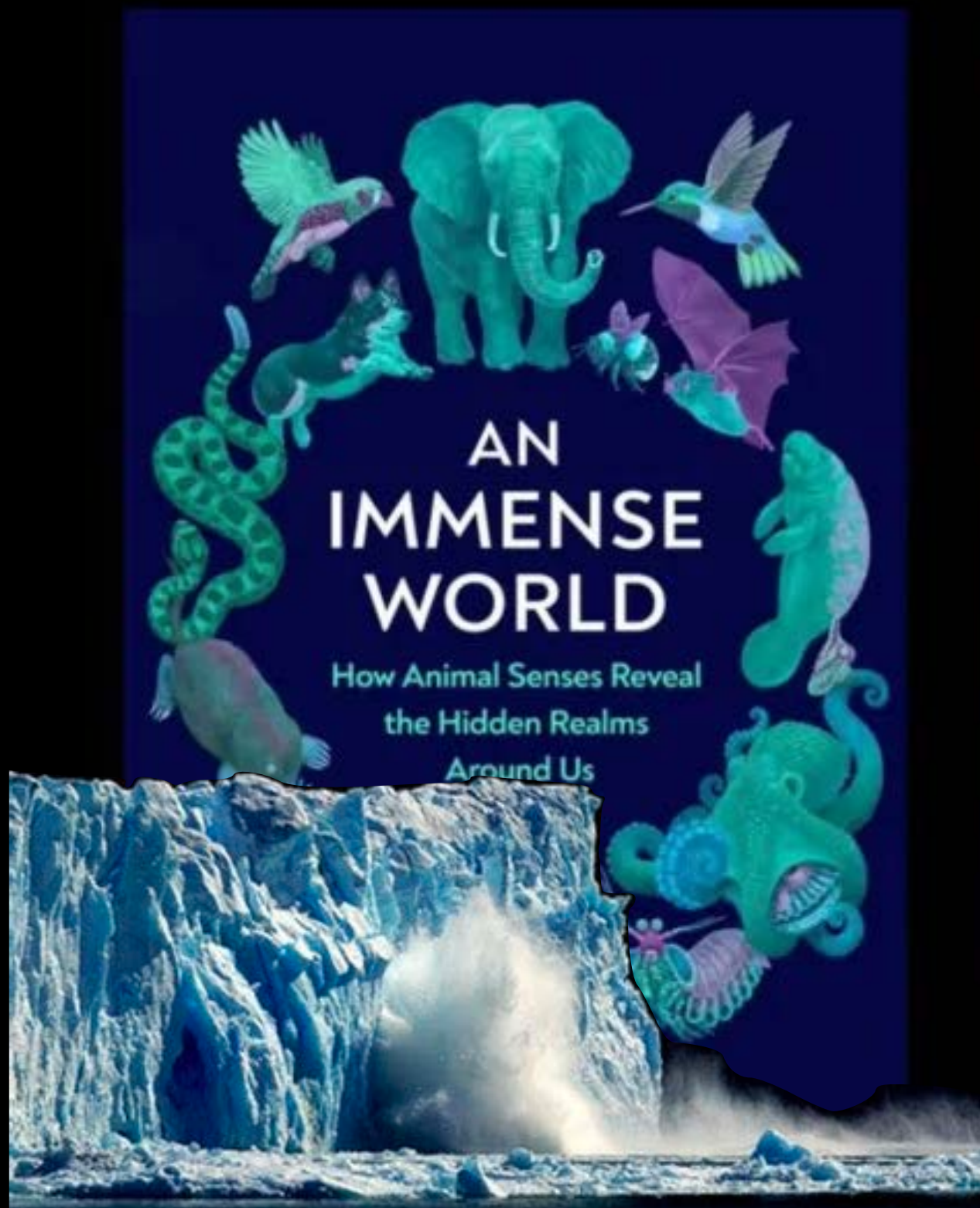
aka “EcoAcoustics”

- **Geophony** • Geluiden van de aarde :
wind, zee, donder, regen, ijs, gletsjers, aardbevingen
- **Biophony** (*acoustic niche hypothesis*) • verwijst naar de collectieve akoestische signatuur die wordt gegenereerd door alle geluidsproducerende organismen in een bepaalde habitat, op een bepaald moment
- **Antropophony** (of mogelijk Technophony) •
door de mens gegenereerd geluid van de mens zelf, of diens elektromechanische technologieën

Geophony

Earth sounds: wind, zee, donder, ijs, gletsjers, aardbevingen, ...

there is much information on our environment in sound
(so it is useful to have hearing senses in nature)



https://youtube.com/watch?v=8dvR_9_jsv4

Sounding soil

wat als je een microfoon in de grond stopt?

- <https://www.soundingsoil.ch/en/> (Marcus Maeder)
soort en mate van geluid
indicatief voor biodiversiteit



Fig. IX

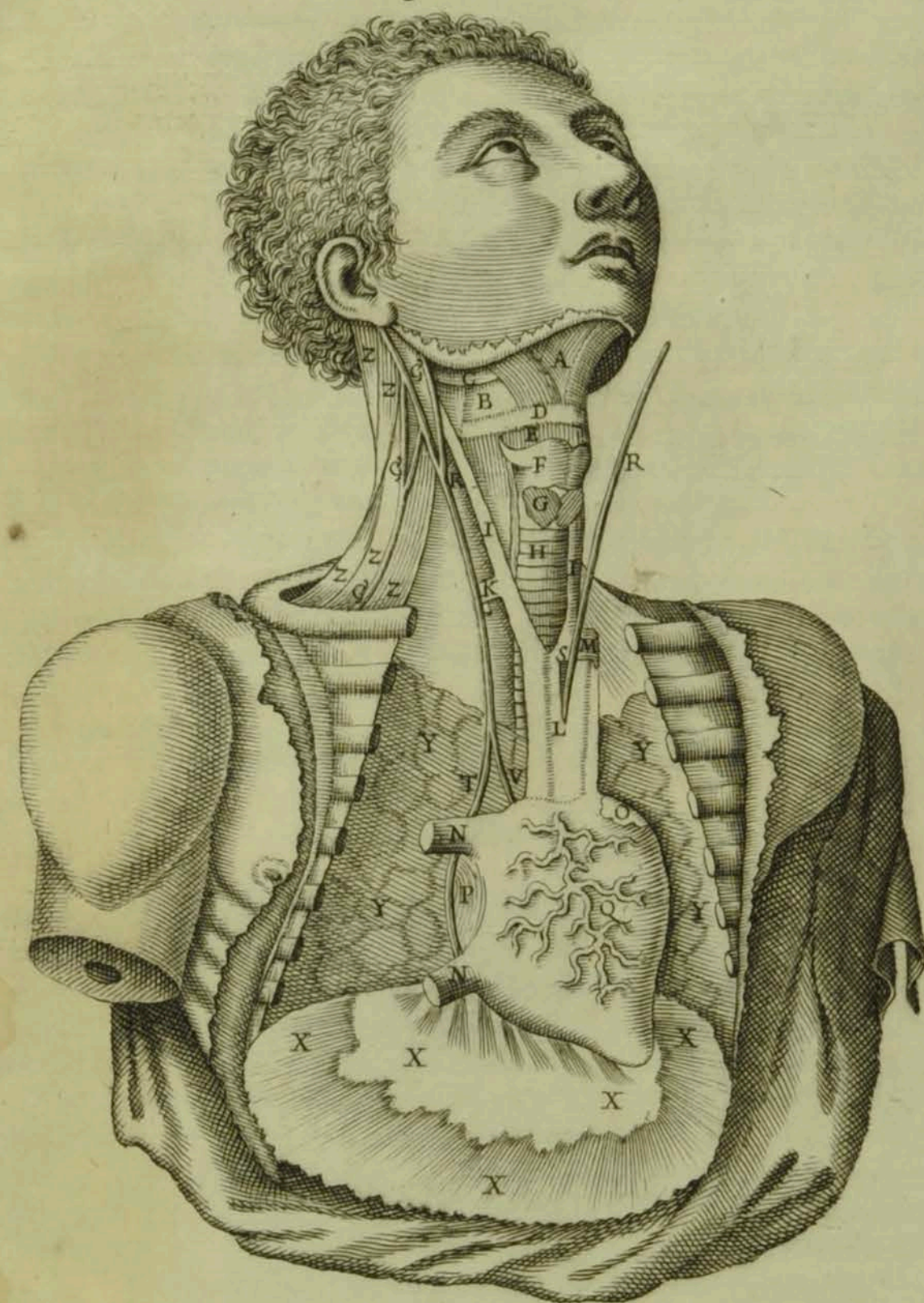


Fig. VIII

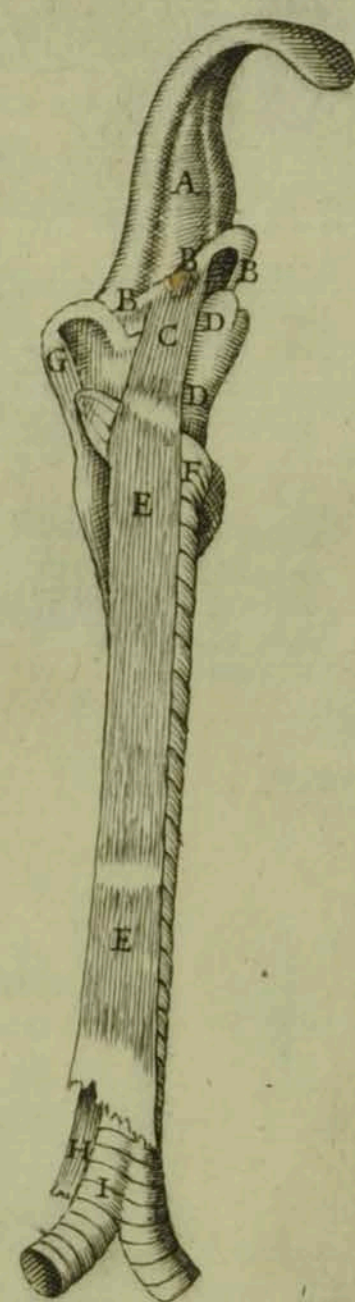


Fig. VII



Fig. VI



Fig. I



Fig. II



Fig. III



Fig. IV

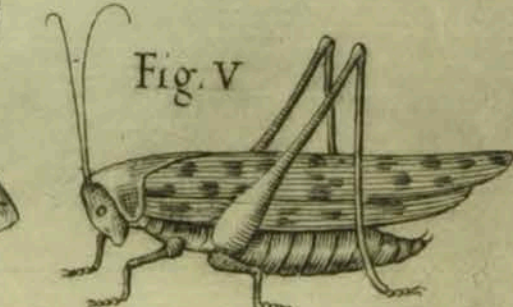


Fig. V

BioAcoustics: geluid generatie, 'propagation' (en perceptie)

- **Biophony** (*acoustic niche hypothesis*) verwijst naar de collectieve akoestische 'signatuur' die wordt gegenereerd door alle geluidsproducerende organismen in een bepaalde habitat, op een bepaald moment
- Resonate
(vb. hommelpollen : buzz pollination)
- Repel (verjagen, kan ook via mimicry!)
- Information
(communication : territorial, danger, aanwezigheid, ..)
(echolocation)

Niche (binnen een habitat)

Alle soorten vergaren op eigen wijze hun voedsel

- Habitat = *waar* een soort leeft
- Niche = *hoe* de soort leeft in habitat

Ecological Niche

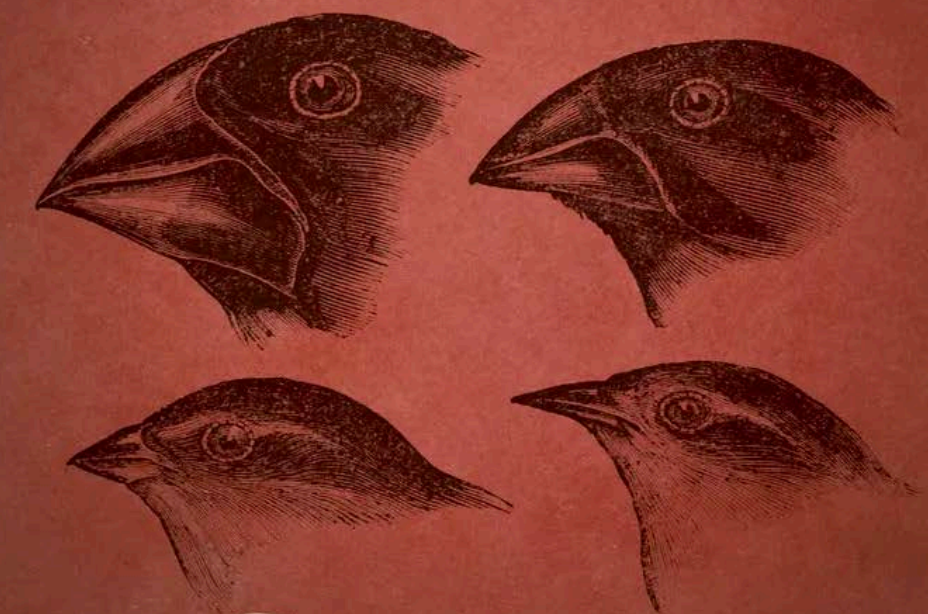
by night



by day



ON THE
ORIGIN
OF SPECIES



CHARLES
DARWIN

Buzz pollination (example of co-evolution)



https://youtube.com/watch?v=h8fmnIWR_9w



Zie ook <https://www.instagram.com/reel/CtG8VqZIJ7I/> van Sander's Doe Groen

WETENSCHAP

Bloemen kunnen bijen horen zoemen - en dat maakt hun nectar zoeter

"Mensen moeten beseffen dat horen niet alleen met de oren gebeurt."

DOOR MICHELLE Z. DONAHUE Gepubliceerd Op: 16/01/2019



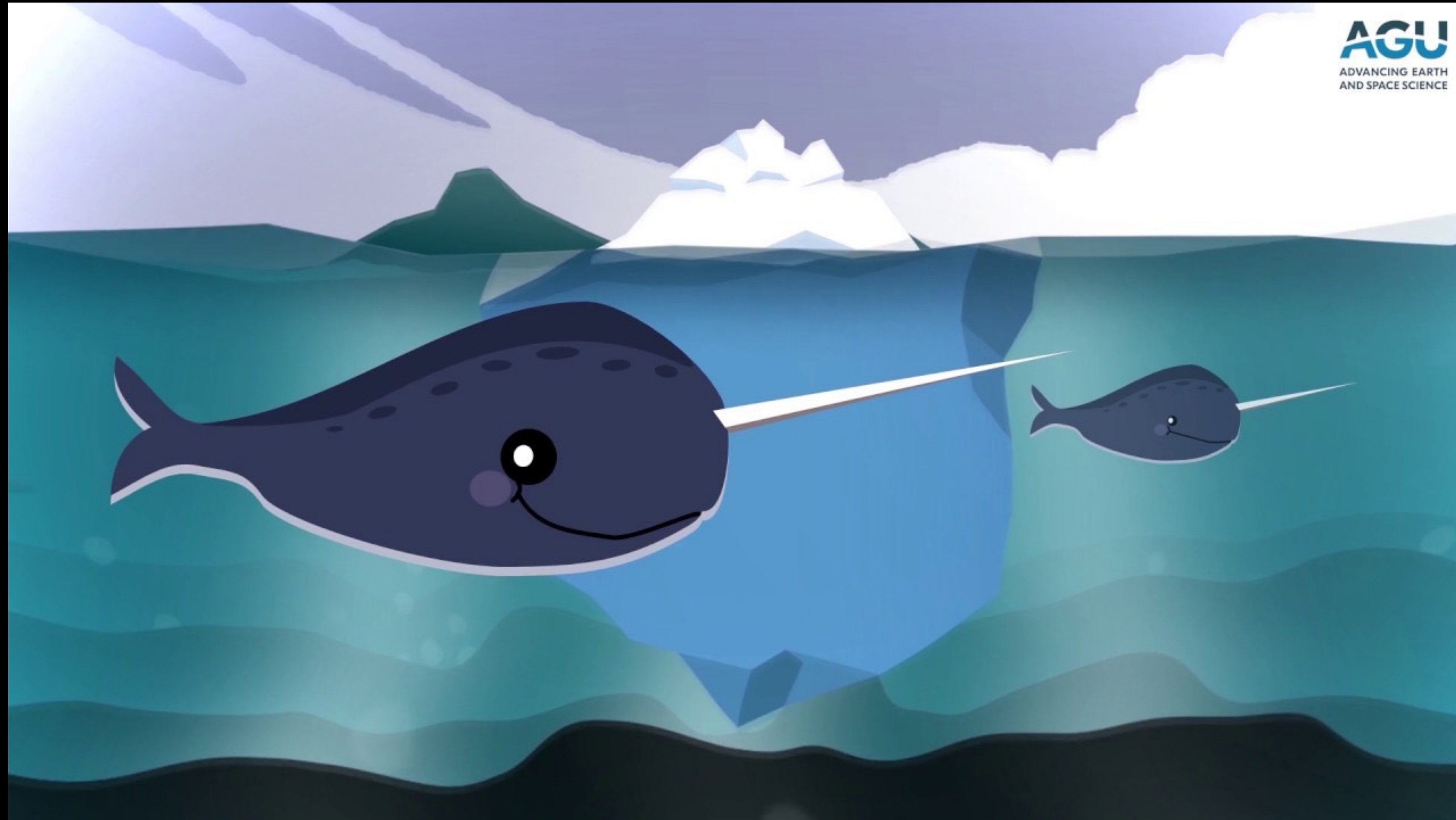
DENNIS FRATES, ALAMY

Zelfs op heel stille dagen leven we in een wereld van geluiden: vogels tjilpen, de wind ruist door de bomen en insecten gaan zoemend op weg naar hun werk. De oren van zowel roof- als prooidieren zijn afgestemd op elkaars aanwezigheid.

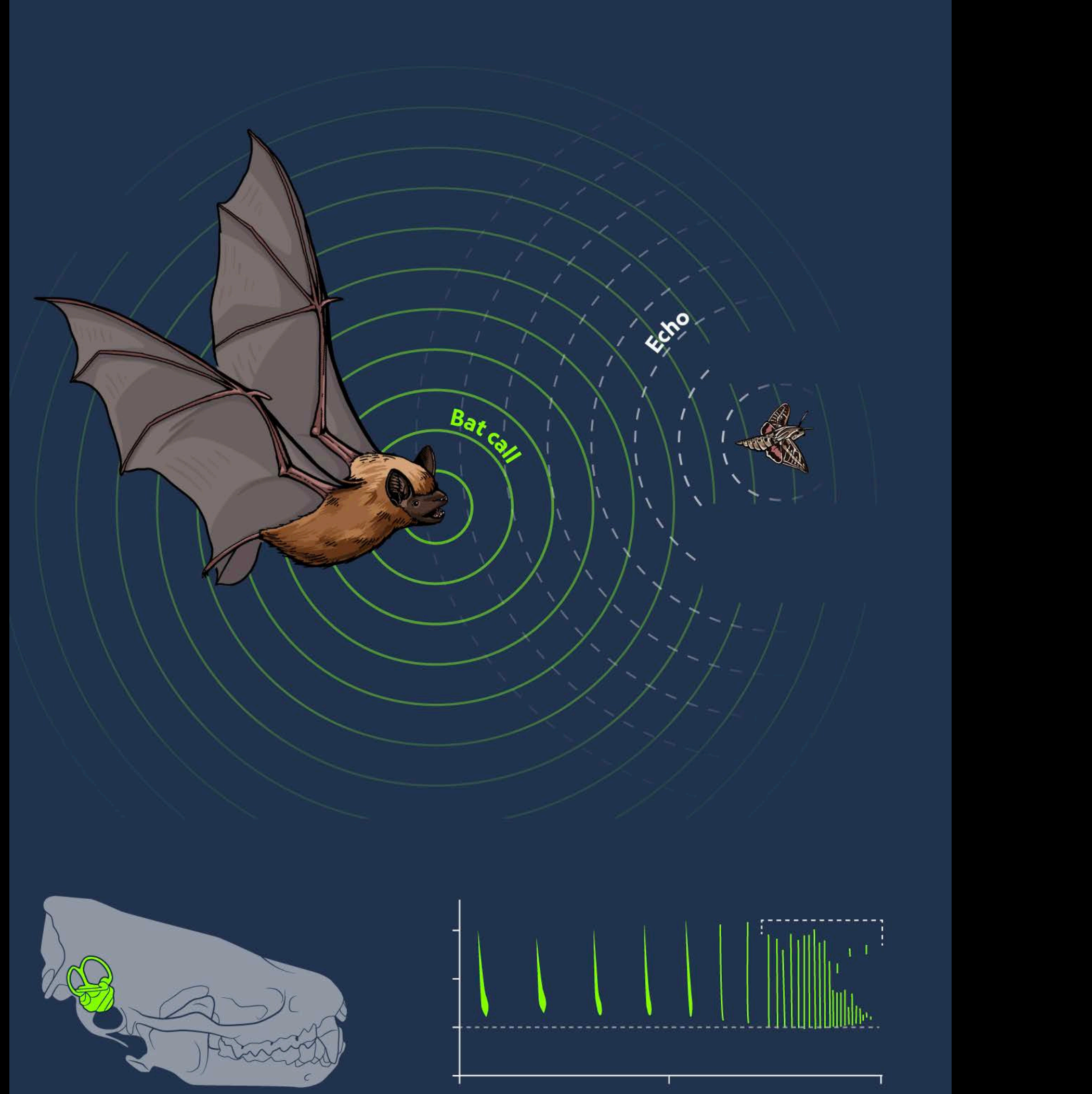
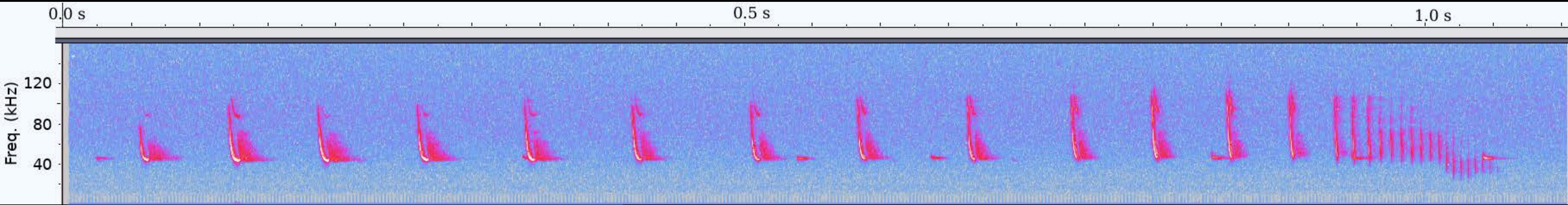
<https://www.nationalgeographic.nl/wetenschap/2019/01/bloemen-kunnen-bijen-horen-zoemen-en-dat-maakt-hun-nectar-zoeter>

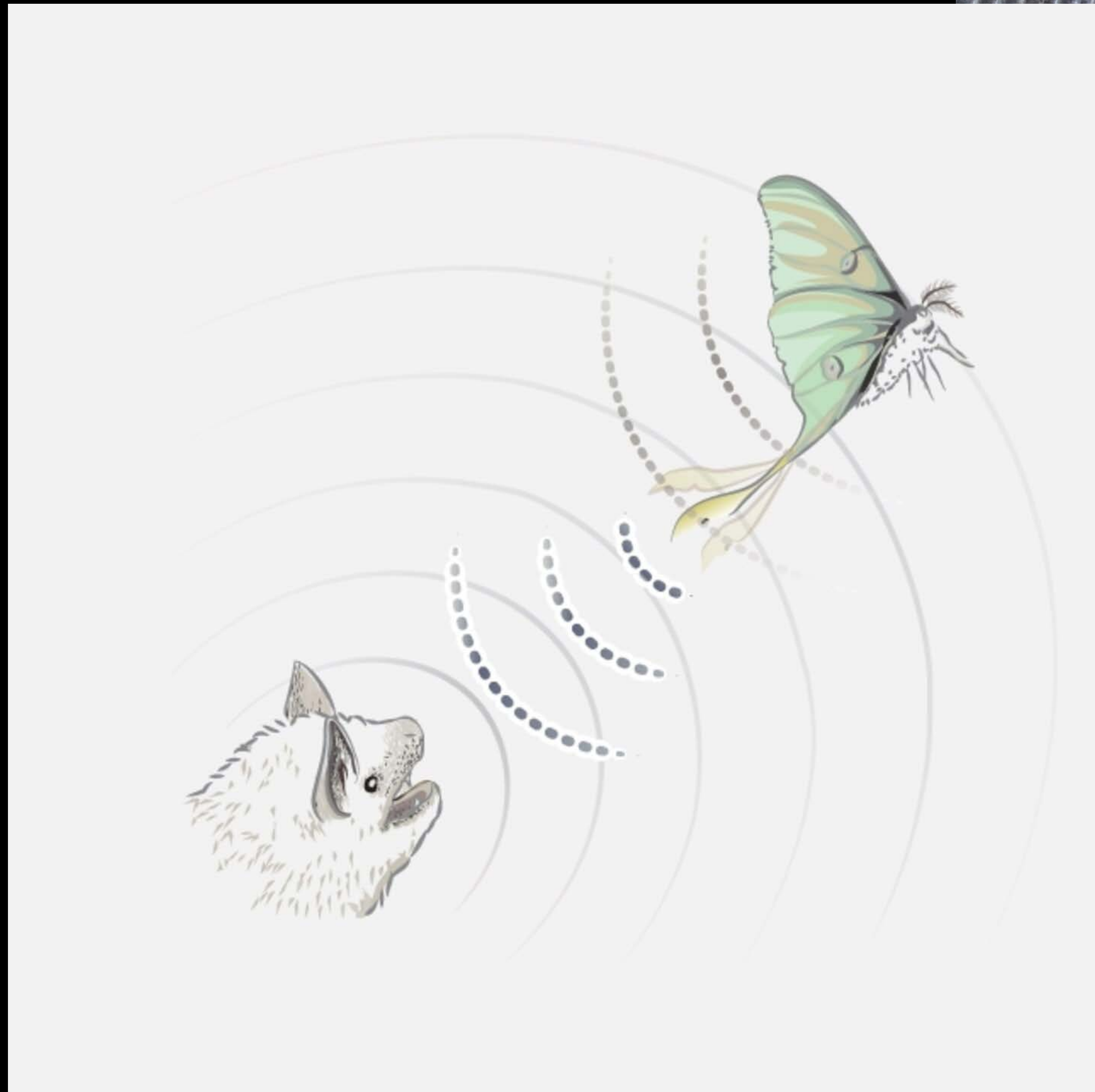


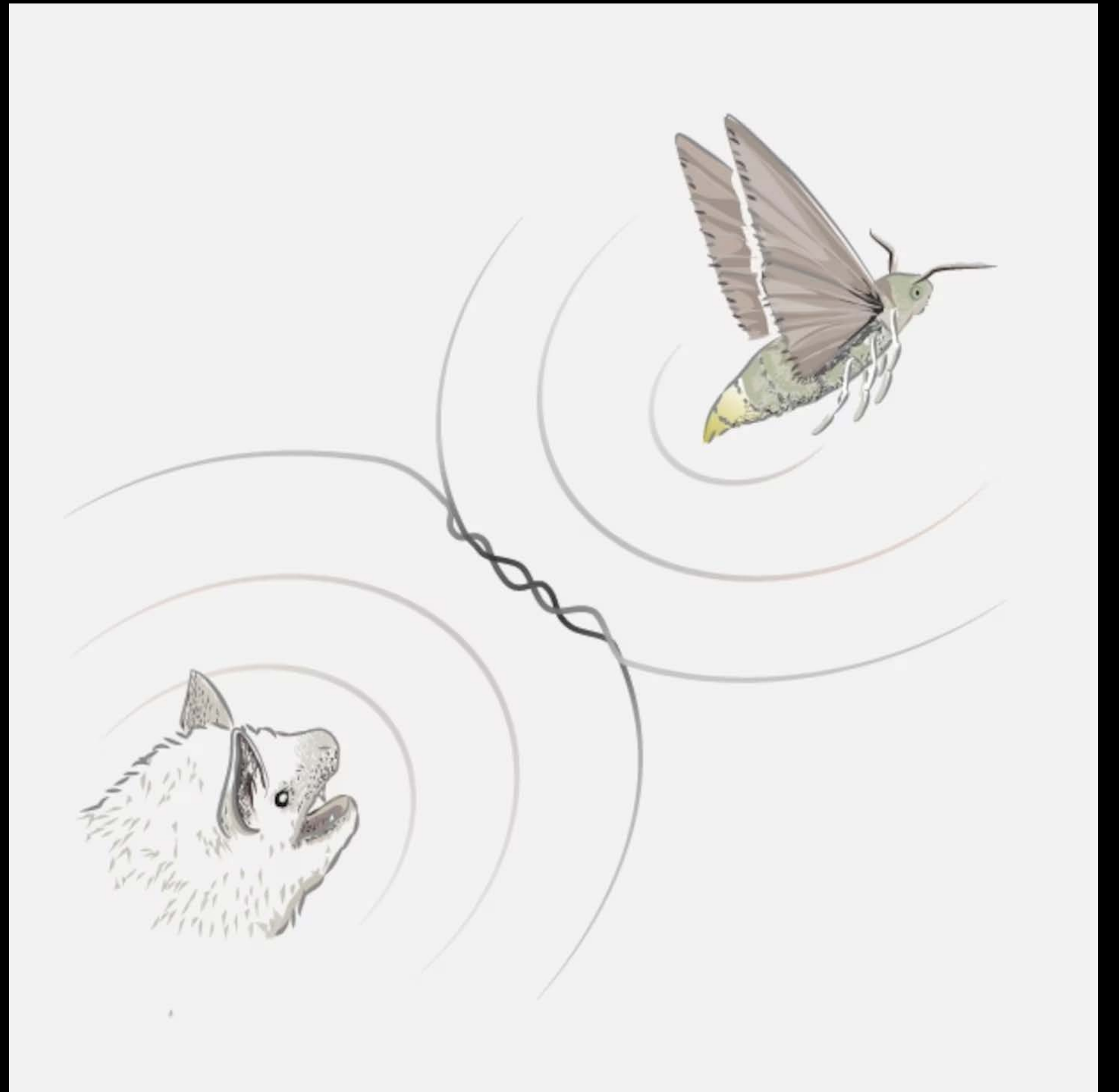
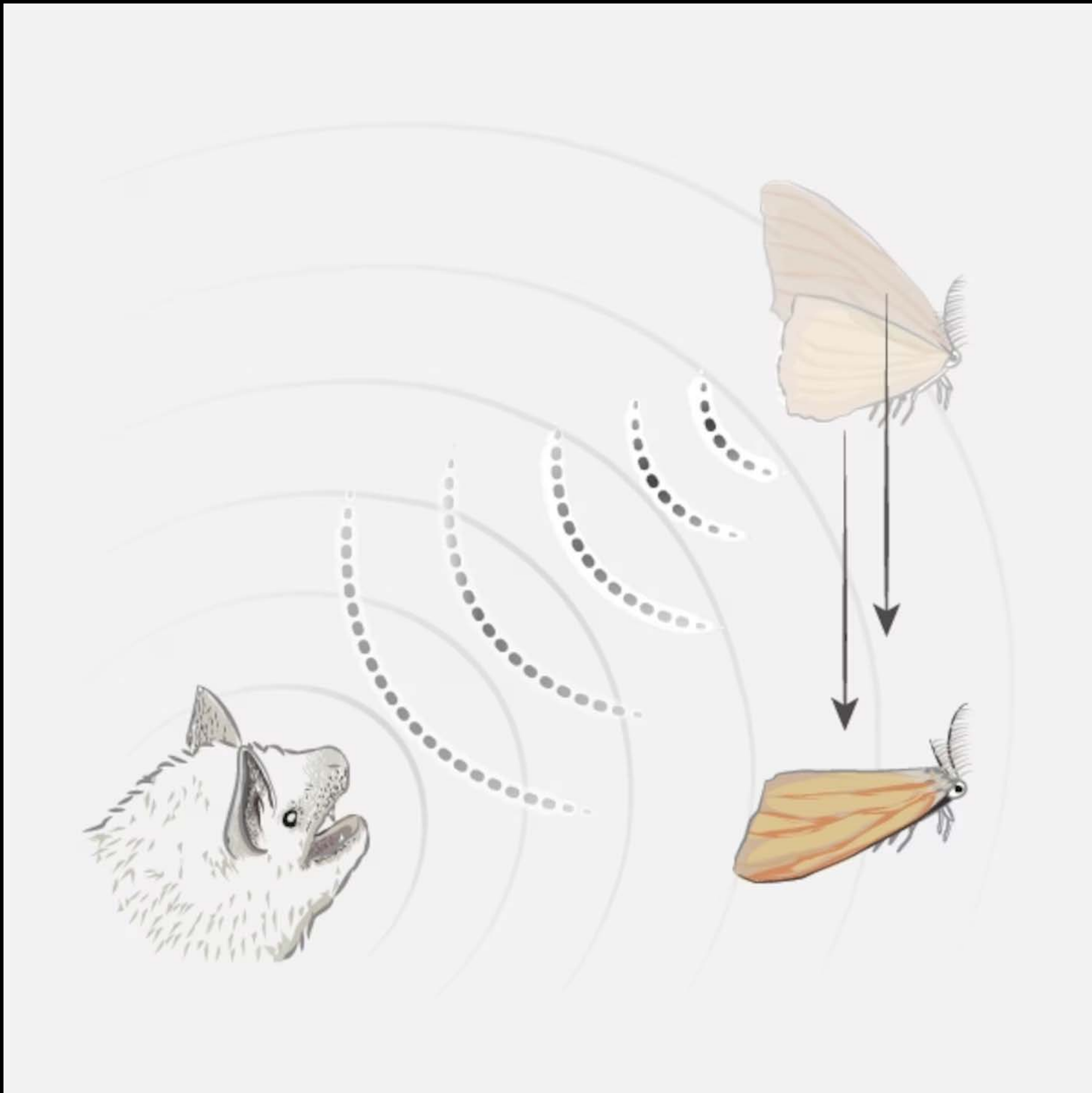
Echolocatie (en communicatie)





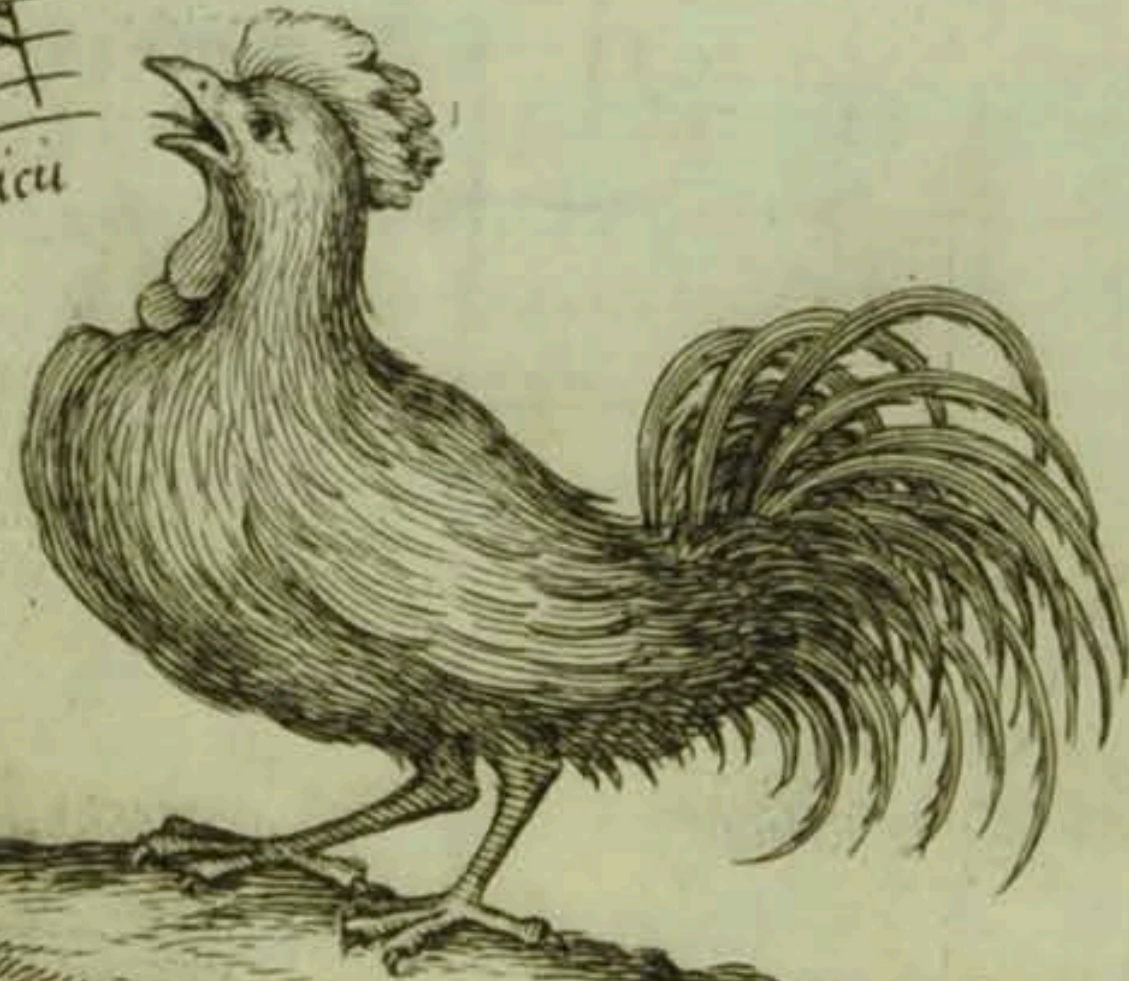






Diuersarum uolucrum voces
notis musicis expressæ

Gallicinium
Cuculicu Cuculicu
A



Vox parturientis Gallinae
to to toto to toto to toto to toto

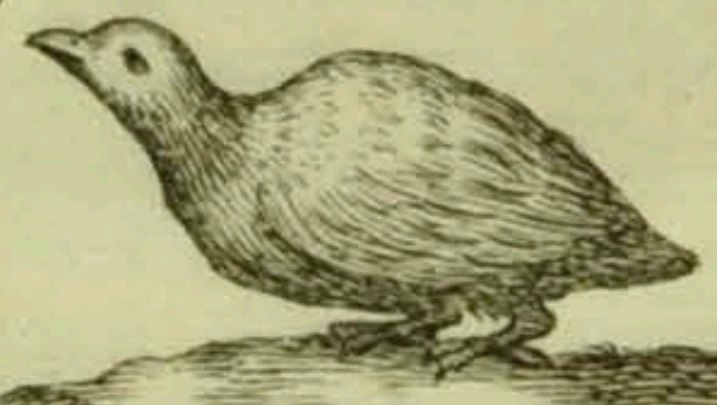


Gallina conuocans pullos
glo glo glo
C

Vox Cuculi
Gucu gucu gucu
E



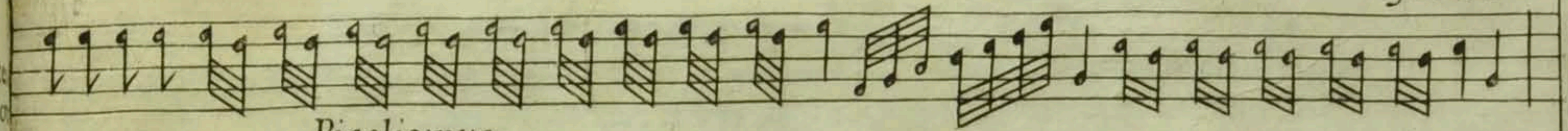
Vox Coturnicis
Bikebik bikebik bikebik
D



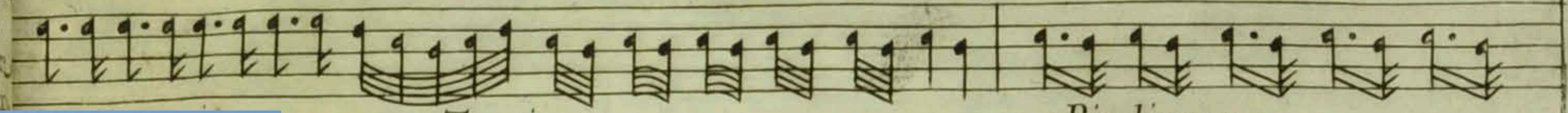
Glottismi modulationum sibilo exprimendi in Luscinia obseruati

Iconismus III.
fol. 30

ce eodem inte
es reliquas glo
in Iconismo III
videremur.
n alios notat
tamen si min

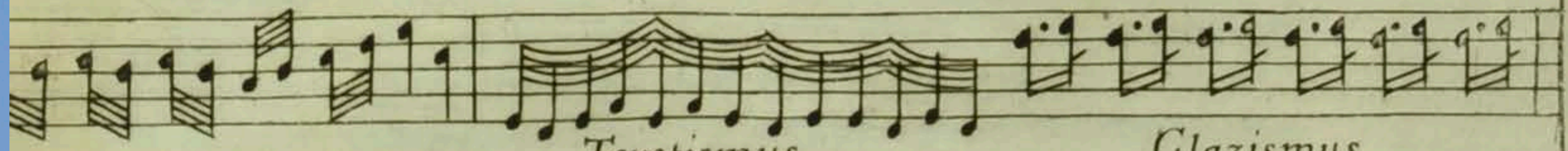


Pigolismus



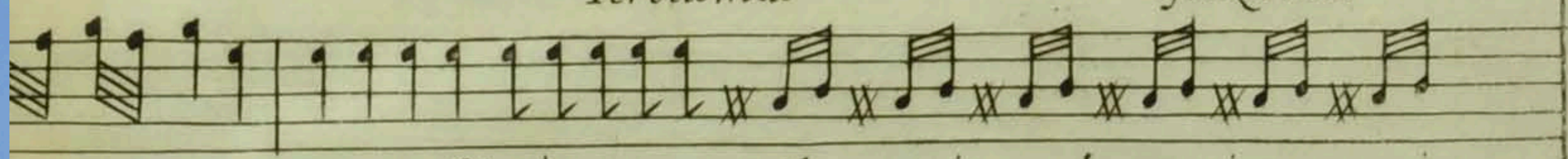
Teretismus

Pigolismus



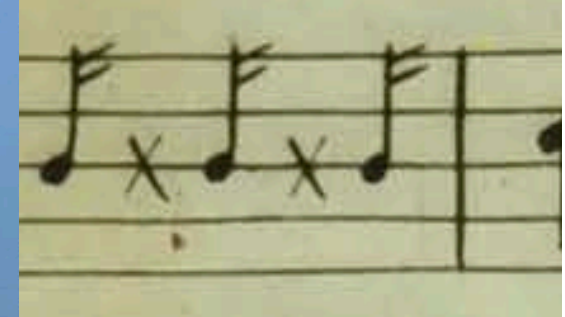
Teretismus

Glazismus

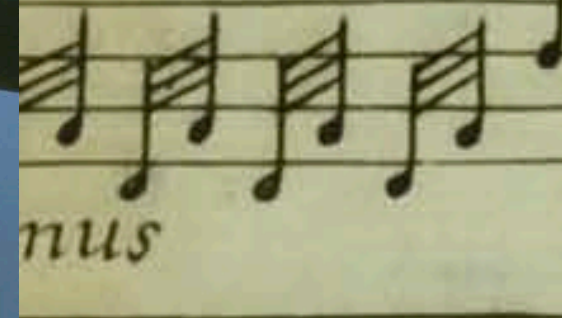


Glazismus

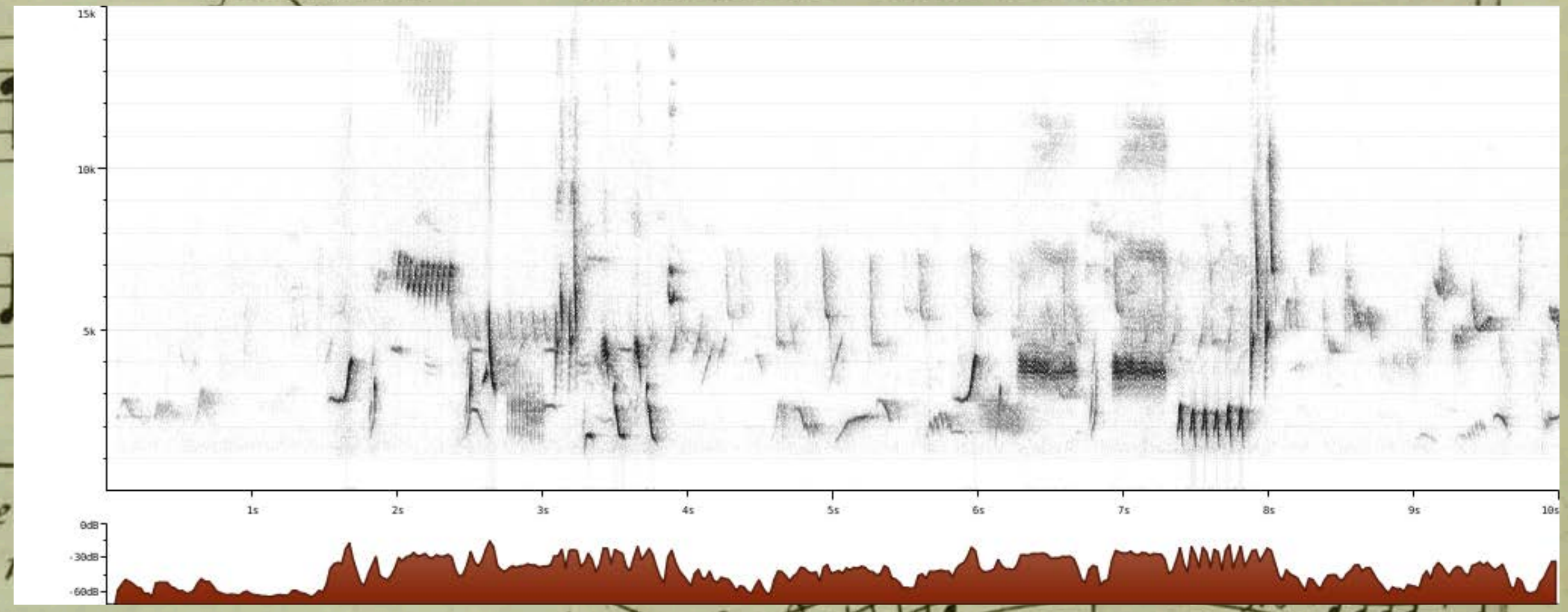
Chromatico-enharmonicum nescio



nus

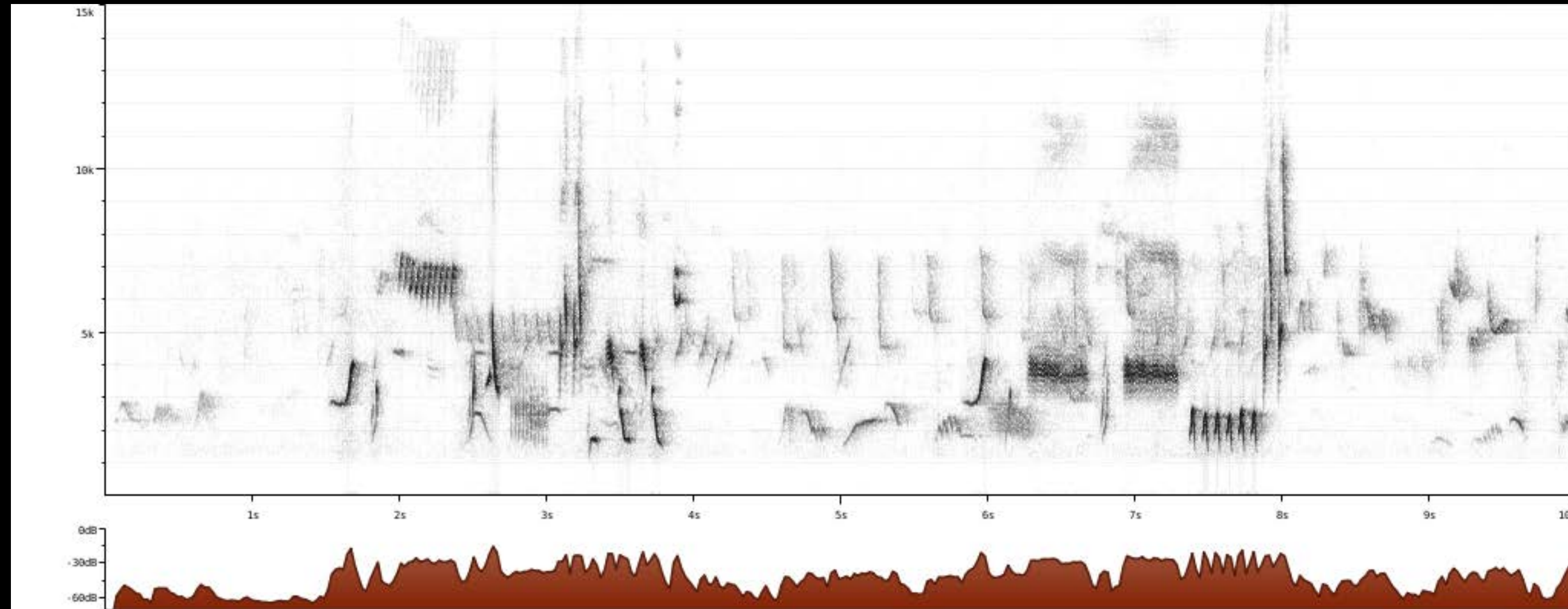


Diue



<https://xeno-canto.org/explore?query=pica+pica&view=3>

<https://xeno-canto.org/species/Erithacus-rubecula?view=3>



Common Nightingale - *Luscinia megarhynchos*

<https://xeno-canto.org/explore?query=Luscinia+megarhynchos&view=3>



Earth Species Project & <https://bioacousticalai.eu/>

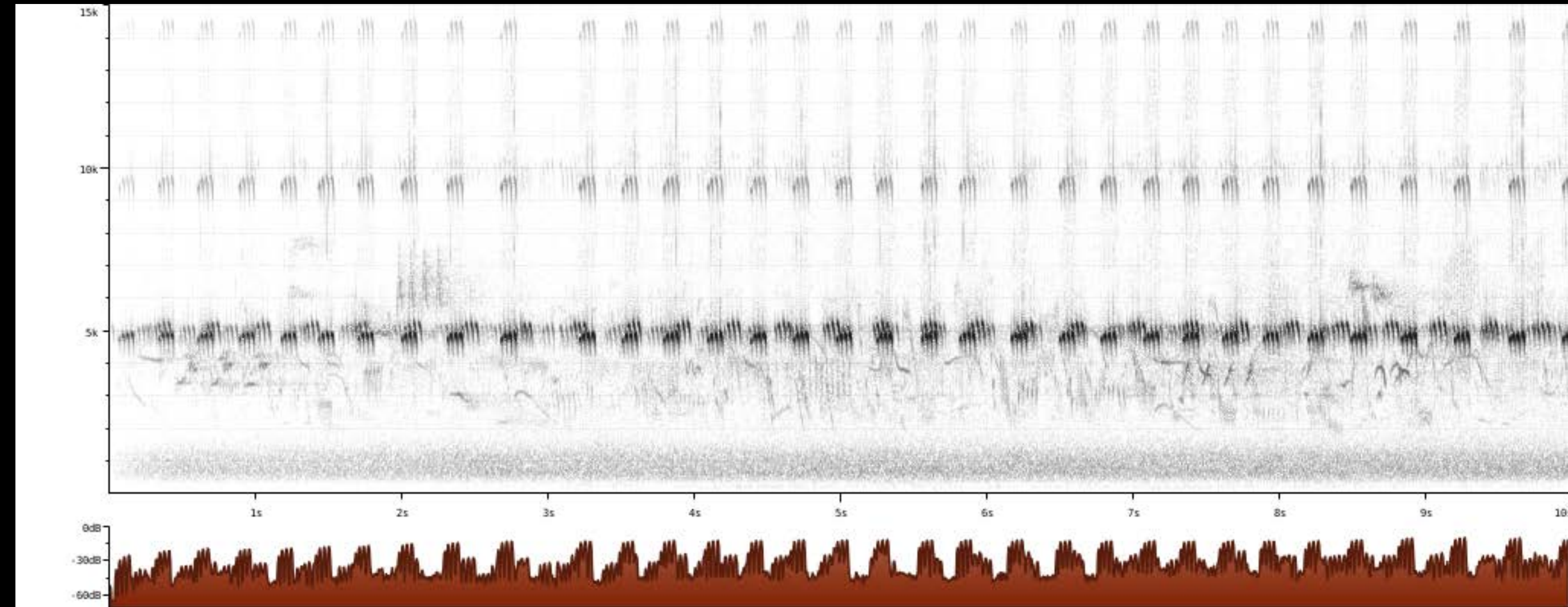
<https://xeno-canto.org/explore?query=Luscinia+meigarhynchos&view=3>



check <https://youtu.be/3tUXbbbMhvk> !

A screenshot of the Earth Species Project website. The browser address bar shows "earthspecies.org". The website has a dark header with the ESP logo and navigation links: "ABOUT US", "WHAT WE DO", "PARTNERS", "NEWS", and "SUPPORT". The main content area features a large image of a black crow with its beak open. To the right of the crow, there is a text block that reads: "More than 8 million species share our planet. We only understand the language of one." Below this, it says: "We are motivated by the exponential progress we are experiencing in machine learning and human language: starting with the invention of techniques that can translate human languages without dictionaries. These new techniques can now be extended to the non-human domain." Further down, it says: "Like the telescope, these new tools will forever change our perspective." Below the crow image, there is a section titled "Our Roadmap" with the text: "The motivating intuition for ESP was that modern machine learning can build powerful semantic representations of language which we can use to unlock communication with other species." At the bottom, there is a flowchart illustrating the project's process: "DATA" (with icons of a fish, an elephant, and a bird) leads to "FUNDAMENTALS" (with a neural network icon and text "Benchmarks Foundation Models"), which leads to "DECODE" (with a "Learned Representation" scatter plot and text "Pattern Discovery and Exploration" and "Interpretation"), which finally leads to "COMMUNICATE" (with a speaker icon).


'n Veldkrekel *Gryllus campestris*





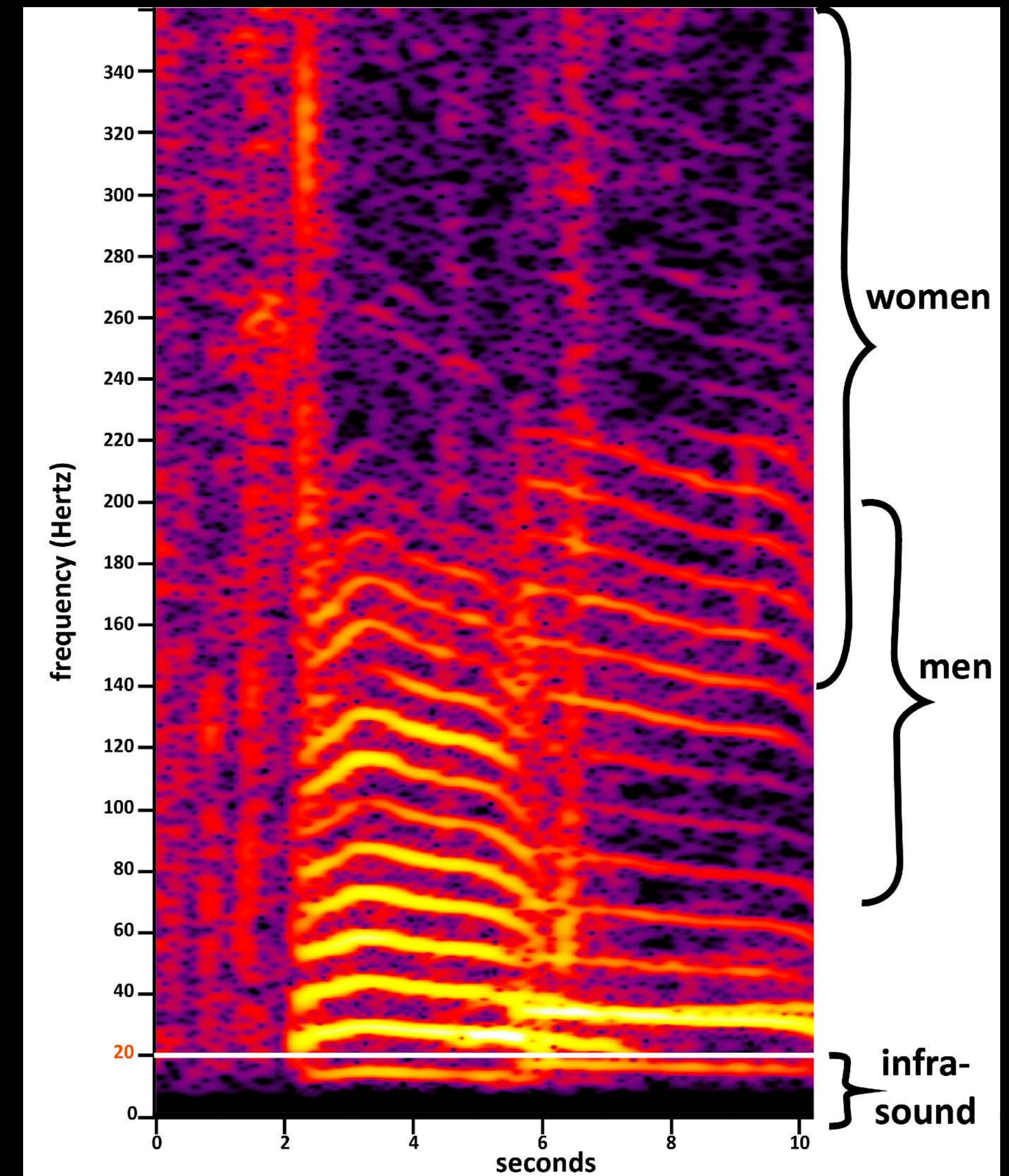
Ormia ochracea

Learning what elephants are saying

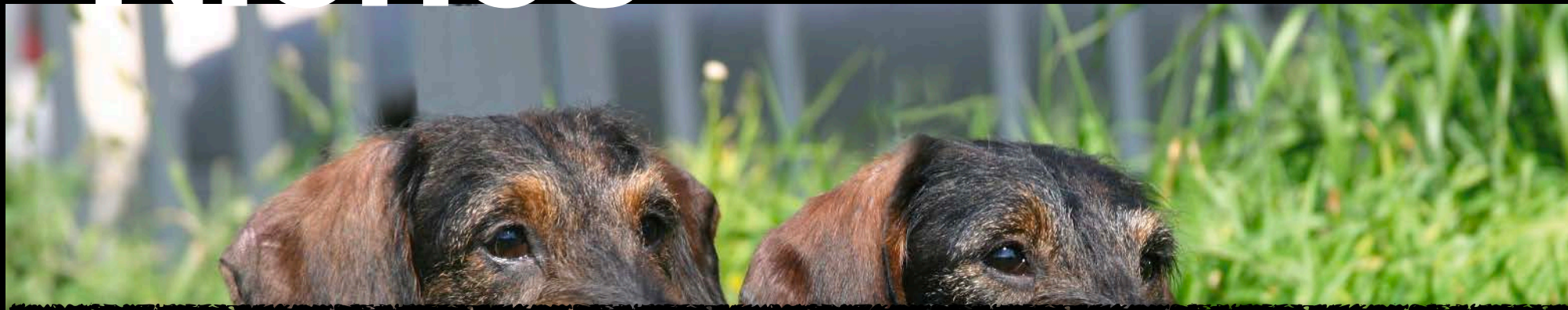


Aida I, mother of 5, listening for where her youngest calf is playing (foot up, ears out).

Elephants are very vocal creatures, yet humans remained unaware of this until 1984, when Katy Payne discovered that often their communication happens below the threshold of human hearing. At the Dzanga Bai in Central African Republic, ELP researchers



Niches



ie imposant, waaks en beschermend was.

De geschiedenis van de **Pyreneese Berghond** gaat lang terug, namelijk tot in de Middeleeuwen. Deze hond werd toen gebruikt als bewaker van kastelen. In Frankrijk in gebruik als schepenbewaker (tegen wolven).

Vb. 5 mezen in één bosje



Koolmees

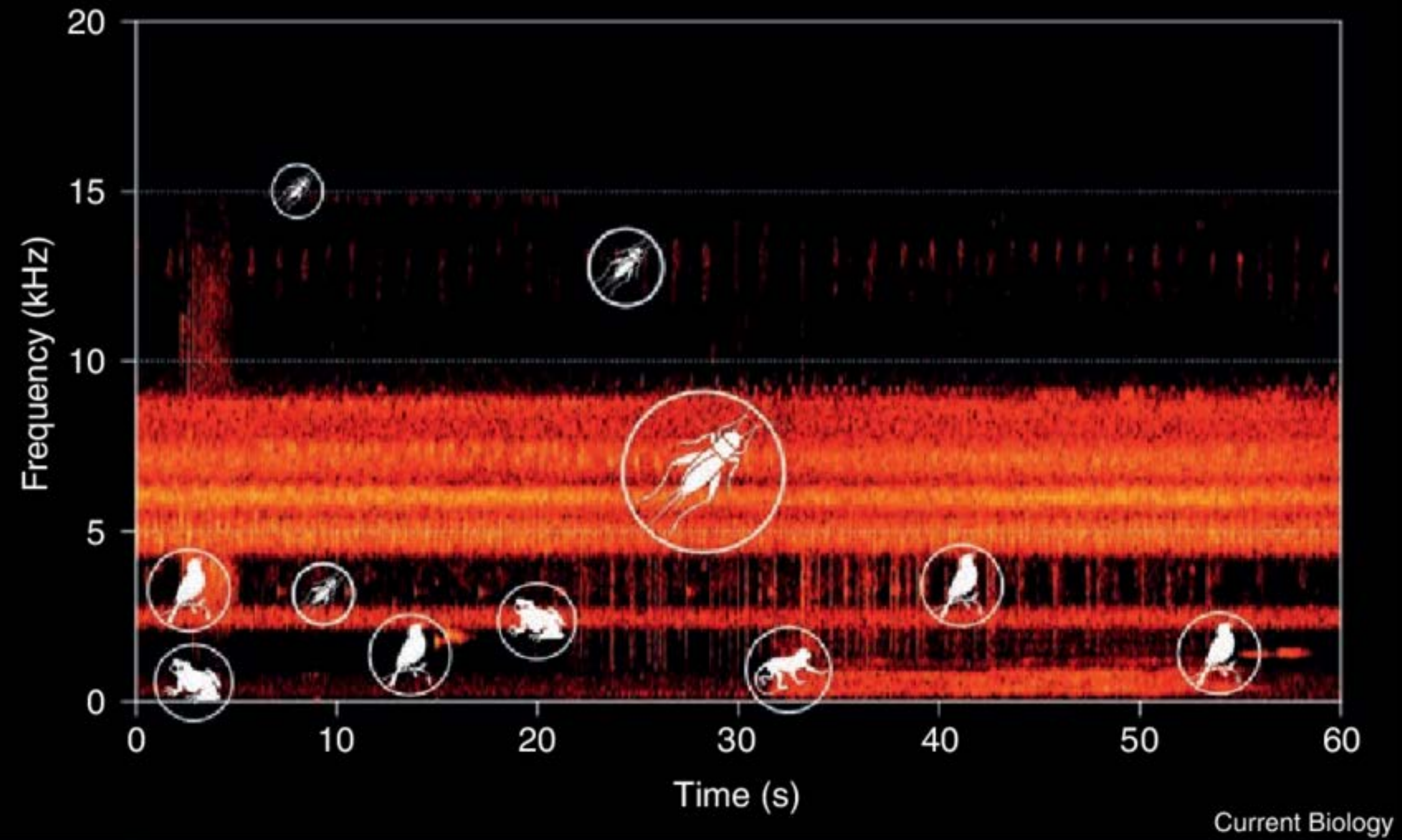


Pimpelmees



Zwarte mees

Acoustic niches



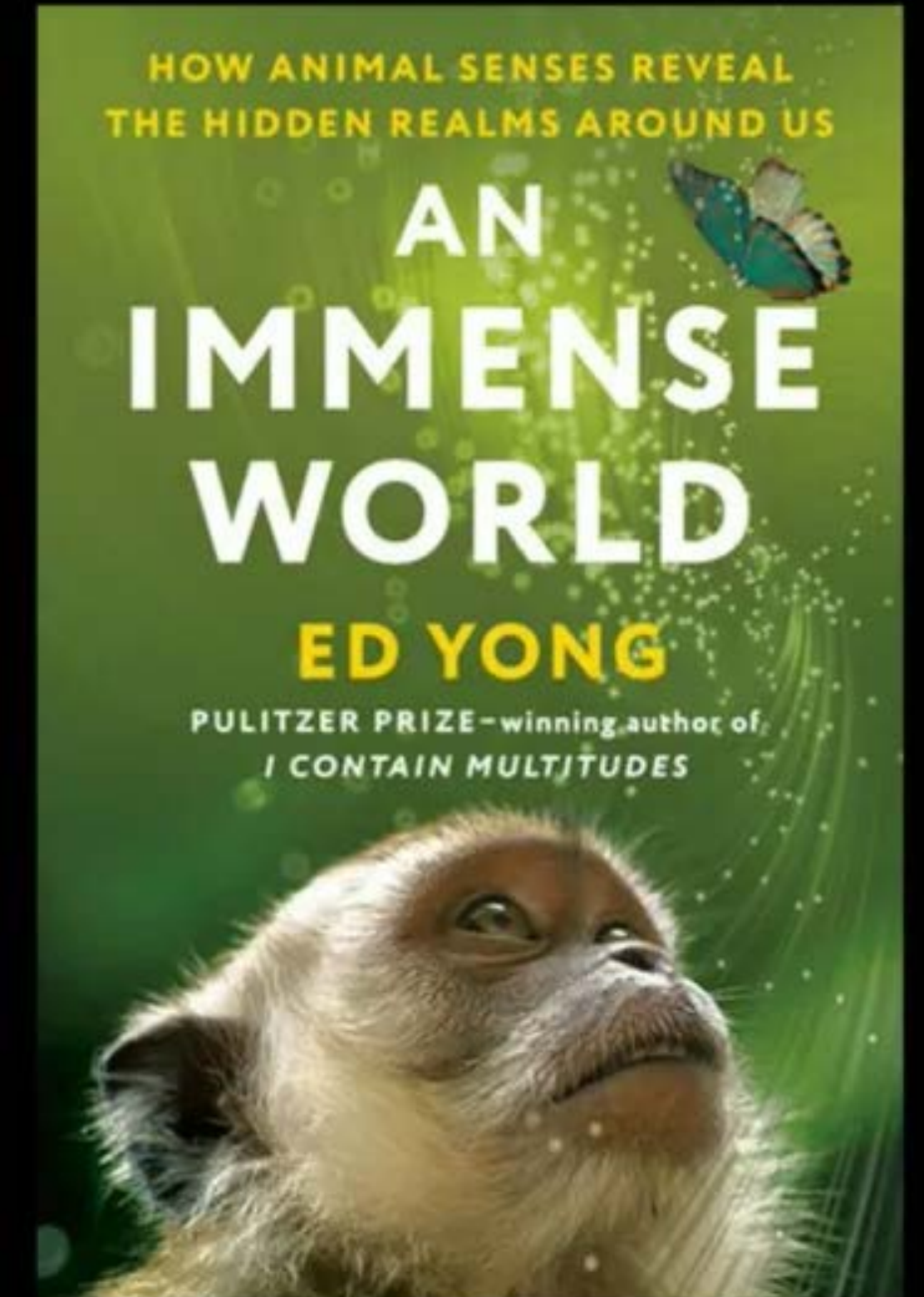
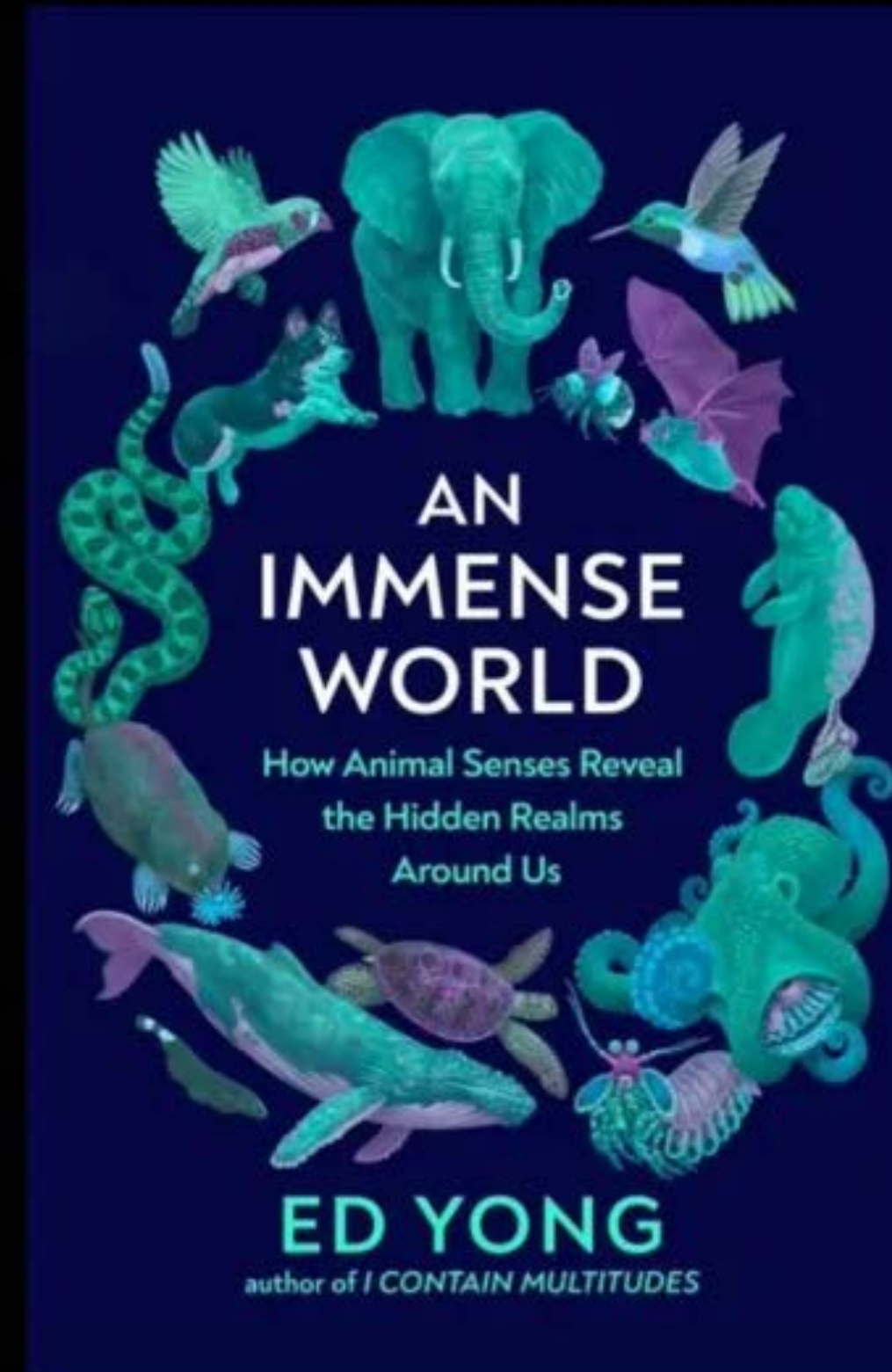
The Sounds of Life

—
How Digital Technology
Is Bringing Us Closer
to the Worlds of
Animals and Plants
—

Karen
Bakker



<https://karenbakker.org/the-sounds-of-life/>



More ?



Lyrebird



<https://www.newscientist.com/article/mg22630191-200-birds-do-impressions-its-time-to-take-them-seriously/>

<https://xeno-canto.org/species/Menura-alberti>

Anthropophony

- the sound of us -

- Language (not discussed)
- Noises (mainly from our Technium)
- (Music)

Noise / Sound pollution (humans)



Geluidsoverlast

Further reads: https://en.wikipedia.org/wiki/Noise_pollution
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6901841/>

How listening to birdsong can transform our mental health

By Tammana Begum
First published 8 October 2020

[f](#) [t](#) [e](#) [h](#) 27

In a recent survey conducted by the Museum, 73% of people reported hearing louder birdsong during the COVID-19 lockdown in the UK.

Many said it comforted and calmed them at a time of crisis - and research shows it really could help improve our mental health.

Birdsong appeared to be louder during the UK's lockdown due to a decline in man-made noise.

While it is pleasant to listen to, could something bigger be going on inside our brains when we hear tweeting and singing from parks and gardens?


Dr **Eleanor Ratcliffe**, a lecturer in environmental psychology at the University of Surrey, looked at how bird sounds may restore attention and alleviate stress.

Eleanor says, 'I was inspired to do this research because of an opinion piece in the Guardian by Pete Brash. He was speculating on how bird sounds might help people through the darkest days of winter.'

The first of her three studies consisted of an online test with 174 British residents listening, rating, and commenting on 50 different bird sounds from the UK and Australia.


The research found some bird sounds offered relief from mental fatigue and stress. This depended on the type of bird and what respondents associated it with.

For example, one participant found the gentle sound of chickens comforting following



Learn to identify birdsongs


Listen to the songs and calls of the most common garden birds in the UK and get tips on how to learn to recognise these familiar sounds.



Protecting our planet

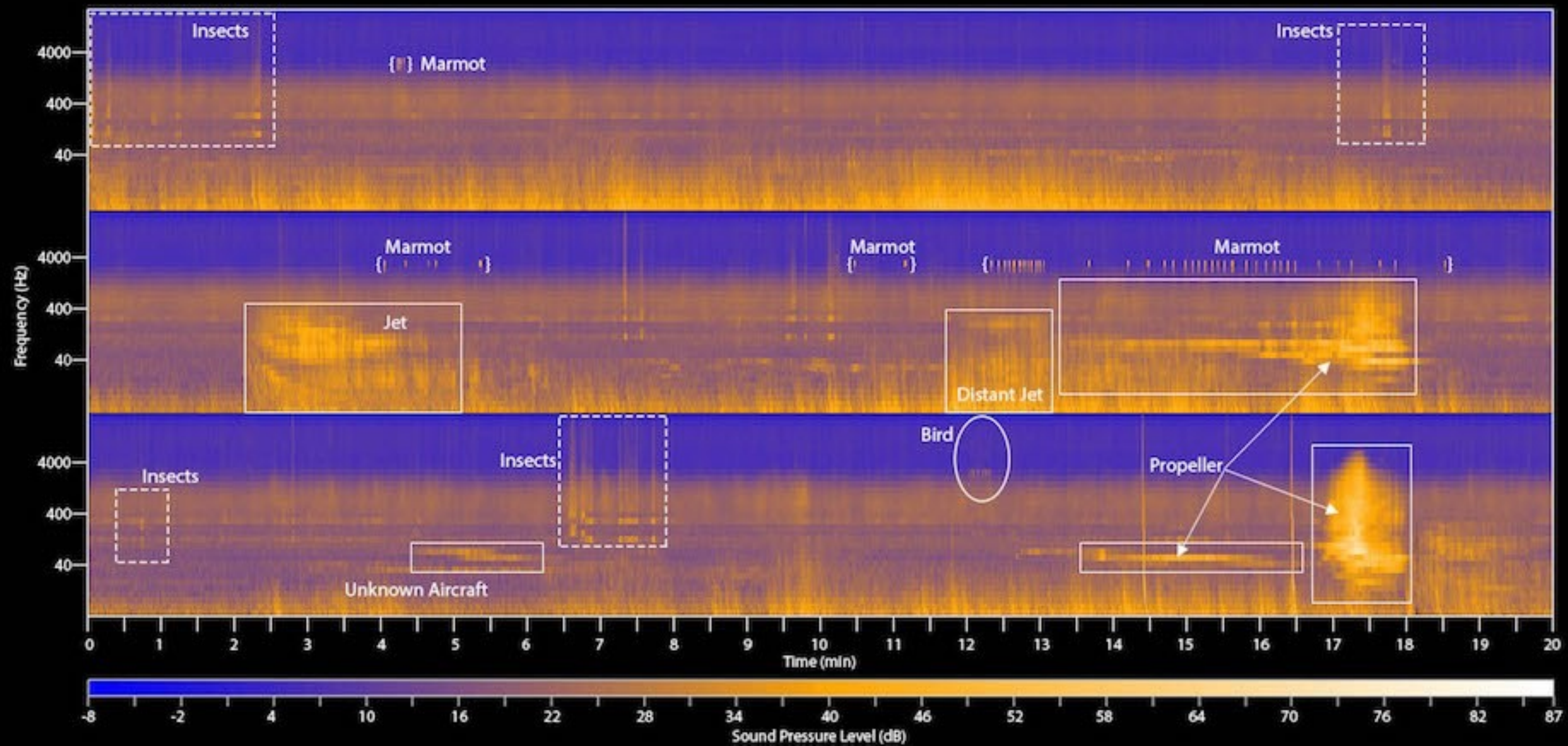
We're working towards a future where both people and the planet thrive.

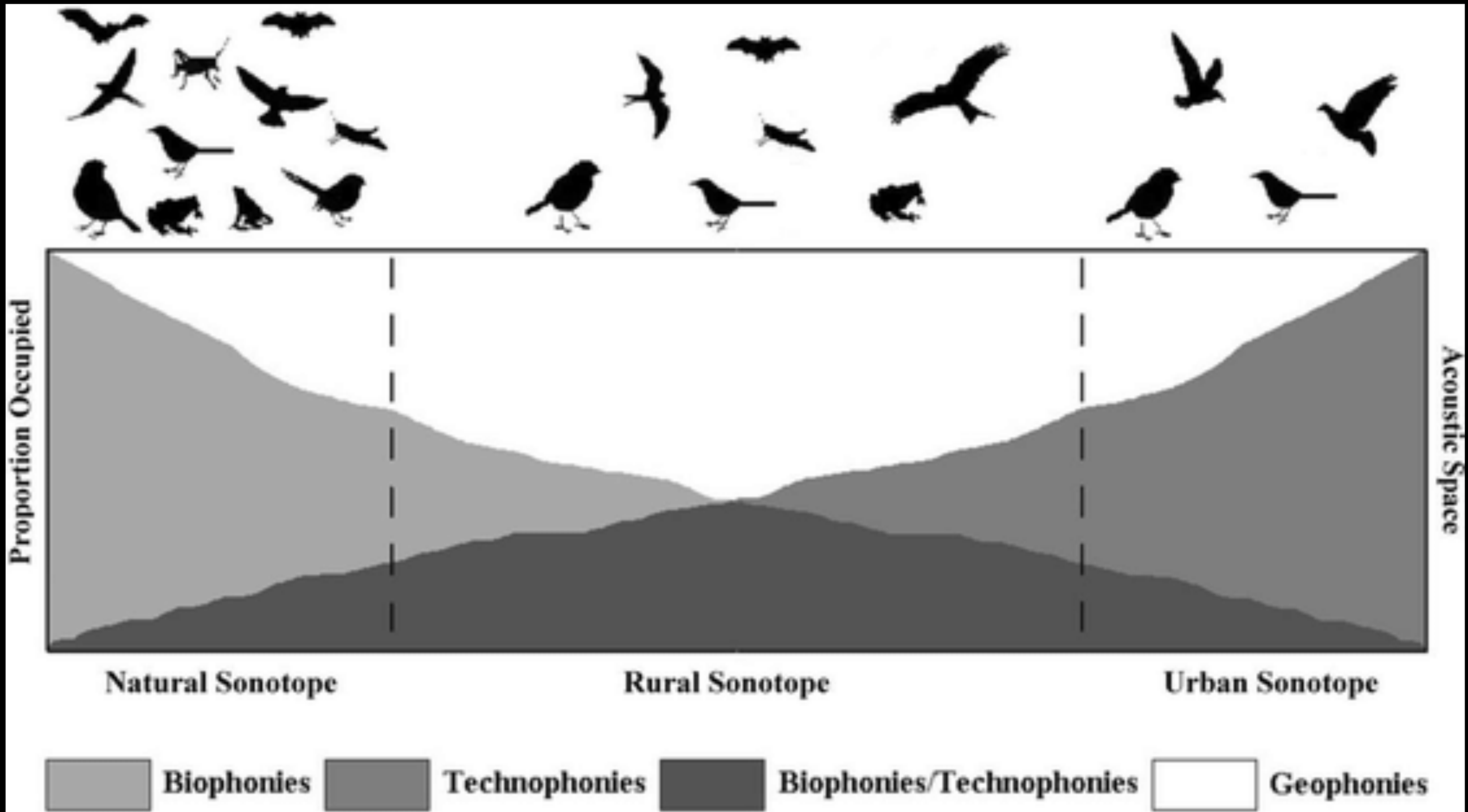
Hear from scientists studying human impact and change in the natural world.



The image features a dark, atmospheric scene with a glowing yellow mesh sphere in the center. The sphere is composed of a grid of small circles and is surrounded by several bioluminescent plants with glowing yellow-green flowers and stems. The background is dark with some faint, glowing elements, creating a mysterious and ethereal atmosphere. The text "NOISE THERAPY" is overlaid in the center in a vibrant, multi-colored font.

NOISE THERAPY







<https://sonicsea.org/film>



<https://news.cornell.edu/stories/2021/02/bearded-seals-are-loud-not-loud-enough>

“To put a positive spin on the scourge that is noise pollution, I would like to add that as compared to other forms of pollution, noise does not leave behind any remnants in the environment once the source is removed, unlike say, plastic or toxic chemicals.”

“But, unfortunately, the problem of noise pollution is not taken seriously enough”

Krause: This is what extinction sounds like

<https://www.theguardian.com/artanddesign/2023/jun/14/bernie-krause-sound-ecologist-disappearing-world>



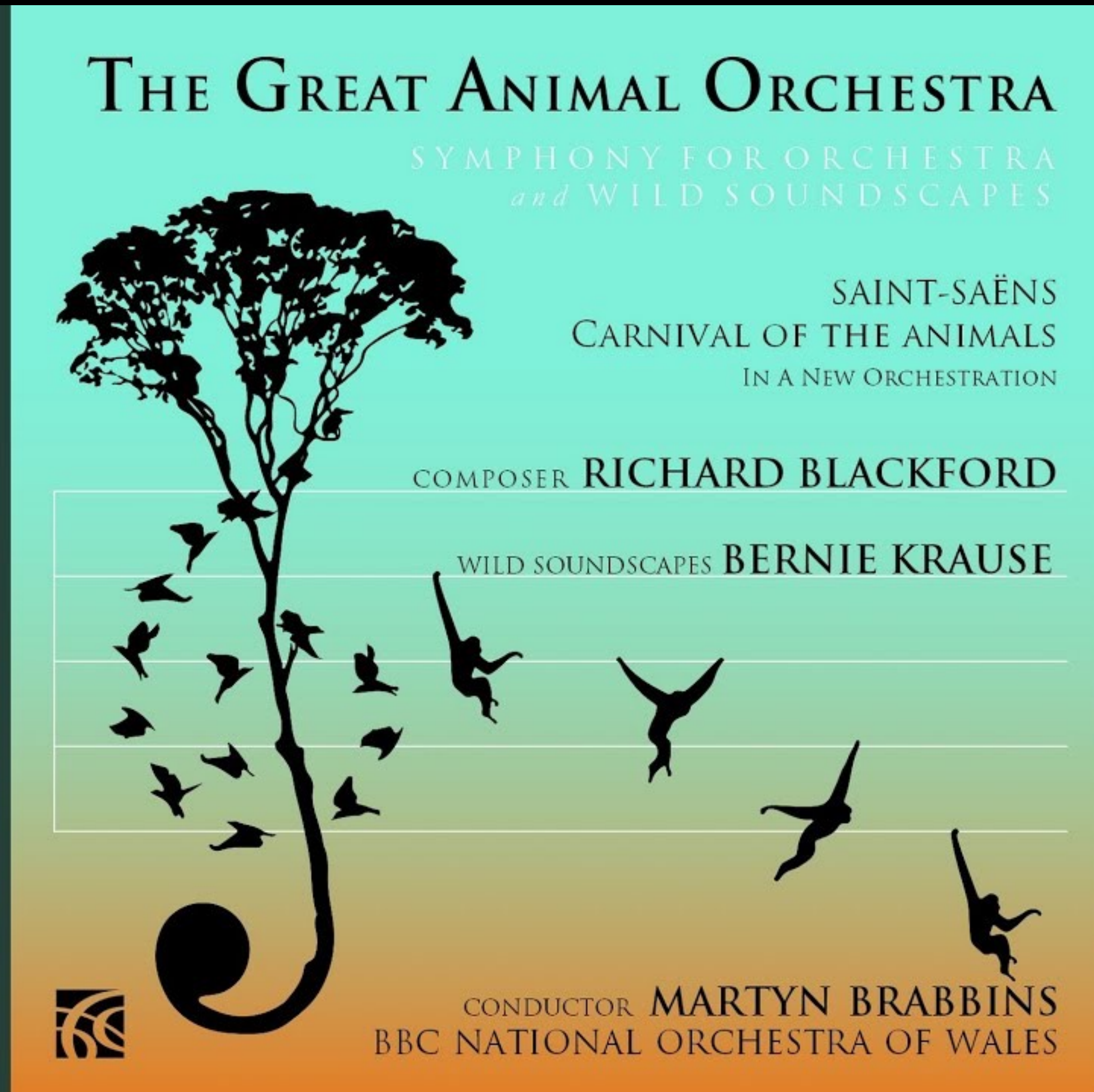
<https://youtube.com/watch?v=KnpsMG0PWRY>

Onderwijs ideeën?

Suggesties en ideeën?

- geo-, bio-, anthropo- —> (niet) levende natuur
- eco acoustics (monitoring van ecosystemen via geluid)
- taal en taligheid
- zintuigen (horen, echolocatie, voelen, enz.)
- evolutie (akoestische niches, evolutionaire ‘wapenwedloop’)
- hoorbare veiligheid
- geluidsoverlast
- . . . ?

Bio & Anthropophony




THE GREAT ANIMAL ORCHESTRA
SYMPHONY FOR ORCHESTRA
and WILD SOUNDSCAPES

SAINT-SAËNS
CARNIVAL OF THE ANIMALS
IN A NEW ORCHESTRATION

COMPOSER **RICHARD BLACKFORD**

WILD SOUNDSCAPES **BERNIE KRAUSE**

CONDUCTOR **MARTYN BRABBINS**
BBC NATIONAL ORCHESTRA OF WALES

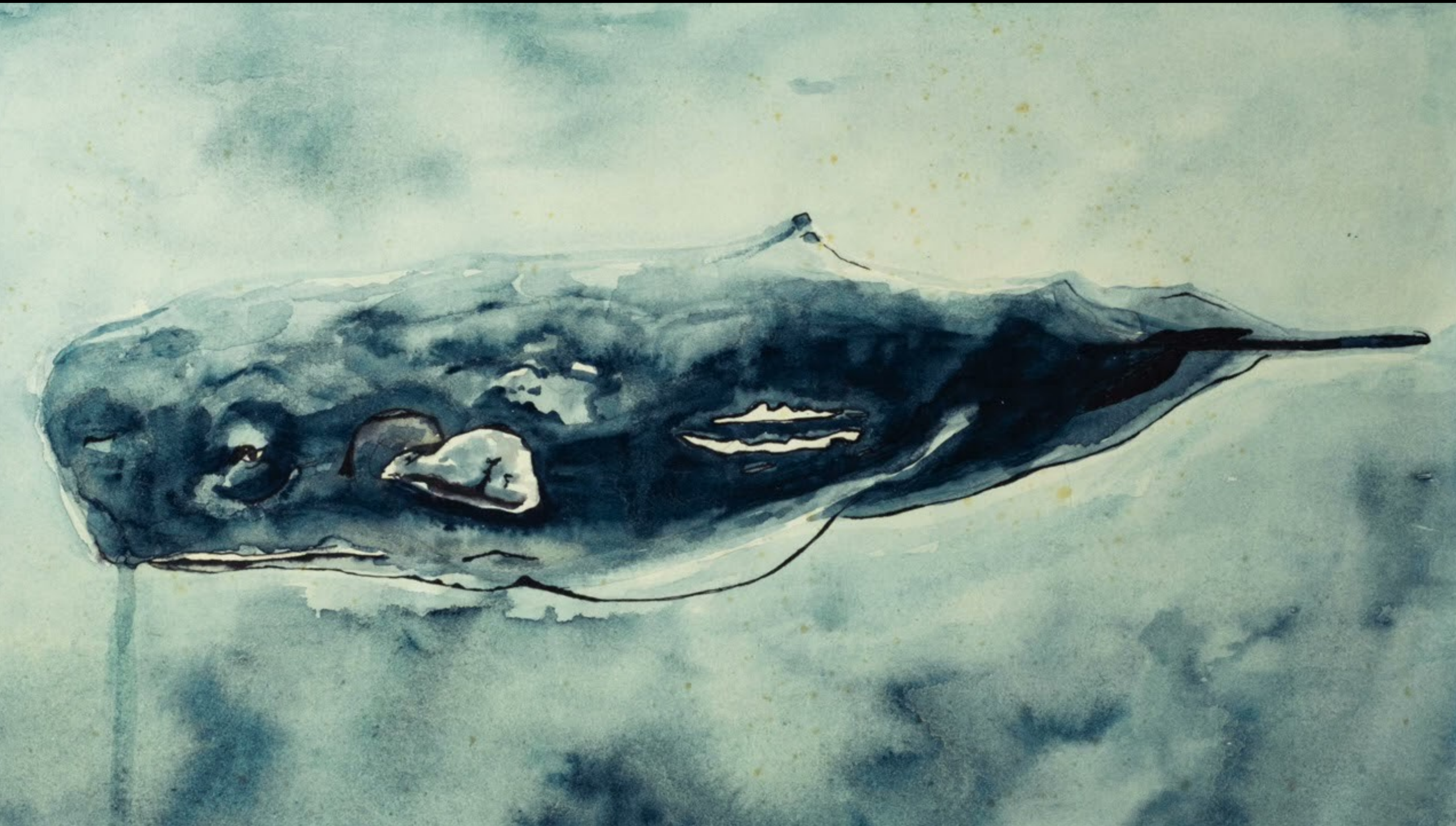


[https://youtube.com/
playlist?
list=OLAK5uy_k_qdjuJ4E2t
FsihTjibr5fqMg7ihprzB8](https://youtube.com/playlist?list=OLAK5uy_k_qdjuJ4E2tFsihTjibr5fqMg7ihprzB8)
The Great Animal Orchestra

Cosmo Sheldrake

Wild Wet World

Wild Wet World an is
an homage to the ocean.



<https://www.cosmosheldrake.com/music/wildwetworld>

50% of the publishing income —> ocean projects

Wake Up Calls

An album comprised of recordings
of endangered birds.



<https://www.cosmosheldrake.com/music/wake-up-calls>

MT • SoundScape Ecologies • BioAcoustics

More info -> pointers

- BioAcoustics <https://en.wikipedia.org/wiki/Bioacoustics>
Masters: <https://www.eneslab.com/teaching>
<https://www.ibac.info/> (International Bioacoustics Society)
- EcoAcoustics aka Soundscape Ecology
vb. <https://rfcx.org/> Naturalis, enz.
[Hans Slabbekoorn](#) • Hoogleraar Akoestische ecologie en gedrag
- ZooMusicology <https://en.wikipedia.org/wiki/Zoomusicology>
and <https://en.wikipedia.org/wiki/Ecomusicology>
- BioMusic <https://en.wikipedia.org/wiki/Biomusic>
- —> <https://bioacoustical.eu/> (Dan Stowell, Naturalis) • Interspecies Communication (ViHaR (Vocal Interactivity in-and-between Humans, Animals and Robots)

Resources

Nature sounds & mood / emotion

- <https://www.nhm.ac.uk/discover/how-listening-to-bird-song-can-transform-our-mental-health.html>
- <https://www.pnas.org/doi/10.1073/pnas.2013097118>
- check out Tjerk Stoops field recordings :
<https://soundcloud.com/user-355006298>
- Chris Watson (Fieldrecording artist) <https://chriswatson.net/>

Noise sources

- <https://noise-planet.org/>
- <https://decorrespondent.nl/10703/hoe-slecht-is-lawaai/af29837b-a713-0fef-2c81-4549f6f192c3>
- <https://nl.wikipedia.org/wiki/Geluidshinder>
- <https://onesquareinch.org/> (A sanctuary for silence)

Many other resources

- <https://www.researchgate.net/profile/Bernie-Krause>
- [https://en.wikipedia.org/wiki/Soundscape ecology](https://en.wikipedia.org/wiki/Soundscape_ecology)
- <https://thereader.mitpress.mit.edu/a-complete-history-of-collecting-and-imitating-birdsong/>
- <https://www.markijzerman.com/>
- SoundScape Ecologies playlist : <https://www.youtube.com/watch?v=ZdIxnI3pKNM&list=PL-uSty7ZhL3Vg-AROVE1RWh5ulwpxrCfK>
- <https://time.com/6279011/scientists-using-sound-to-study-nature/>