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# JOURNAL of BIOPHILIC DESIGN

## SOUND

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## WELCOME

**Welcome to the sixeenth edition of The Journal of Biophilic Design.**

Sound is an important aspect of our environment, in fact is one of the most common things which annoy people in the workplace according to occupancy evaluations, and yet, for some reason we tend to forget about how a space "sounds". Because we can't see it, it's hard to specify, and it's certainly not top of mind when we are going shopping for the flooring, table lamps, curtains and tiles. But it should be. In a study of 1000 workers led by environmental psychologist Dr Nigel Oseland for the Remark Group, it was found that 65% of workers said noise impacted their ability to complete work in an accurate and timely manner and 58% said that noise had a high impact on their stress levels in the workplace.

Terrapin Bright Green has a whole paper on sound "An Ear for Nature – Psychoacoustic Strategies for Workplace Distractions & The Bottom Line" and explores how biophilic design interventions can help alleviate acoustic stress.

In our edition here, we look at this invisible aspect of interior design, we have case studies of biophilic design interventions in healthcare, workplaces, hospitality and more. We look at the science behind how sound affects our minds and also the wildlife around us. How sound affects us in the workplace, which noises annoy, how to mask irritating sound, ideas and tips on how to bring biophilic interventions into your designs how and when to add soundscapes to a space to mask or enhance the living systems in a space.

We have some heavy hitters who are experts in sound, from the amazing Julian Treasure, to expert psychoacoustician Paige Hodsman. Sound is one of the last things that leaves us when we depart this earth, we forgot about this. We put people in cacophonous hospitals, we shove them into corridors while they wait for emergency treatment. People's eyes might be closed, but they are aware of the sounds around us.

Being mindful of how our spaces sound could be one of the best things you do this year. Collaborate, reach out for advice, switch the harsh reflective surface you were intending to put in the open plan office, and include some sound wave deflecting plants, wool lampshades, softer furnishings, create zoning for quiet work, bring in wood rather than metal and plastic, use cork. Many, many ideas, we are here to help find the best solutions too, do reach out, our sourcing director in Milan can help you, globally. We want to accelerate this change, and we can do it. Together.

Vanessa Champion PhD, AMRSPH
*Editor and Founder*
editor@journalofbiophilicdesign.com
www.journalofbiophilicdesign.com



## HIGHLIGHTS

*Each edition of The Journal of Biophilic Design has regular sections. We highlight them here so you can navigate your way around the Journal. If you would like to contribute to a future edition, please do contact our editor we would love to feature your research and case studies.*



Details of our contributors can be found on our website.
Each edition of The Journal of Biophilic Design is published every other month.
Next issue's focus is **Architecture.**

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*Errata – on page 21 of the 15th issue of the Journal – the new light "Glow Out" should be "Big Glow" and the company is Rakumba – Decorative Lighting*

# SOUND

# Sound Affects

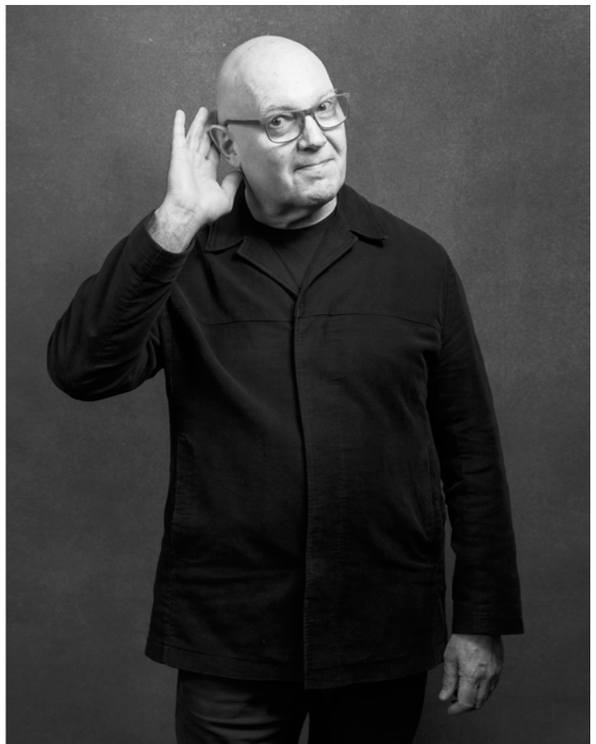
*How sound shapes our lives, our wellbeing and our planet*

**Julian Treasure**
***founder of The Listening Society and one of the most watched TED speakers***

***Homo sapiens* has been around for perhaps 300,000 years, and our ancestors for anything up to three million years before that. For the vast majority of that time, our relationship with sound has been first and foremost a matter of survival. Early humans used sound to detect and probably also trap the animals they hunted; even more crucially, like all living things, hearing was their primary warning sense. For most of human history, we had good reason to fear the darkness. At night, at the edge of the firelight, our eyes begin to fail us – but our hearing functions just as well in night as in day, and what's more, we can hear what's behind us. As a result, sound goes very deep, very fast. If a twig snaps behind you in a forest you will spin around: the survival instinct is non-negotiable. If I want to warn you about urgent danger, I don't wave, I shout. This was brought home to me once in Kents Cavern, a cave system in Devon where they have found human remains dating back 40,000 years. In a small chamber deep underground, we sat down and switched off our torches. The darkness was thick to the point of suffocating, and my sense of hearing was suddenly dramatically heightened. It was easy to imagine sitting in that spot thousands of years earlier with only a small guttering torch, listening constantly for danger in the surrounding darkness. Since language developed at least 100,000 years ago, knowledge has been passed from generation to generation in sound, which is ephemeral and invisible: people learned by listening to teachers speaking, and if they missed it, they missed it. This is why Pythagoras is said to have erected a screen for his first-year students, who were called *akousmatikoi*, so that they could not see the teacher: he believed that seeing was a distraction from the important business of listening. For all but the last few thousand years of human history, our culture and communication were oral and aural.**

In the fourth millennium BCE, writing developed independently in many places, although until the Industrial Revolution only the elite few in most societies were literate. In the short time since then, accounting for less than a tenth of one percent of human history, our relationship with the world has dramatically tilted and become heavily weighted to the eyes. Visual communication has become dominant. We teach reading and writing in school, but not speaking or listening. Of course, there are good reasons for the popularity of writing, which revolutionized how we stored and transmitted information, allowing us to send stable information through time and space in ways that changed humanity. Most of the communication methods we've invented since personal computers and the Internet arrived have been visual: email, SMS, social media and instant messaging hold hostage our eyes and our fingers. Screens on mobile devices have further increased the dominance of the eyes as most people's primary portal to reality.

Much of our communication now is written without much regard to the consequences: quick, overheated opinions that will earn the tiny dopamine reward of a thumbs-up icon; typo-laden group messages; instantly regretted, half thought-through emails, perhaps accompanied by the slightly surreal sound effect of an imagined physical message rushing through the air. For many people today, the experience of entertainment at home is a similarly distracted, multi-screen one, in which we're never entirely focused on one thing. We consume so much of our media in transit, whether literally or figuratively: a recent study found that internet users are 80% more likely to watch a video if it has subtitles. The requirement to focus on audio has become almost countercultural. However, it is no coincidence that podcasts have seen their recent rush in popularity. This is an intimate, conversational, medium that allows listeners to do something else while enjoying the show, something that's impossible with video or text-based content. There are huge corporations spending billions on ever more seductive ways to seize our attention, almost always through the eyes. I met MIT Professor Sherry Turkle, author of the excellent books *Alone Together* and *Reclaiming Conversation*, when she gave her important TED talk on the way technology is hollowing out our close relationships and replacing a few deep connections with many shallow ones, and we shared a deep concern about the future of intimacy and conversation. Nobody can restrain the unrelenting march of technology – almost nobody is even trying – but its effects on humanity's ability to listen have been, and continue to be, disastrous.



Architecture, too, is almost exclusively ocular, resulting in many buildings that are so noisy they are unfit for the purpose for which they were built. Often, harmful noise results from bad acoustics – spaces that have been designed for the eyes only, with little or no consideration for the ears. Most of our cities are too loud, and many transport systems are literally deafening. If we were to accept the visual equivalent of our auditory experience it would be to travel with strobe lights permanently dazzling our eyes.  It's no wonder that urban earbud-wearing 'podestrians' try to take control of their auditory experience. Sound has become something to block out when we notice it at all.

Our world has become increasingly interventionist, where quietness, passivity or acceptance are often seen as weakness, and those who have the loudest voices or who deploy bullish power to affect things (for right or wrong) are preferred as influencers and leaders. Susan Cain's outstanding TED talk and her book *Quiet* about the value of quiet, introverted people give the lie to this obsession with intensity and loudness and propose that instead we should make use of the introvert's ability to think deeply, strategize and solve complex problems. She cautions: "Don't mistake assertiveness or eloquence for good ideas". In our busy competitive world, it's not surprising that urban consumer culture prefers seeing to hearing, sending to receiving, and speaking to listening. My own TED talk on speaking has at least five times as many views as my TED talk on listening – a ratio almost exactly replicated in research by the Organisational Listening Project, which surveyed a range of organisations and found that they were devoting more than four times as much resource to outbound communication as they were to listening.

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I believe that there is also a spiritual dimension underpinning this shift to the visual. Sight is an active sense: you decide where you are looking, you have eyelids you can close, and visual signals are analysed in the cortex, the region of the brain we associate with higher-level processes. By contrast, hearing is passive: you have no earlids and you hear even while you sleep; as sound waves enter the holes in your head, they physically touch your eardrums and activate the more primitive regions of our brain. Human culture is increasingly based on logic and agency – making things happen, as opposed to going with the flow. We've largely lost our connection with nature as we live in environments that are entirely constructed. And the same increasingly applies to our relationship with the invisible.

Archaeoacoustician Iegor Reznikoff reflects that for most of human history, life was short and tough, so people were more engaged with the invisible, especially with what happened after death: as a result, initially shamanism and later religion were central to their daily lives. Sound is invisible, and partly for that reason it played a key role in these practices – but we now live in a world where seeing is believing, and what's visible and tangible is preferred. We sanitise and even hide death; secularism and materialism encourage us to concentrate on the here and now, the object that can be seen and acquired. The visible increasingly dominates our consciousness and our choices. The eyes rule, while the ears are largely ignored.

I have spent the bulk of my professional life at the junction of sound and communication. I believe that reassessing our relationship with the sound we make and the sound we experience will have a profound impact on how we interact with one another and with nature. I define listening as *making meaning from sound*. This involves two stages: selecting what to pay attention to (which is largely done subconsciously by the brain's reticular formation), and then ascribing meaning to it. My belief is that increasing our awareness of sound and employing conscious listening can transform our happiness, effectiveness, well-being – and in particular our personal and societal relationships. Never have we needed listening more than we do today in a world threatened by polarisation, dogma and conflict.

Hearing is a capability, but listening is a skill. It's tragic that we don't teach it in schools or places of higher education. Conscious listening can be learned, practised, and mastered, and the advantages for anyone who takes the time to do that are enormous. Listening is how we learn, and is the foundation of leadership, persuasion, sales, relationships and even civil society. It is increasingly true that we have stopped listening to each other and that internet-driven polarisation and intolerance are becoming the norm. It's not a coincidence that we call online groups echo chambers, because they are spaces where people reinforce one another's prejudices, opinions are widely confused with facts, and conspiracy theories, post-truth politics and deep fakes distort and hide reality. In all of this, listening is ditched in favour of shouting down the opposition.

Attentive listening is a practice that enhances consciousness and forges fundamental connections in three important dimensions.

First, in time. Listening is often the main way we perceive the passage of time. Sound always exists in time: there is no such thing as an auditory photograph. The sound of music or speech acts like a ticking clock, and iconic sounds like the dawn chorus or a kettle boiling can mark important times of day. In his book *The Third Ear*, Joachim Ernst Berendt quotes Herman Hesse as writing: 'Music is time made aesthetically perceptible.'

Second, in place, both physical and spiritual. Your ears are constantly giving you information about your surroundings: even with your eyes closed, you can sense the kind of room you're in and who or what is there with you, from tiny sounds and acoustic reflections. And spiritually, every tradition that I am aware of has at its heart quiet contemplation of some kind, involving silent listening to the person's connection with the ineffable, or to their own innermost essence as appropriate. Third, in society. All the research about happiness I've seen suggests that the foundations for personal happiness are a strong network of family and friends and doing service for others – both built on relationships. All our relationships are in turn built on listening, which is why the most common complaint in any relationship is 'you never listen to me.'



This is even more true of groups and organisations. Every human being listens uniquely, because we all listen through filters – the cultures we are born into, the languages we learn to speak, the values, attitudes and beliefs we pick up or set aside throughout our lives – and our listening changes over time and contexts. At any moment we may have expectations, intentions, emotions and assumptions that colour our listening – for example, people tend to vote for politicians with deeper voices, because we have the innate assumption that more significant (or possibly dangerous) things make deeper sounds. It is a grave but almost universal error to assume that everyone listens like you do. They don't. Simply understanding and accepting the diversity of other people's listening can transform communication and teamwork.

Sadly, this is rare in most organisations. The Organisational Listening Project is a major piece of research carried out between 2014 and 2016 by a team headed by Professor Jim McNamara at the University of Technology, Sydney. They surveyed thirty-six organisations ranging from large to small across public, private and non-profit sectors, and found that on average these organisations claimed to be devoting eighty percent of their time and resources to outbound communication such as PR and advertising, and only twenty percent to listening. As McNamara noted: 'Given that these are self-assessments, claims in relation to time and resources spent on listening are more likely to be generous rather than minimalist.' We all like to think that we listen more and better than we really do. The conclusion of the research was damning: 'Most organisations listen sporadically at best, often poorly, and sometimes not at all.'

Of course, organisations don't have ears: the reason for this abject corporate listening is that they are full of people who are not listening. McNamara found that there is solid financial justification for changing this. Paying proper attention to listening is a competitive advantage, because the survey found that organisations ranked as the better listeners had better staff and customer retention, higher morale and productivity, and better reputations. Those at the bottom of the listening table experienced more criticism and crises. Listening is profitable.

The miraculous story of sound takes us from the microscopic choir of the cells in our bodies to the largest cosmic scale we know of. The more we learn, the more we discover how alive with vibration is everything around us. The Perseus Cluster is one of the largest structures in the known universe, containing thousands of galaxies surrounded by a super-heated cloud of gas; at its centre lies a supermassive black hole. In 2003, a team from Cambridge University analysed 53 hours of readings from the Chandra X-ray Observatory space telescope and detected powerful sound waves generated by this black hole, causing huge ripples in the superheated plasma that surrounds it. They calculated the sound's frequency as once every 9.6 million years, which is a note some 57 octaves below middle C. Though it is true that in space, no human can hear you scream, an entity with an ear drum the size of a galaxy might be able to hear that note. Amazingly, even intergalactic space is full of sound, which is what we will explore later in my book *Sound Affects*.



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It is a remarkable and thrilling story, and along the way I ask you to keep in mind that it's a story with a purpose – to help you reclaim sound as a vital part of your life, and by so doing make your life better. *Sound Affects* is about the effects of the sound we humans make, and the sound we, and all other living things, consume. Throughout the book, you'll find suggestions for practical actions you can take to improve your own happiness, effectiveness and wellbeing, and that of those you interact with, as well as actions we collectively can take with sound to support the increasingly fragile ecosystem of this planet that we so often take for granted. By becoming more conscious of sound, we can all can take responsibility for how it affects us, and how we affect it.

This is an excerpt from Julian's new book "*Sound Affects. How Sound shapes out Lives, our Wellbeing and our Planet*" and kindly repurposed here with his kind permission.

Enjoy two brilliant video and audio interviews with Julian Treasure on The Journal of Biophilic Design: The Power of Sound: https://journalofbiophilicdesign.com/podcast-journal-of-biophilic-design/the-power-of-sound

The Sound of Silence – How Noise is Destroying our connection to Nature and each other. https://journalofbiophilicdesign.com/podcast-journal-of-biophilic-design/julian-treasure

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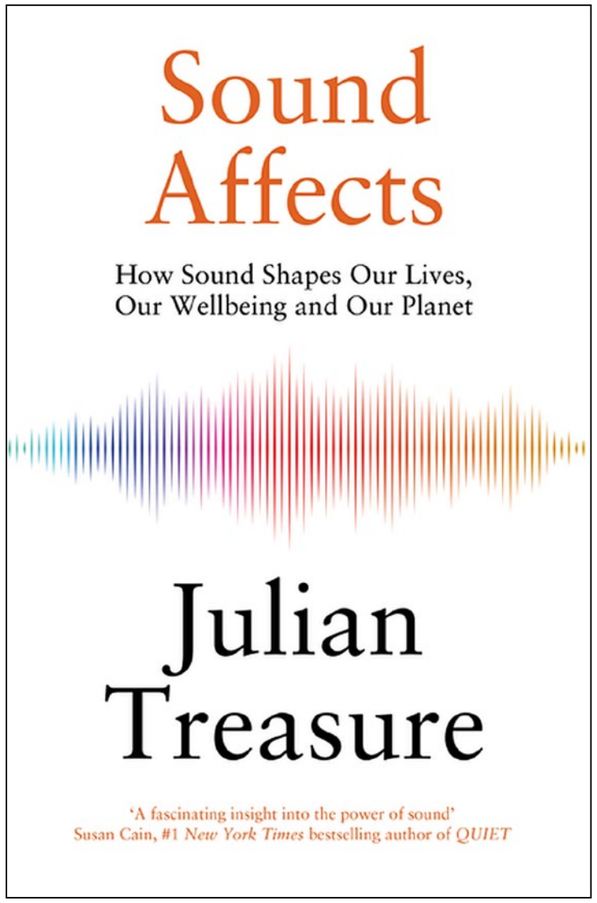
Julian is also speaking at The second Biophilic Design Conference 17 November 2025 www.biophilicdesignconference.com

To join the Listening Society visit: https://listen.thelisteningsociety.community/1mth



# Beyond the Floorplan ~ Elevating Interiors with Vertical Design and Acoustic Harmony

*"When we think about interior design, it's easy to overlook the powerful role of walls and vertical elements in shaping a space's atmosphere. Thoughtfully layering bespoke joinery, textured materials, and acoustic treatments transforms rooms into immersive, beautifully balanced environments that soothe both the eye and the ear."*

**Caroline Milns**

**Designing a room with both vertical and horizontal elements in mind is fundamental to achieving a balanced, immersive, and acoustically refined interior. Too often, the focus remains on the layout across the floorplan, yet the vertical plane – the walls – offers immense potential not only for functional enhancements but also for elevating the spatial and sensory experience of a room. Incorporating bespoke joinery, such as custom shelving or a carefully crafted media wall, is an ideal place to begin. These architectural features serve a dual purpose: they provide intelligent storage solutions that can be discreetly integrated into the design, while also offering beautifully curated surfaces to showcase treasured books, artworks, and objets d'art. Importantly, by lifting elements off the floor and introducing structured verticality, these pieces help to optimise the room's footprint, giving the illusion of more space while maintaining a cohesive flow.**

Beyond their practicality, vertical design elements contribute significantly to the acoustics of a space. Architectural details, layered wall treatments, and textured materials help break up soundwaves, reduce echo, and soften the overall auditory experience. This, in turn, fosters a sense of calm and comfort – a cocooning atmosphere that enhances the liveability of the room.



Equally essential is the thoughtful layering of materials and textures throughout the space. Upholstery in tactile fabrics such as bouclé, velvet, and linen introduces depth and richness, not only elevating the visual interest of a room but also contributing to acoustic absorption. These fabrics dampen sound, lending a gentle hush to the environment that supports both relaxation and conversation.

Accessorising with intention further enhances this layered approach. Plush cushions, soft throws, and intricately patterned rugs not only enrich the visual story but also offer an additional layer of acoustic insulation. These elements bring softness underfoot and warmth to seating areas, making the space feel both grounded and luxuriously appointed.

Innovations in wall treatments have also opened new possibilities for vertical acoustic design. Leading brands such as Arte are

redefining decorative wallcoverings with collections that feature 3D textile surfaces and velvet-touch finishes. These not only add dramatic texture and a sensory richness to the walls but also function as subtle sound absorbers, enveloping the room in a sense of softness and serenity. When used strategically, such wallcoverings can transform even the most expansive or minimalist interiors into intimate, welcoming retreats.

Ultimately, designing for acoustics does not require compromise on aesthetics. Through intelligent use of structure, texture, and material, it's entirely possible to create spaces that are as acoustically attuned as they are visually compelling – where every surface, whether horizontal or vertical, contributes to a harmonious, inviting whole.

**Caroline Milns,**
*Head of Interior Design*

www.zulufish.co.uk

*Architecture and Interiors by Zulufish*
*with bespoke joinery and kitchen by Hux London*
www.hux-london.co.uk



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# Interior Design for Acoustics ~ case studies

*Two very different practical examples of how design can improve acoustics*

**Stephen Dick**

**I believe that we design for all of our senses, and while sight often dominates interior design, these recent projects highlight how careful attention to acoustics can dramatically transform our spaces and the wellbeing of those who use them.**

Auditory sensations can profoundly affect mental wellbeing, and managing sound is a vital component of biophilic design. Although often overlooked in favour of visual elements, a calm and balanced acoustic environment promotes relaxation, reduces anxiety, and can lower heart rate and blood pressure.

Nature isn't silent though – it's filled with subtle sounds and gentle rhythms. Incorporating acoustic elements into our designs involves creating harmonious environments, while specifically addressing harsh or intrusive noises.

These two very different projects demonstrate how a carefully considered auditory environment significantly enhances the quality of spaces: the reception of a busy dental practice and the dining room of a private residence.





In these projects we incorporated acoustic design alongside other elements of biophilic design. And not forgetting how sight-dominated we remain, the acoustic solutions were incorporated subtly and harmoniously into these spaces.

**A Country Home**

*Designing a space to entertain and enjoy conversation*

In the dining room of a beautiful country home, a combination of hard surfaces and a relatively low ceiling created an acoustic challenge. Over dinner parties, guests struggled to hear each other, raising their voices and escalating noise levels.

The goal here was to create a comfortable, intimate space where guests could relax and converse effortlessly.

*Strategic acoustic improvements:*

- A large rug beneath the dining table significantly reduces echo from the limestone flooring.
- Timber furniture and fabric-upholstered chairs enhance sound absorption.
- Heavy, interlined curtains in the bay window absorb sound whether open or drawn.
- The ceiling design with recessed features aids sound diffusion.
- Custom cabinetry integrating upholstered panels and open shelving further diffuses sound.

Most significantly, an entire wall conceals a sculpted, sound-absorbing foam installation – the kind often used in recording studios – hidden behind acoustically transparent horsehair fabric panels. This dramatically reduces reverberation and improved acoustic clarity, making quiet conversation comfortable and natural.

*Additional biophilic touches:*

- Natural materials and textures – stone, timber, horsehair – enrich sensory experiences.
- Warm, ambient lighting and soft, organic shapes reinforce the welcoming atmosphere.

Transformative results of acoustic design
Both projects benefitted greatly from thoughtful acoustic design. Patients at the dental practice now experience a calmer, more relaxing welcome, positively influencing their overall treatment experience. The residential dining space has become inviting and comfortable, and conducive to extended, enjoyable conversations.

Importantly, I hope these projects illustrate that carefully considering acoustics as part of biophilic design significantly enhances our experiences in the spaces we create.
By designing with all senses in mind, we not only address our natural preference for visual harmony but also deeply align our environments with our inherent connection to the natural world through sound. Designing for sound – subtly and elegantly – creates genuinely comfortable spaces where we can relax, thrive, and connect.

## Dental Practice

*Shaping the patient journey through sound*

For this dental practice, our brief was to create a welcoming, premium environment with a Scandinavian-inspired feel. Located in a converted Victorian villa, the original layout was challenging acoustically – with noise from multiple floors, busy reception activity, and constant client traffic. I believed that improving the auditory experience in the reception could also play a key role in reducing patient anxiety and creating a calming atmosphere at the beginning of their treatment journey.

### Acoustic solutions thoughtfully integrated:

*Separation*

- A broken-plan layout acoustically separates reception staff from behind-the-scenes activity, minimising distractions without isolating the space visually.

*Diffusion*

- Timber slatted surface treatments effectively diffuse sound, creating acoustic clarity and balance.
- Plants were positioned to naturally diffuse and soften sound – the larger the leaves the better the diffusion effect.

*Absorption*

- Acoustic felt hidden behind timber slats absorbs excessive noise, reducing overall sound levels.
- Above the reception desk, a sculptural light installation by Swedish acoustic specialists Abstracta features spherical acoustic absorbers interspersed with the light sources, significantly diminishing reverberation in this high-ceilinged area.

*Insulation*

- Dense underlay beneath flooring and stairs softens impact and footfall noise, enhancing acoustic comfort throughout.

### Enhancing acoustics with other biophilic elements:

- The layout maintains natural light, creating a bright, welcoming space.
- Greenery provides visual calm and a natural backdrop at eye-level.
- Natural materials, warm tones, and soft shapes subtly foster comfort and visual harmony.
- Warm, indirect lighting complements the acoustic and visual design, reinforcing a calm atmosphere.

Stephen Dick is the founder of Residence Interior Design.
www.residenceinteriordesign.com

**Photo credits:**

Dining Room – *Rob Sanderson*
Dental practice – *Residence Interior Design*

# Biomimicry in acoustic design

*"In the heart of Silversquare's coworking space in Louvain-la-Neuve, Belgium, amidst vibrant collaboration and constant motion, stand sculptural phonebooths that do more than just look striking. These structures, 3D-printed in concrete by Incremental3D, represent a growing shift in how we approach sound and silence in our built environments. Inspired by the wisdom of nature, they are functional sanctuaries designed by the use of biomimicry."*

**Lilian van Daal**

**Biomimicry is the practice of learning from and emulating natural strategies to solve human challenges. In acoustic design, nature has been refining solutions for millions of years. From the porous bones of birds that absorb impact while remaining light, to the textured surfaces of owl wings that break up airflow and reduce sound during flight. Nature offers countless strategies for managing vibration, resonance, and reflection.**

At Silversquare, I embraced this philosophy to address one of the biggest challenges in open workspaces: noise pollution. Traditional soundproofing often involves layering various materials like foams, fabrics and panels, to absorb or block sound. While effective, these approaches are unsustainable, and material-intensive. Instead, I asked: how does nature solve the problem of controlling sound, using form and material as one?

The resulting phonebooths are fabricated entirely from a single material and printed concrete, a porous material, yet their internal and external geometry is carefully designed to diffuse and dampen sound. Drawing inspiration from nature, we used porous surfaces and curved forms to create acoustic complexity. Sound waves are scattered and absorbed as they pass through textured, non-linear surfaces, reducing reverberation without additional materials.



The choice of large-scale 3D printing allowed us to achieve intricate, continuous geometries and the layered texture created by the printing technology is also effective in absorbing sound. This technique also minimises waste. What emerges is a monolithic yet organic structure that feels grounded, calm, and tactile, a functional sculpture in the middle of a dynamic workspace.

Beyond function, the aesthetic of the booths is also rooted in nature. The curved, shell-like shapes and soft shadows echo natural shelters, giving users a subtle sense of comfort. In a space where people come to connect, think, and create, these moments of acoustic and sensory retreat are essential for well-being.

Biomimicry doesn't just give us better-performing products, it offers an entirely different lens for design. When we look to nature not only for technical efficiency but also for emotional intelligence, we create spaces that support how people truly live and feel. At Silversquare, these phonebooths are just one example of what happens when architecture listens to nature.

As we continue to rethink workspaces and wellness, it's clear that nature holds the blueprint, we just have to learn how to read it.

https://www.lilianvandaal.com/coworkingsilversquare

# Sound ~ Invisible Interior Design

*The invisible blueprint that resonates through space*

**Emi Melin**

**Close your eyes and listen.**

**Not to music, but to the quiet hum behind it:**

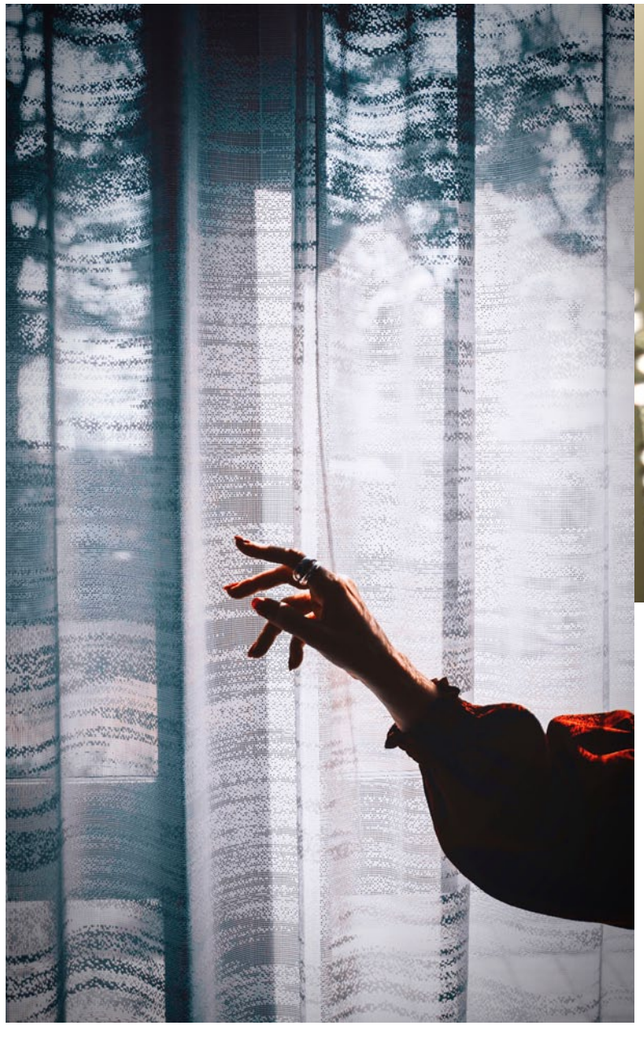
**the breath of a room, the pulse of your body, the vibration of something you can't name but feel.**

Sound is not decoration. It's not an afterthought. It is a living material, shaping how we feel in a space, even when we don't realise it. And yet, it remains one of the most invisible forces in interior design.

We don't just hear with our ears. We perceive sound through vibrations in the body and the way our internal systems respond. These inner rhythms don't 'hear' sound, they resonate with it.

Even before birth, we're immersed in the sonic environment of the womb – surrounded by a mother's heartbeat, breath, voice, and the fluid rhythms of life itself.

As explored in the previous issue 15 of The Journal of Biophilic Design on '*Light*', the invisible aspects of a space are often the most powerful. Sound, too, is one of those invisible yet essential design elements.



## Sound and Neuroscience

The space between what we hear and what we don't reveals a shift in perception - quiet proof that something unseen is shaping our experience of space. This reflects the brain's ability to filter sensory input and manage perception without conscious awareness. Living across from a church where bells ring out day and night, I was initially startled by the volume. But over time, the sound faded into the background until I had unconsciously muted it in my mind.

Our brains do this through habituation, prioritising novelty and filtering repetition. We also fill in gaps through phantom frequencies or auditory illusions – proof that perception is not passive, but a dynamic process between vibration and the brain.

## The Misconception of Silence

In interior design, sound doesn't behave like furniture or lighting. It permeates the air and acts directly upon us. It includes not just audible sound, but also inaudible frequencies, vibrations, and energetic waves that influence us in many ways: nourishing, calming, or stimulating, but also potentially disrupting or harming, depending on their type, frequency, and intensity.

Unpleasant background noise in the workplace, for example, can lead to chronic stress, especially when we have no control over what we hear.

Many responses focus on eliminating sound altogether. But humans don't thrive in complete silence either. Like ecosystems in nature, balance is everything. Removing one part of the sonic environment can cause disruption, not relief.

The answer isn't silence.
It's about coexistence.

**Cymatics: the Hidden Architecture of Sound**

Recently, I conducted an experiment using Cymatics Therapy, developed by Dr. Sir Peter Guy Manners, in a 3D sound cinema studio.

Cymatics is the study of visible sound and vibration, showing how frequencies shape matter into patterns. Dr. Manners developed over 600 therapeutic sound combinations to address specific health issues, pioneering the use of frequencies as a medical tool. It also reminds us, as explored by water researcher Masaru Emoto, that vibration has the power to shape water, memory, and matter itself.

We broadcast them through 3D speakers into the space, creating a sound-bath-like experience that evoked calm, clarity, and openness. We also experimented binaural frequencies aimed at improving focus.

Though the test was done in a special environment, these could soon be integrated into everyday life. When combined with meditation, yoga, or wellness space in even workplaces, the potential applications are vast.

A space layered with sound and fine-tuned to human needs is, to me, the essence of Invisible Interior Design.





**Designing with Intention**

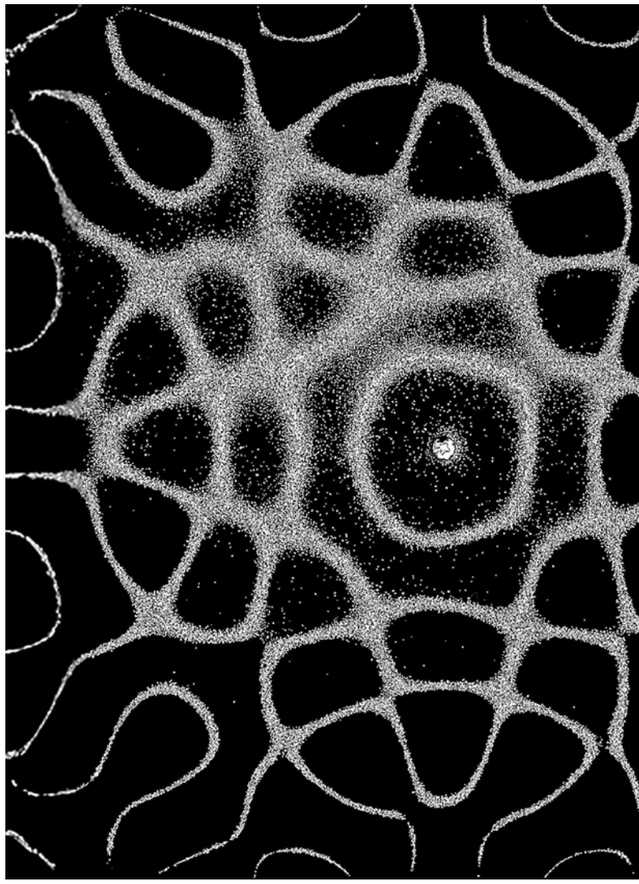
This is where **Invisible Interior Design** comes in. Just as biophilic principles guide sustainable design, they can also inform how we design with sound. Designers can integrate acoustic thinking from the outset by selecting appropriate materials and products, controlling noise while inviting nature in, and shaping the overall sound environment through thoughtful and strategic planning.

At +Creatives, we collaborate with industry expert, specialists, manufacture and suppliers to seamlessly integrate these invisible layers into the interior design process.

Soundscaping is the method of intentionally shaping the sonic atmosphere – preserving natural sound heritage, weaving in nourishing auditory elements, and integrating both organic and engineered frequencies that enhance well-being.

> Sound is part of the unseen blueprint of space.
>
> Frequency becomes the new building material.

Because sometimes, the most powerful part of a space is not what you see – but what you feel, deep in your body.



***Visible form is emptiness; emptiness is invisible form***

*– 色即是空 空即是色 Heart Sutra (般若心経), Buddhism*

https://pluscreatives.co.uk

# Tuning Space

*Pablo Lambrechts*

**Pablo Lambrechts**

**In architecture, we often focus on how a space looks. But how it sounds – or doesn't – can profoundly shape how we feel. Sound is a key design material. It defines mood, zones activity, and enhances well-being, especially in biophilic and inclusive environments.**

From a biophilic point of view, it's vital to create acoustically dry zones – quiet, low-reverberation spaces that feel cosy and contained. These offer calm and psychological restoration. In contrast, public or open areas benefit from slightly more reverberation, adding energy and encouraging social interaction. This layering of reverberation – from silent to resonant – builds sensory richness and supports wellbeing at a neurological level.

This principle is played out clearly in the Google building at Pancras Square, King's Cross – a landmark project I led as Principal Architect at Wilmotte UK, from concept to completion. The central atrium was large and framed by reflective materials, yet beneath the colonnade, we created sheltered, sound-softened zones. These invited informal conversations and spontaneous meetings – everyday moments that helped build community and a true sense of place.

After founding L+ Architects and L+ Living seven years ago to champion biophilic design, I brought this acoustic layering into projects like Tun Yard and Linford. At Tun Yard, a creative workspace in Battersea, we softened the soundscape using slatted timber ceilings, vertical planting, and zoning. Collaborative hubs were balanced by quieter, acoustically dry corners. Greenery absorbed sound as well as light, creating spaces that energise without overwhelming.

Linford, a zoned warehouse designed for a producer and manufacturer, had a very different brief. It needed to flex between high-activity production areas, studio workspaces, and landscaped roof terraces. We used suspended acoustic panels, resilient floors, and green roof barriers to modulate sound across zones. The result is a layered environment that supports different activities and mindsets throughout the day.


Google



If you've ever sat in a large space without acoustic treatment, you'll know the feeling – exposed, unsettled, and somehow out of place. Though hard to explain, that discomfort is real. Our nervous systems are finely attuned to reverberation and echo. When a space lacks acoustic care, we feel unsupported by it.

Biophilic design is not only about light and greenery – it's about attunement. When we tune a space acoustically – shaping silence, introducing rhythm, and offering both refuge and openness – we don't just build structures. We create atmospheres that feel calm, connected, and deeply human.

Pablo Lambrechts, is Principal Architect,
L+ Architects + L+ Living

https://lplusarchitects.com

**Photo credits:**

Google HQ – *Alamy stock images*
Linford and Tun Yard renders – *Tallbox*
Tun Yard – Images near completion – *Jack Winstanley L+ Architects*

# Interior Design Case Studies from Symbiotic Living

**Sharlene Young**

CASE STUDY 1

## Battles with the Baffles in a London House

Enhancing the sound within a building and cultivating a harmonious acoustic environment has an invisible, yet profoundly impactful element on our comfort and wellbeing. For the owner of this period property, a devoted audiophile, acoustic design was paramount to crafting the ideal living and listening space. The primary goal was to replicate the immersive experience of a live musical performance, demanding acoustic clarity and quality across various frequencies and volumes – a standard typically found only in spaces specifically designed for performance and critical listening.

### Obstacles with a Victorian period building

Our challenge was to achieve a minimum of the acoustic objectives for the living room, all while seamlessly integrating considerations of function and aesthetics. As this was the home's sole sitting room, transforming it into a dedicated listening room was not an option. It needed to remain a versatile space for general enjoyment and to be presentable for hosting guests.

Achieving the right acoustics, from managing reverberation time to ensuring sound distribution and eliminating first reflection points proved challenging. Every room inherently accentuates or dampens certain frequencies based on its geometry and dimensions. This room's high ceiling, expansive bay window, and period features like the fireplace made balancing acoustics difficult without thoughtful design intervention. Low frequencies, for instance, tend to accumulate in corners, obscuring other frequencies and sounds. With an abundance of sound-trapping corners, this was a primary area of intervention.



Another key issue to address was how parallel and hard surfaces reflect sound unevenly. Low- frequency bass sounds, with fewer vibrations per second than treble, require more mass for effective absorption. Conversely, echoes of high frequencies often occur at the top corners of walls. The owner's ability to precisely measure all frequencies and their volumetric response using a measurement microphone provided invaluable data, directly guiding our solutions. This meant carefully considering sound propagation, reverberation times across different frequency ranges, and the strategic application of sound absorbing baffles and reducing surfaces.

**A design solution that integrates exceptional acoustics with visual style and grace**

Our overarching aim was to subtly dampen high frequencies and create a uniform sound distribution throughout the room. We employed two distinct acoustic treatment approaches. One involved commercially acoustic baffles which can be custom sized to size to hang from rails or bass traps in the corners. We strategically placed these on the left, along the east-facing wall near the speakers, and on the north-facing wall behind the Hi-Fi equipment, opposite the French doors. While functionally effective, this solution needed careful visual integration. Given the room's asymmetrical rear corner/wall configurations behind the speakers, the owner also adjusted the left/right speaker balance for optimal stereo imaging.





The second approach was entirely bespoke, involving elements we created ourselves. On the right side of the room, behind the main seating area, we integrated felt banners onto the party wall. This served to dampen sound and reduce reflections bouncing back towards the front of the room where the main sound originates. This method effectively blocked out high frequencies that could otherwise muddy the music's clarity.

A significant benefit of this bespoke design is the cavity between the felt banners and the party wall, allowing for additional acoustic tuning or tweaking in specific areas without appearing patched or out of place. This approach also incorporates two layers of felt banners, with the second layer strategically positioned in the critical area behind a seated person's head, appearing as a colourful woven element through the front layer.

Beyond dedicated acoustic treatments, we also utilised broader room elements to optimise the audio experience and overall acoustical comfort. Heavy drapery at the south-facing window serves multiple purposes: it absorbs some sound reflection, minimises sound transmission from outside, and cleverly enhances the decor by concealing the asymmetrical openings of a door and window.

This project highlighted how crucial sound is to our overall wellbeing and how it subtly shapes our experience of a space. Achieving this level of acoustic purity in a home environment was a fascinating challenge and Symbiotic Living is thrilled with how our biophilic approach harmonised both sound and aesthetics.

CASE STUDY 2

## A Multi-Sensory Sanctuary for Rest at an East Coast Oceanfront Residence

Research has shown how important the acoustics within a building can be on the occupants' health and wellbeing. Detrimental sound, described as noise, can cause stress, have a detrimental effect on the cardiovascular system as well as cognitive performance and contribute to sleeping problems.

Sleep is the single most important thing we can do to reset our body and brain health each day. "Did you sleep well?" is a question we often ask, and even more often, we feel the profound impact of the answer. Quality sleep is not just a luxury; it's the bedrock of wellbeing, a vital connection to our inherent biological rhythms.

As interior architects and designers, we recognise sleep as nature's essential reset, as it profoundly influences our physical and mental health, memory, mood, cognitive abilities, immune system, and even lifespan. Sleep expert, Matthew Walker, notes, "Sleep is our superpower." Yet, in our modern world, this superpower is often compromised. Sleep deprivation is a widely experienced issue, with significant portions of the population struggling to achieve restful nights. This disruption extends beyond mere fatigue, affecting our circadian rhythm – the master clock that governs critical bodily functions like metabolism and cellular repair. As research reveals, our circadian rhythm's influence extends far beyond sleep, deeply connecting to metabolism, cognition, chronic disease risk, and numerous other critical aspects of health.



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Going beyond aesthetics and embracing biophilic design our goal was to create spaces that not only look beautiful but also actively support wellbeing, particularly in the realm of sleep. This involves an holistic consideration of sensory experiences to craft environments that promote calm and facilitate the body's natural restorative processes. Acoustic comfort – creating quiet, tranquil spaces, is one of the key principles of our biophilic design for sleep,

To create the most beneficial acoustic environment, the designer should consider the level and type of noise outside; the configuration and size of the indoor spaces and how sound is carried through these; and what sound barriers or sound reducing surfaces can be used to make a difference.

The Oceanfront Residence exemplifies a biophilic approach to bedroom design, specifically tailored to promote restorative sleep and a profound sense of disconnection from the outside world through a focus on design for the senses. The interior has been designed with considerations to the smallest details for the experiences of sound, lighting, tactile and scent. The primary bedroom was envisioned as a "forever home" sanctuary, maximising the benefits of its stunning natural setting. A silent environment was the goal, supported by the integration of sound-absorptive material behind the bed and a membrane beneath the wood floor to minimise noise and vibration transmission from the media room below.

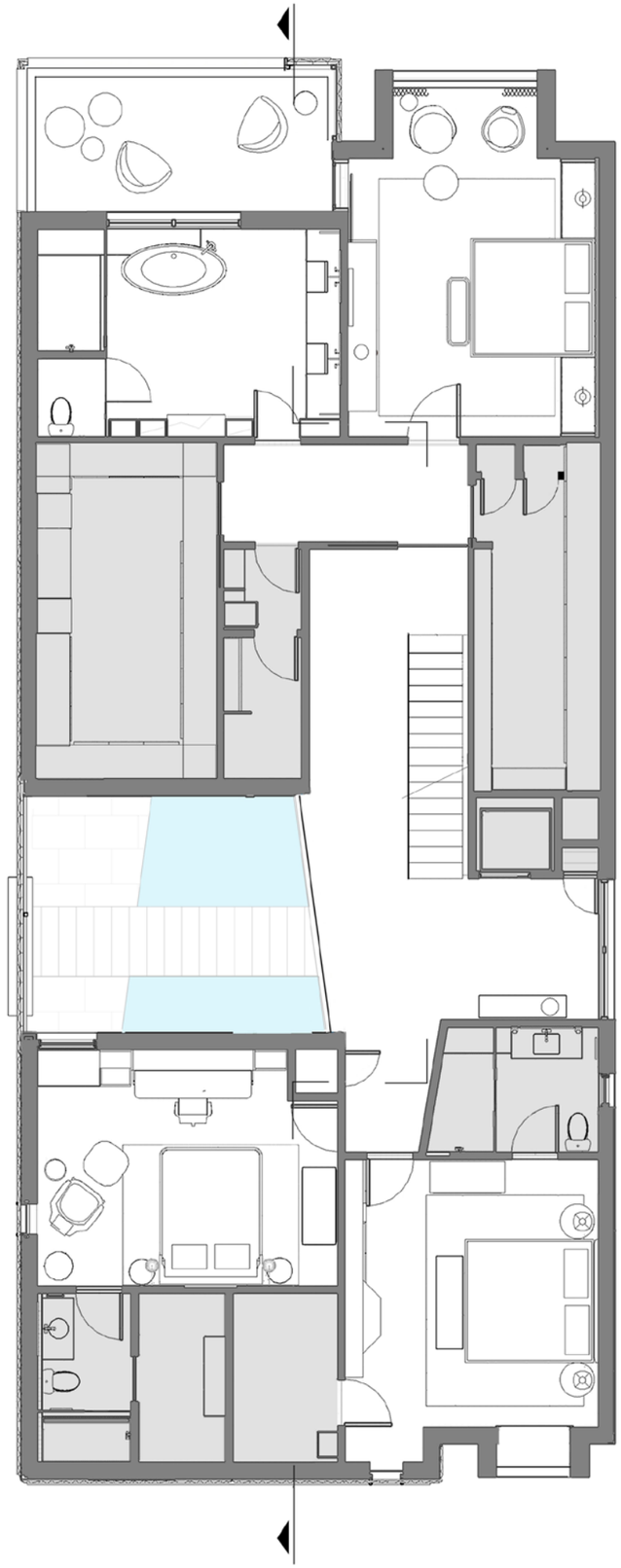
The arrangement of the house is inverted with the living, dining and kitchen areas above, maximising unobstructed views to the ocean beyond. With public access to the beach running alongside the house, the bedrooms are downstairs for added privacy and refuge.

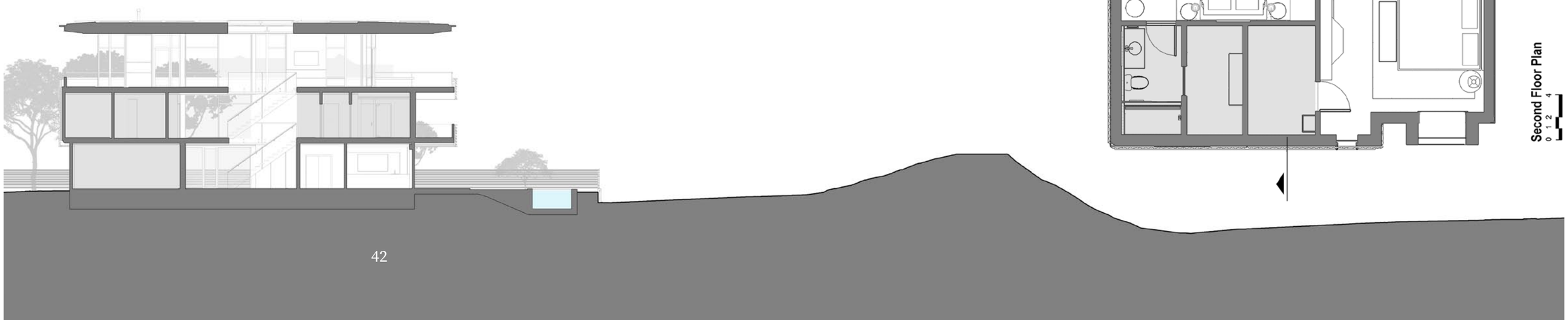
It was very important to minimise sound and vibration transmission between the floors. Acoustical panels behind the headboard make the room less lively from a sound point of view. A silent environment was achieved through integrated sound-absorptive material behind the bed and a membrane under the wood floor to minimise noise and vibration.

By meticulously addressing light, sound, tactile elements, and scent, the bedroom at the Oceanfront Residence became an holistic sensory sanctuary. Biophilic design principles can be effectively applied to create truly restorative sleep environments that engage multiple senses, fostering a deeper connection to nature and promoting profound wellbeing.

**Sharlene Young**
*Founder and Principal,*
*Symbiotic Living*

https://www.symliving.com



# Spatial Music

*Designing Sensory Spaces that Resonate & Connect*

**Charlotte Wheatley**

**Sensory design shouldn't just be an added layer, our philosophy has been to curate environments and spaces that connect deeply with the people who inhabit or use them. We start at the core: understanding and responding to emotional needs and the most direct way to access those emotions is through the senses.**

Sound is one of the most powerful sensory tools at our disposal. It shapes how we feel in a space, how we focus, how we rest, and how safe or inspired we feel. That's why working with sound should be embedded in the process from the outset, considered with the same weight and intention as light, materiality, and spatial flow. Designing with sound isn't about control or containment; it's about expression, connection, and atmosphere.

We work with the acoustic properties of materials not simply to soften noise, but to shape how sound lives and moves within a space. Sometimes that means absorbing and diffusing it with bio-based materials like wool, cork, or cotton to create calm and clarity. Other times, it means embracing resonance, allowing footsteps to echo lightly across timber floors or letting the hum of daily life fill a kitchen with warmth. We treat sound like a kind of spatial music a subtle soundtrack to everyday living that can energise, soothe, or ground depending on how it's composed. Just as with light or form, our aim is always to create emotional harmony through thoughtful sensory layering.

We also design with sound as an active, living presence. The gentle rhythm of a water feature, the rustle of nearby trees, or the ambient hum of the natural world can be just as impactful as a colour palette or a layout decision.  These sounds create a consistent, calming backdrop, helping users feel more settled, emotionally connected, and attuned to their surroundings.

This approach is especially important in spaces where people live, work, and gather anywhere where emotional connection, clarity, and resonance matter. Whether someone is seeking restoration, focus, inspiration, or calm, sensory design helps shape environments that intuitively support those needs.



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Sensory design offers value in commercial contexts as well. In environments where communication, experience, and identity are central, engaging the senses becomes a strategic advantage. It can quietly express values, build trust, and leave a deeper impression than purely visual design alone. Sound, for example, can create brand atmosphere, guide behaviour, or reinforce purpose, all without saying a word. This is where design transcends aesthetics and becomes an active participant in storytelling and experience. Clients aren't just looking for beautiful interiors, they're seeking places that help them feel more themselves, more relaxed, more restored. By thinking beyond the visual and curating the full sensory experience, environments can be created that resonate on a deeper level. Sound plays a vital role in this, subtle, continuous, and deeply personal.

"We don't see sound as a problem to be solved. We see it as a material to be shaped, one that offers emotional nuance, behavioural cues, and sensory richness."

Spaces should be designed not just to be seen, but felt, where every material, every sound, and every detail is chosen to foster emotional connection. By treating the senses as the starting point, environments can be created that support real human needs, not just aesthetic trends.

Charlotte Wheatley is Creative Strategy Director for Novaco Design

www.novacodesign.com BIID Member

# Five minutes on sound with.... Cathy Cherry, Purple Cherry Architects & Interiors

**What key Biophilic Design patterns would you recommend to enhance the acoustics in the workplace, schools or healthcare?**

*Introducing occasional natural sounds – like birdsong, rustling leaves, or water trickling – offers a calming, almost meditative contrast to the often static, mechanical hum of HVAC systems. These should be subtle and irregular, mimicking nature.*

*Water features like indoor fountains, cascading walls, or streams provide gentle, masking sounds that reduce the perceived volume of disruptive noise. They also increase humidity and improve air quality.*

*Using natural materials like cork or rammed earth in walls, ceilings, or flooring adds tactile warmth and some acoustic absorption (as can wood that is installed in a specific textural pattern). These materials reduce echo and reverberation without feeling clinical or overly engineered.*

*People seek quiet nooks, especially in high-traffic environments like schools or hospitals. Incorporating alcoves, booths, garden pockets, or sound-buffered zones gives people choice and control over their sensory experience.*

**How can we bring better acoustics and even soundscaping into the urban environment?**

*Strategic green buffers are a great idea. Bring in trees, shrubs, and green walls along busy corridors which don't just filter air, they dampen urban noise. Also urban water features like interactive fountains or shallow rills in parks or plazas can be used to mask traffic noise and create dynamic soundscapes. Introducing or removing sound can also be considered. For instance, sound art installations which bring in public art such as chimes, echo walls, or interactive sound pieces that engage people and distracts from unwanted noise. On the other side creating quiet zones in a city can reduce sensory overload in a busy urban environment, such as meditative gardens, church courtyards, or shaded seating areas designed with acoustic softening in mind.*



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**Do you have an example of a beautifully designed space you would like to recommend, where soundscaping, waterfalls, birdsong, biodiversity, or improved acoustics has enhanced the space?**

*If you want a space that really shows what's possible, the Khoo Teck Puat Hospital in Singapore is a masterpiece. It's a biophilic triumph and acoustically rich without being overstimulating. [You can see a whole article on this hospital in Issue 3 of the Biophilic Design which focusses on Healthcare, ed.]. The hospital is nestled in a lush vertical garden that draws in birds and insects – the natural soundscape becomes part of the healing process. Courtyards include water features that create a calming, continuous sound. Open breezeways and cross-ventilated spaces minimize the need for mechanical ventilation, reducing low-frequency background noise. Patients and staff report significantly higher satisfaction – not just because of how it looks, but how it feels to be in a space that sounds natural.*

https://purplecherry.com

Photos: *David Burroughs*

# Music is liquid architecture

*"Before we spoke, we listened – and the rhythms of nature shaped our earliest understanding of the world. Music, rooted in natural soundscapes and mathematical harmony, can guide design, influence emotion, and reconnect us with something timeless and universal."*

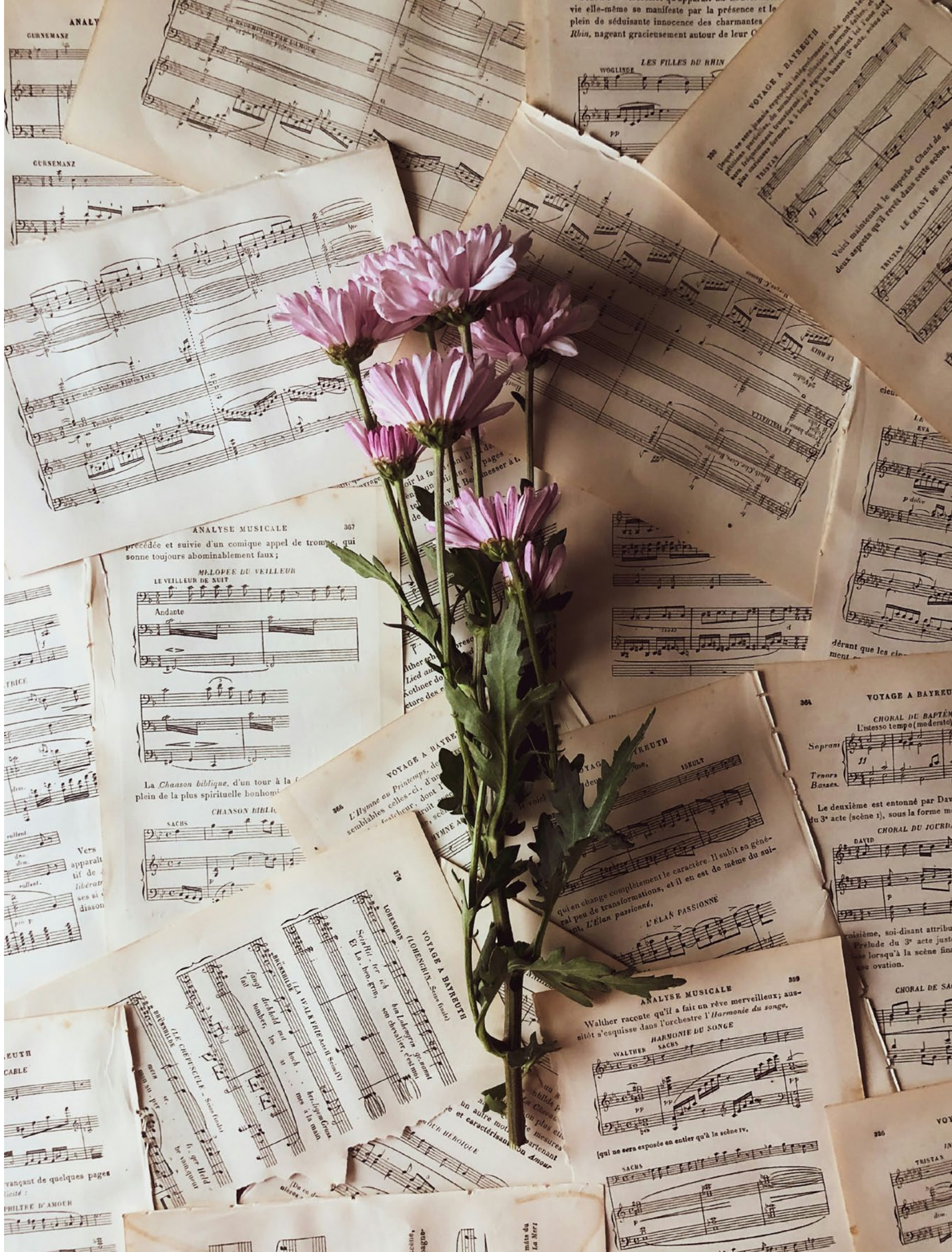
**Boon Lay**

**Apparently, music evolved before language. If we understand music in its simplest form – variation of sound, in terms of volume, pitch, and rhythm – it can communicate emotions and survival-related signals perhaps more quickly and easily than speech. This proto-language is not just shared among us, but also shared with other living things. Even the sounds of inanimate nature, like the wind through the trees and faraway thunder, locate us in nature and suggest its vitality. Through wordless sounds, we can hear and understand when an animal is afraid or angry, when it is calling out to its kind, and even when it is threatening prey or warning away a potential threat. Evolutionary theorist Steven Mithen refers to this early mode of communication as "Hmmmmm": holistic, multimodal, manipulative, musical, and mimetic.**

We often forget that music arises from nature. The rustling of leaves, the murmur of brooks, and the drumming of rain are not just background noise, but nature's own music. They have inspired human compositions for millennia. More importantly, they remind us that the natural world is not silent. To listen to music is to reconnect with the rhythms and sounds of nature and to reconnect with something both primal and sustaining.

Bernie Krause introduced the concept of biophony, referring to the acoustic ecology of nature. In undisturbed habitats, each species occupies its own unique acoustic niche, using distinct frequencies, rhythms, and timing to communicate without interference from other species – a principle termed the "acoustic niche hypothesis." The sounds in a forest are not just a cacophony of noises, but a harmonious soundscape that signals the health and balance of the environment.





Science struggles to explain why some sounds are music to some ears but not to others, but we, like other animals, respond immediately to wordless sounds and, through them, understand and navigate the world we live in better. Sounds are not confined to living things, of course; the sounds that nature makes – the wind through the trees, the water gushing in streams – help us locate where we are and interpret our circumstances. Some of our senses, like smell and taste, evoke memories, but sound brings us into the present. It has a sense of urgency that the rest of our senses are perhaps less capable of evoking. When in desperate need, we call out, and the loudness and tone of our voice are more important than any words it might contain.

All physical forms are thus also acoustical forms. We knock on a fruit to hear how ripe it is. We sing in bathrooms but not in bedrooms because the softness of the bedroom does not support our voices. Music lovers may praise a particular concert hall for its acoustics, but musicians adapt their music to the auditorium as if it is a musical instrument. Just as no two musical instruments are alike, so too are no two auditoria alike. David George Haskell, in his luminous book Sounds Wild and Broken, writes: "The world's music is a sonic expression of place and community, yet the human ear has a startling ability to love and understand music from unfamiliar cultures. Music is both local and universal."

In ancient times, music was thought to influence our moral development. In ancient Indian philosophy, particularly within the Vedic and later Hindu traditions, the universe was thought to resonate with a sacred sound, "Om." Confucius taught that ritual and music are fundamental to cultivating our virtues and promoting social harmony. The Greeks argued that different musical modes instilled different virtues and vices, which led Plato to propose that music be censored so that we would listen only to the right kind of music. Perhaps it is still so today. When overly stressed, it may be more helpful for us to listen to calming music than to loud, noisy music. Over time, it may help us develop more equanimity in our manner. On the other hand, when caught in an environment where one might feel confined and suppressed, loud, raucous music may be exactly the right kind to liberate our souls without provoking violence. It instils courage in dangerous times.

Unlike noise, music is mathematically harmonised. The different notes on a musical scale have precise and rather simple mathematical relationships. An octave, for instance, doubles the frequency (2:1); a perfect fifth has a ratio of 3:2; and a perfect fourth is 4:3. If a frequency falls short of these relationships, we notice that the two notes are not in tune.

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Our ears are acoustical, mathematical instruments of very high precision. The evolutionary value of this is uncertain. Perhaps it suggests that beauty and order are woven into our biology in ways we do not fully grasp. The acoustical design of architectural space has direct implications for its form and materiality. The mathematical relationships of music were advocated by Vitruvius as essential proportions for harmonious architectural form. Their architectural expression did not take form until the Renaissance.

If understood as a musical instrument, the formal attributes of the architecture of sound, however, will not be simple ratios, but complex shapes that help to provide additional reverberation and directionality. Getting the acoustics right will result in beautiful architectural form.

This harmony between mathematics, music, and beauty is perhaps best captured in the quote, often attributed to Johann Wolfgang von Goethe: "Music is liquid architecture; Architecture is frozen music."

www.linkedin.com/in/ongboonlay

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# Designing the Unseen

## *Soundscapes and Technology in the Indoor Environment*

**Jeff Larson**

**Sound is architecture we can't see. It defines spaces and influences behaviour as much as light, material, or layout – shaping how we feel, think, and function.**

Sound may also be the most elusive element in biophilic design, especially in urban environments. Opening a window might let in some birdsong, but it brings with it traffic, construction, and other pollutive noise. Closed windows trap us with the hiss of ventilation or the drone of machinery, devoid of any nature.

The challenge here isn't just to add nature's soundtrack into buildings, but to do so in a way that supports health, connection and cognition. That's where design and technology open up some exciting possibilities.

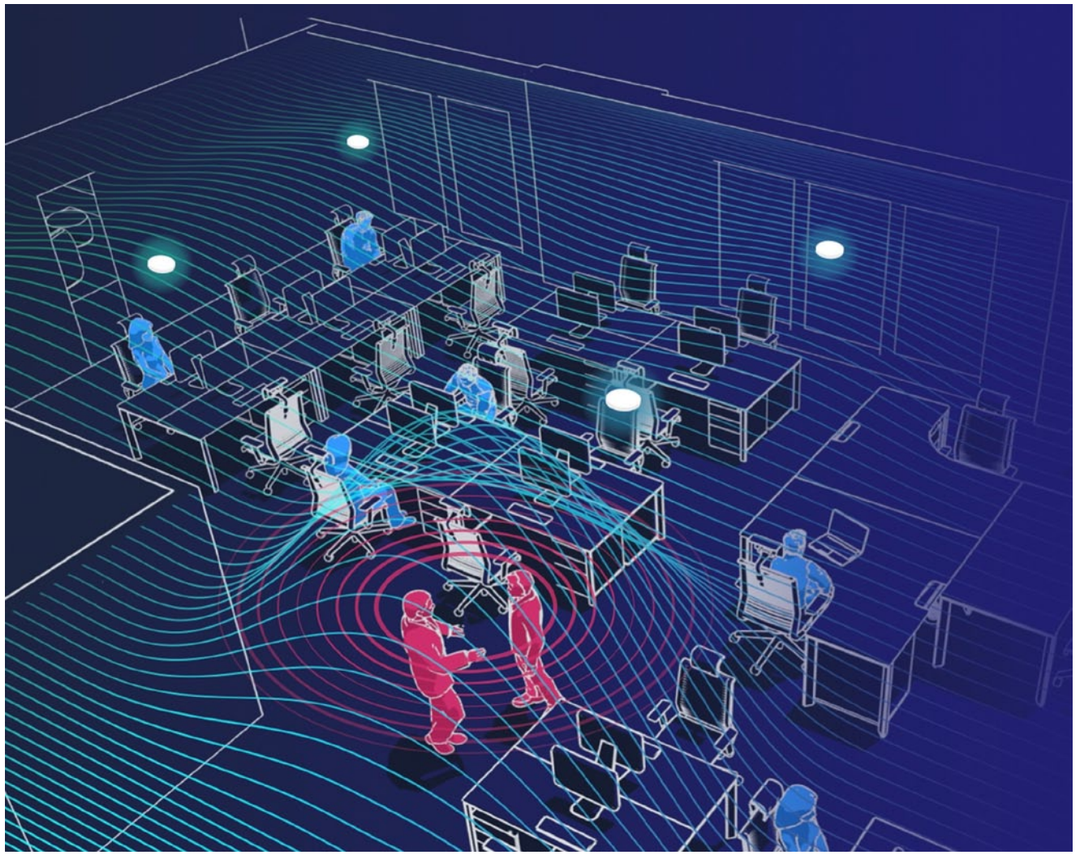
### What Is Biophilic Soundscaping?

We know about the benefits of natural sound, but *soundscaping* practically applies those benefits in indoor spaces. Simply put, this means introducing these sounds into buildings at an ambient level, using sensors to ensure they adapt based on how people are using the space moment to moment.

These *soundscapes* add an essential sensory dimension; they complement visual biophilic design, support attention, reduce stress, enrich spatial experience, and contribute to a cohesive biophilic experiences.

Soundscaping is a powerful example of something quite rare: how we can use *technology* to help buildings feel more *healthy and organic*. It's a field that's rapidly evolving, and it's already changing how we design for wellbeing indoors.



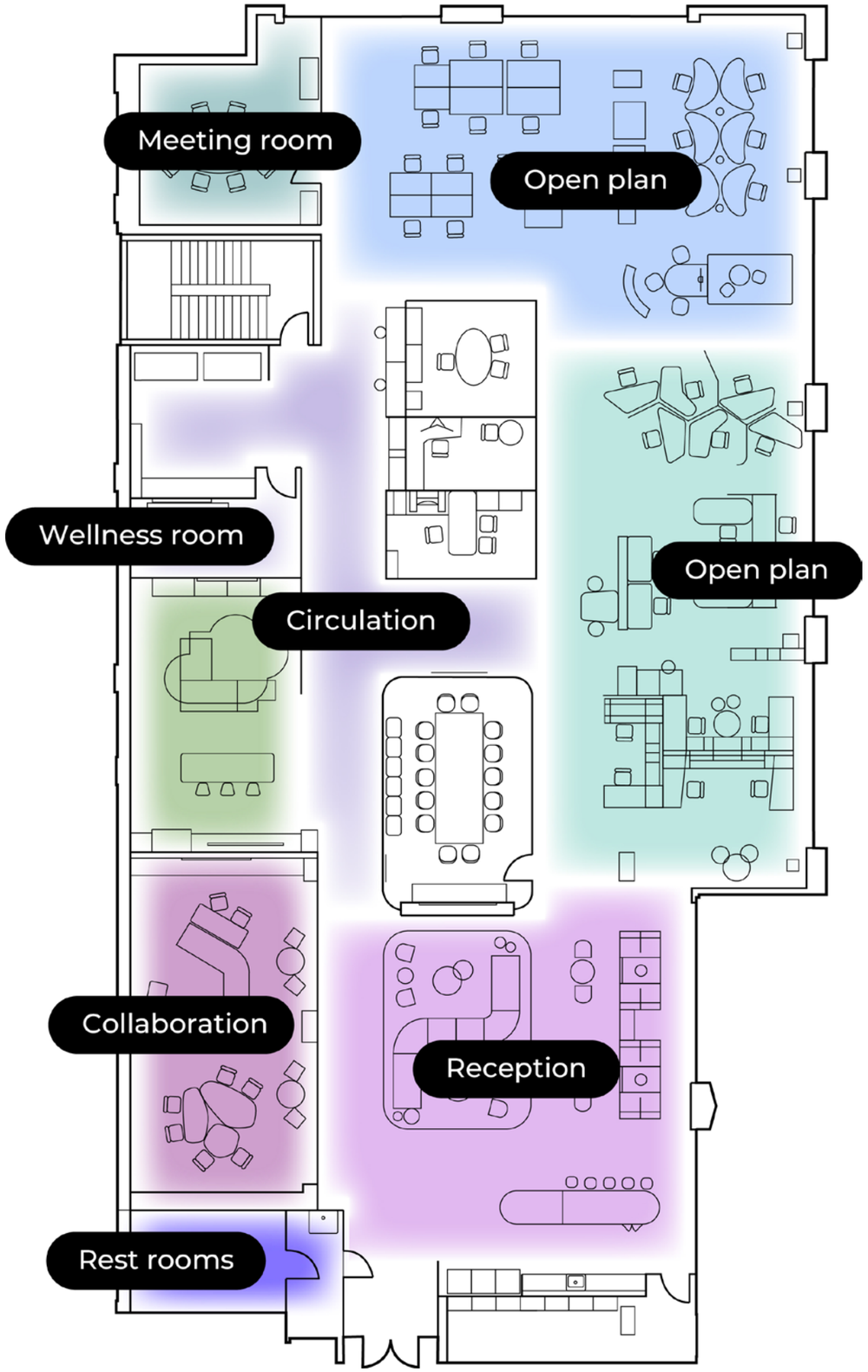


### 1. Movement, Choice and Zoning

In nature, we move. We may choose a sunny rock to rest on and then step back under the trees when it gets too hot. This mobility is a core part of why outdoor environments feel safe and productive: we can choose our surroundings to match our needs, rather than being fixed in place.

Biophilic design can mirror this by creating variety across a building, like zones of energy or calm, of openness or shelter. Stephen Kellert and other visionaries have emphasised mobility as a core principle in their work: people feel most comfortable when they can move freely between different spatial experiences.

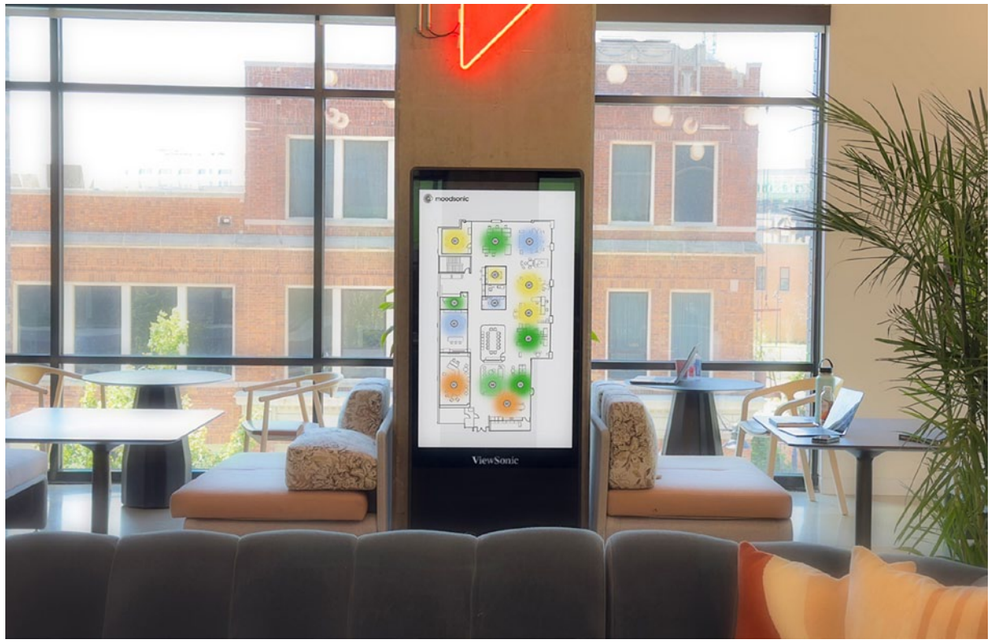
In soundscaping, this translates into designing zones, transitions, and user journeys. For example, a workplace might include a focus zone with soft ambient water for masking, a collaborative area with a more energetic soundscape, and transitional corridors that gently shift between the two or provide sounds that work best with shorter-term exposure.




Soundscaping can be tailored by zone – supporting different activities and the transitions between different areas



Using technology, you can even communicate these sensory zones through digital signage, wayfinding cues, or interactive apps to gives people greater clarity and choice.




Soundscaping can be tailored by zone – supporting different activities and the transitions between different areas

**Design cue:** Design with mobility in mind. Use sound to support zoning and transitions, and communicate sensory options to occupants.

### 2. Multi-Sensory Coherence: Sound as a Connecting Thread

Natural environments engage all our senses simultaneously. Forests are not experienced through vision alone – they're a complex combination of scent, texture, breeze, sound, light, and perhaps even taste. This level of sensory experience is rarely matched indoors.

In real-world projects, we've begun to combine sensory inputs thoughtfully: aligning soundscapes with lighting changes throughout the day, complementing olfactory design with corresponding soundscape qualities, or using sound to emphasize natural views. These combinations can reduce cognitive fatigue, create a sense of immersion, and help indoor spaces feel more cohesive.

**Design cue:** Think about how sound can work together with lighting, scent, and other sensory inputs. Use sound to enhance the multi-sensory character of a space – not in isolation, but as part of a coherent design.

### 3. Identity and Belonging

Place matters. Our sense of wellbeing isn't just shaped by comfort – belonging and emotional connection are important too. Kellert noted that people's attachments to place can be grounded in ecological and cultural familiarity because of our territorial predispositions. Design that connects to these roots can create more meaningful indoor environments.

Sound is a powerful expression of place. In a workplace in India for a global tech company, we created soundscapes inspired by the nearby Himalayan ecology, including insect and bird sounds found only in that region. Employees spoke of their vivid, emotional connections to these locally-relevant sounds. In another project in Australia, we worked with Aboriginal elders to co-create soundscapes with cultural meaning, which integrated with visual artworks and corresponding interior design elements.

Soundscaping inspired by local culture or ecology can help occupants form stronger emotional connections to a space





**Design cue:** Use soundscapes that reflect cultural and ecological identity to strengthen belonging.

### 4. Generative and Responsive Environments

Most indoor sound is monotonous – like air conditioning or humming machinery. It's constant, repetitive, and often subtly draining. In contrast, natural sound is dynamic. The forest doesn't loop. It changes from moment to moment, hour to hour, and season to season.

Natural sound is always changing – moment to moment, and season to season

It's now possible to create indoor soundscapes that are generative rather than repetitive. That means they don't just play back recordings – they evolve over time, like the natural environments they're inspired by. This has particular benefits for neurodivergent people, who might be more sensitive to predictable loops.

Generative soundscapes also support attention restoration. Much like the visual experience of dappled sunlight through moving leaves, a gently shifting sonic environment holds our interest without demanding it.

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Some systems are responsive too, adapting and optimizing in real time to data like occupancy, time of day, or lighting conditions – creating soundscapes that are not just *organic*, but *intelligent* too.

**Design cue:** Design for dynamism. Use generative and responsive soundscapes to create environments that change and adapt, like nature does.

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Biophilic sound isn't just an aesthetic overlay. It's become a foundational tool in the design of healthy indoor environments. To work at its best, soundscaping can integrate with light, materials, scent, layout, and technology.

We're already seeing soundscaping shape workplaces, healthcare spaces, learning environments, and more, to create buildings that support restoration, identity, mobility, and engagement. Today's technology makes it possible to realize these biophilic designs in ways that weren't achievable before.

*Jeff Larson is Co-Founder and Chief Product Officer, Moodsonic*

moodsonic.com

Just like dappled light through the trees, generative soundscapes shift gently over time to support attention restoration

# Oceanfront Soundtrack

*"Sound is more than ambiance – it is architecture. We take a quick journey from Japan to the Philippines, to show when a building is designed with nature instead of simply decorating around it, the real soundscape doesn't need to be edited. It simply needs to be heard."*

**IDr. Mars Sambo,** PIID

**We spend most of our lives surrounded by concrete and circuitry – buzzing lights, rigid furniture, air we didn't ask for piped in from vents we can't locate. Then, like clockwork, we flee it. We book weekends at ocean-view villas, hide away in cliffside cafes, and announce we're "off-grid" from Instagram – ironically, via Instagram.**

But even in our escapes, we curate the experience. We don't just want nature – we want *designer* nature. The sea, yes – but only at a soft volume. Rain? Preferably gentle. Birds? Okay, as long as they're not too shrill. What we're craving isn't just a return to nature; it's an *edited* version. In the biophilic design world, this raises an intriguing question: what role does sound play in our built environments – and how honest are we about it?

**Beyond Green Walls: The Missing Sense in Biophilic Design**

Biophilic design, for all its organic cred, has become surprisingly visual. Designers bring in light, natural materials, and foliage. We mimic the textures of the forest floor and the pattern logic of river stones. But our ears? They're often left out of the conversation.

Yet sound is the first thing we register when we wake up in a new place. It tells us we're somewhere else. Somewhere real. Somewhere alive. The soundscape of a place affects heart rate, cortisol levels, and even how we perceive time. If we're serious about designing for human well-being – especially in hospitality – nature's soundtrack deserves a starring role.



### 1. Iwado Base, Tottori – Architecture That Listens

Set against the sandy shores of Tottori, Iwado Base by ISHIKAWASAMBO looks at first like a utilitarian fortress. But listen closer. The Sea of Japan doesn't just frame this place – it fills it. Wind, waves, and the occasional call of a seabird echo subtly throughout the structure's layered terraces. There is a responsibility in building near geological heritage sites such as the Tottori Sand Dunes.

ISHIKAWASAMBO didn't try to overpower the soundscape with architectural gestures. Instead, they composed around it. Large windows and steel-cladded walls work like instruments, catching the outside noise. It's not about muting nature – it's about mixing it, like a live audio engineer with a fondness for seascapes.

Here, the sound of the ocean isn't white noise – it's a presence, a pacing device, a mood.

**2. Izumo The Cliff, Shimane – The Drama of Silence**

And then there's Izumo The Cliff by Balnibarbi, poised like a brutalist sculpture against the seaside cliffs. With visuals so photogenic it practically begs for influencer foot traffic, you'd expect curated playlists or ambient spa tracks piped into every room. But here's the surprise: *silence*.

There is no music playing. There's no engineered sound system filling in the blanks. Just wind. Water. The occasional humming from the supertrawlers you can spot at the dead of the night.

This deliberate acoustic restraint is radical in a world addicted to background noise. By doing less – by letting nature's raw track roll unedited – Balnibarbi flips the hospitality script. The soundscape becomes the luxury, not an accessory. It's a meditative approach to space, proof that silence (and its natural companions) can be the most luxurious element of all.

### 3. Pearl Farm Beach Resort, Davao – Acoustic Culture

Now let's head south to Davao, Philippines, where Pearl Farm Beach Resort, designed by national artist and architect Francisco "Bobby" Mañosa, offers a refreshing contrast to minimalism – not in visual clutter, but in *acoustic openness*.

This is not resort-as-theme-park. It's resort-as-heritage.

Mañosa was a master of Filipino vernacular architecture, and Pearl Farm's design pays deep respect to native materials and acoustic permeability.

With overlapping split bamboo nodes echoing the architecture of the Isneg People, the structure beathes with the land. Philippine native materials such as coconut, bamboo and, yakal – they all let the sound and the materiality of the island drift in, unfiltered. You don't just hear the waves here; you hear the workers in the distance, the hum of evening insects, the off-tempo rhythm of palm leaves colliding in the wind.

In a global design climate where silence often equals luxury, Mañosa insisted on acoustic authenticity. And that changes the guest experience from one of consumption to one of *communion*.



**The Irony of "Escapism"**

This all circles back to the awkward truth: we design cities that disconnect us from the environment, then spend a fortune escaping to places that reconnect us – but only on our terms. We're still curating, still filtering.

We call it "white noise" when we like it, and "noise pollution" when we don't. The ocean is therapeutic; a squawking crow is a nuisance. Hospitality design, even when it uses natural materials, still often defaults to simulated serenity – piped-in waves, chirping digital crickets, Spotify playlists titled "Meditate by the Ocean."

But when the building is designed *with* nature instead of simply decorating around it, the real soundscape doesn't need to be edited. It simply needs to be heard.

**Sound as Architecture**

Just as we lay out lighting plans or HVAC schematics, designers should be building *acoustic palettes* for every biophilic project. This means not just minimising mechanical hum or insulating street noise – but actively inviting natural sounds into the experience.

This is about *intentional listening*. Working with acoustic ecologists, understanding wind corridors, mapping how materials conduct sound, and placing openings not just for views, but for audio. It's also about setting expectations: letting guests know that part of their experience might be the unpredictability of birdsong or the percussion of rainfall on a tin roof.

It's design with humility.

**Stop tuning out**

Biophilic design isn't just a moodboard trend – it's a philosophy rooted in restoring balance. We are nature. We crave its rhythms, even when we try to drown them out with airpods and automatic doors.

If we're going to design spaces that truly reconnect us to the natural world, we have to stop treating sound as a backdrop. Let's stop simulating nature and start *listening* to it. Because sometimes the most profound design move is not to add another feature, but simply to open a window, and let the sea do the talking.

https://en.ishikawasambo.com

*Photos of Iwado Base and Pearl Farm by Sambo*

*Photos of Izumo the Cliff provided by Balnibarbi*

# THE SCIENCE BEHIND BIOPHILIC DESIGN

# BIOPHILIC SOUND DESIGN

## *Creating a restorative environment*

*"Noise harms our health and wellbeing, but it's not just about avoiding noise – exposure to natural sounds can actively promote relaxation and faster recovery from stress. This article explores the research on how thoughtfully designing soundscapes – especially by integrating natural sounds and greenery – can create more restorative environments at home, work, and beyond."*

**Adam Scott**

**Noise (i.e. unwanted sound) is known to have negative consequences on peoples' health and wellbeing. As an example, it is estimated that at least 1.6 million healthy years of life are lost in western Europe alone due to road traffic noise[1]. While reducing noise is a good thing, that does not mean that the goal is silence.**

So what sounds are good? To some extent, it depends who you ask, and it certainly depends on the context. Nevertheless, natural sound sources (that you are used to) are overwhelmingly perceived as tranquil, regardless of upbringing/environment[2]. Beyond the subjective improvements of feeling more comfortable, exposure to natural sound sources is shown to promote physiological expressions of relaxation, suppressing sympathetic nervous activity and reducing heart rate[3].

A study of skin conductance[4], a physical measure of stress, found that, post a stressor, after a sharp increase in skin conductance, participants would see their skin conductance steadily reduce. However, those exposed to audio of road traffic noise were observed to have their recovery plateau and not reduce, in comparison to those exposed to an audio recording of natural sound sources. This shows that sound can strongly influence how we recover from stress, and while limiting noise is good, promoting natural sounds too is better.

Therefore, wherever you are, whatever you're doing, being in a restorative sound environment is in your interest. At work, it helps you have an effective break. At home, it can help you rest your mind. In a healthcare setting, it can promote recovery.



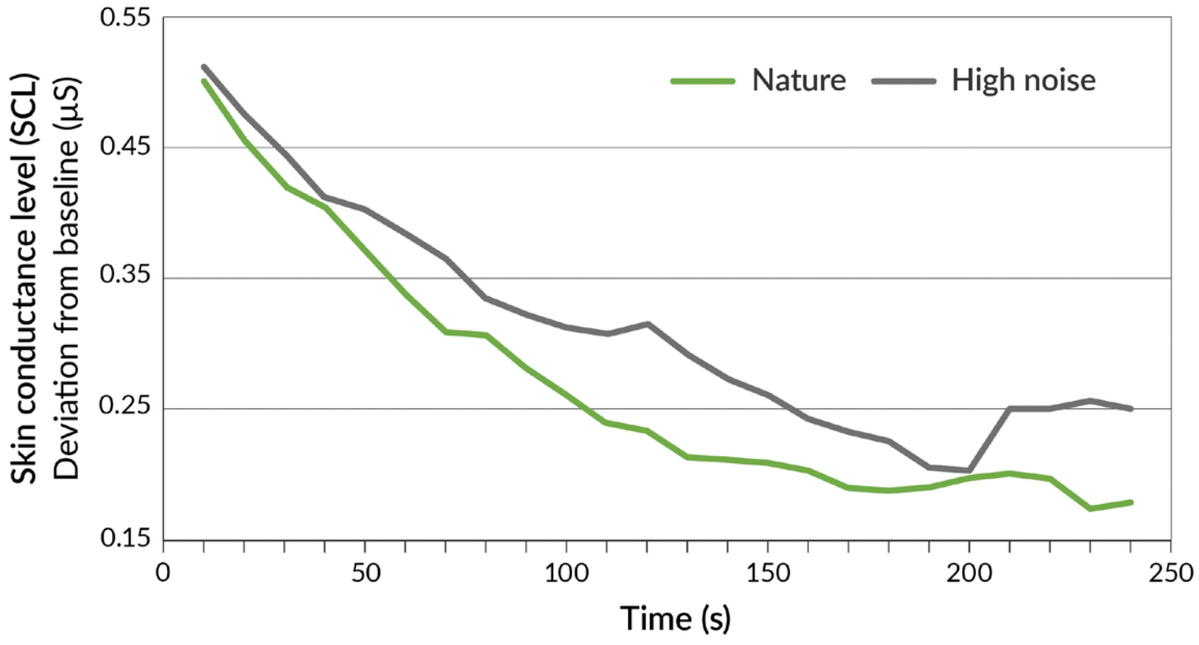


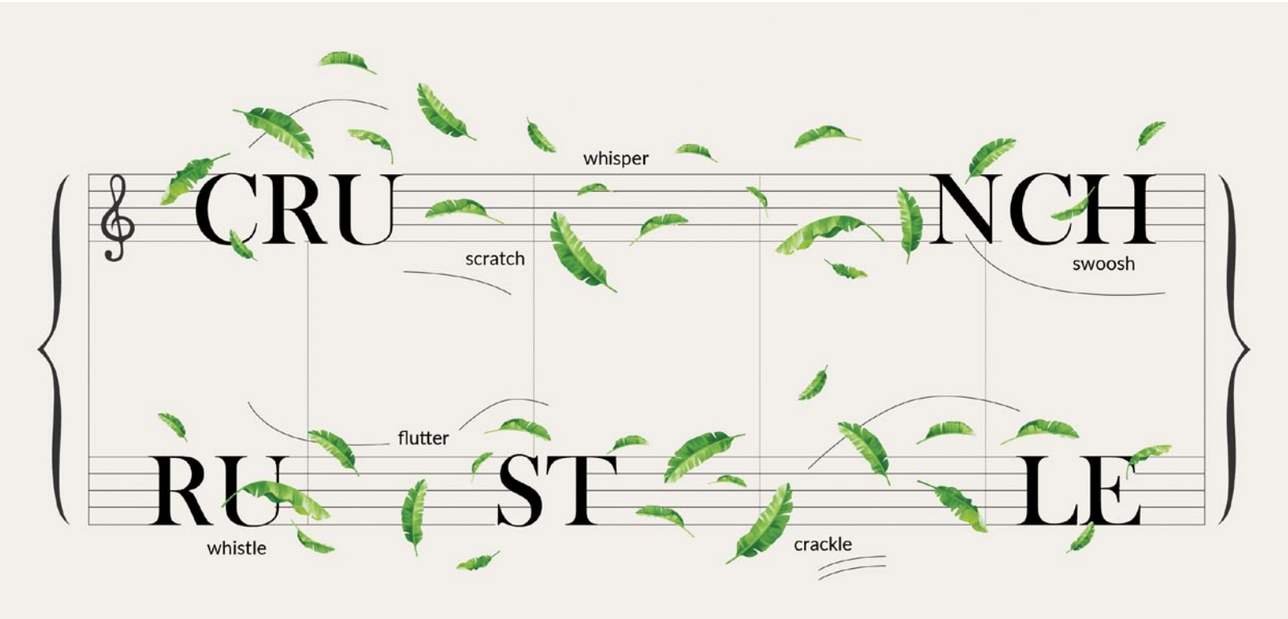
So how do we design a restorative sound environment? In practice we're holistic beings, so sound environments cannot be designed in isolation. Soundscapes need to be contextually appropriate[5]. Playing loud birdsong in an office (where there are obviously no birds), will not necessarily be perceived as relaxing by all and may even reduce cognitive performance[6].

A more pragmatic approach is to design calm environments intuitively, without forgetting about sound. The keys are to not let noise ruin an environment; and to try to facilitate a diverse mix[7] of natural positive sound sources where possible.

Greenery is good for so many things, and perceptions of soundscapes is no exception to this – most of the time. Perceived biodiversity (which in an ideal world, would be actual biodiversity), generally promotes wellbeing[8] and the presence of greenery in a residential setting is shown to be able to reduce the perceived annoyance caused by road traffic noise to a quantifiable extent[9]. Moreover, research related to noise annoyance[10] shows that factors such as having access to quiet areas, not being able to see a noise source, the presence of greenery and even how much someone trusts/accepts a development can influence relationships to a noise source. Therefore, generally promoting the things that we know make people happy goes hand in hand with how people interact with their sound environment.

**Stress recovery during exposure to sound, depending on source.**
Source: PubMed Central






Designing restorative sound environments is more straightforward outdoors than indoors, particularly as local sound sources indoors have such a strong influence on peoples' perceptions of their environments. Soundscapes indoors are often dominated by human voices, which can be perceived differently by different people, in different contexts, and in different moods.

Therefore, indoors, providing a restorative sound environment is often about agency/choice and providing occupants with calm sound environment alternatives.

By providing people with tranquil areas, we can facilitate restoration. Adding geophony or biophony (i.e. natural sounds) indoors sensibly can be challenging. Therefore, considerations should be given to a person's relationship to the outside. If a quiet environment can be provided **with** access to green visuals outside, then this is a better outcome than just a quiet environment alone.

If rooms meant for rest can be located considerately, then it is possible to have scenarios where opening windows, should someone choose to, allows natural sounds in, rather than anthropogenic noise. These natural sounds can then be promoted.

Giving people access to tranquil external sound environments is the least we can do.

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# Biophilic Acoustics in the Workplace

*Designing for Wellbeing, Engagement, and Restoration*

**Paige Hodsman**

**Reconnecting people with nature is a growing focus in architecture and design, often seen in the use of plants, daylight, and biomorphic shapes. Biophilia (the love of nature), suggests that humans benefit from natural connections. However, while sight and touch have been widely explored, sound perception in biophilic design is somewhat underexamined.**

Humans evolved immersed in natural, low, ambient background sounds for millennia, yet today, we are constantly exposed to very loud, artificial noise. Understanding how nature has shaped hearing helps create better spaces where we live, work, learn and heal.

A positive acoustic experience depends on the presence or absence of certain sounds, shaped by individual traits and environmental factors.[1] While not all questions can be answered, examining acoustics from the biophilic perspective can expand awareness, knowledge, practical applications and ultimately the impact on human well-being.

## Evolution of the Ear

The origins of hearing organs are ancient and trace back approx. 1.5 billion years, beginning with water-dwelling organisms using cilia to detect vibrations for movement and feeding. Early fish evolved a rudimentary 'hearing' device that later formed the central nerve responsible for hearing and balance in land animals'.[2] As amphibians evolved into reptiles, three lower jawbones migrated to form the mammalian middle ear.[3] [4] [5]

Sound travels through gas, liquid, or solid as pressure waves and whether we hear a sound depends on its frequency (Hz) and amplitude (dB). Humans hear 20Hz–20kHz, surpassing goldfish (100Hz–2kHz) but falling short of dogs (50Hz–46kHz).[6] Human hearing is exceptionally good at the speech frequencies (125Hz–8kHz), due to their relevance for survival. Studies suggest human hearing evolved between 1–3 million years ago, adapting for short-range vocal communication in open habitats.[7] As such, the natural outdoor environment shaped our hearing and speech abilities.



**Auditory Structure**

The outer, middle, and inner ear control balance, coordination, and hearing. Sound waves reach the tympanic membrane (eardrum), traveling to the cochlea and vestibular system, which processes sound and maintains equilibrium.[8]

Hearing evolved primarily as a survival mechanism, it remains active even during sleep.[9] Humans excel in speech perception, though it's unclear whether auditory discrimination or vocal tract adaptations came first. As noted in S. Raghunandhan et al., (2016) hearing was essential for communication, vocalization, and later speech.[10]

**How do we measure sound?**

Acoustics, a field grounded in physics and mathematics, explores the behaviour of mechanical waves across various mediums. Sound waves move similarly to ripples in water, traveling through air at a speed of 343 meters per second. The frequency of a sound wave determines its pitch – how high or low it sounds – while amplitude measures the wave's strength, influencing its loudness.

When measuring for acoustic conditions in rooms, key factors include how sound transmits (spreads), insulates (holds in), absorbs, reflects, and diffuses (breaks up) within interior spaces. Acoustic conditions vary by room type. While small rooms require simpler adjustments, open-plan offices, for example, demand more complex solutions due to the size and shape of the room and the different types of activities that occur simultaneously.

Objective room acoustic measurements are crucial for understanding how sound waves behave within a space. When combined with psychological and physiological biophilic factors that influence sound perception, they provide the foundation for effective acoustic design.

**A recap on the Biophilia Hypothesis and its relevance in the Built Environment**

The term biophilia, was first introduced by American psychoanalyst and philosopher Erich Fromm in *The Anatomy of Human Destructiveness* (1973).[11] Fromm argued that biophilia is essential to humanitarian ethics and human survival, believing a love for nature enhances creativity and a caring attitude toward life.

American biologist Edward O. Wilson later popularised the term in Biophilia (1984).[12] His evolutionary perspective examined the relationship between human society and nature. Wilson asserts that phylogenetics – the evolutionary relationships between organisms – is reflected in the human mind and that the human mind must be viewed as part of the biosphere.

Ulrich (1993) hypothesized that humans' positive responses to natural settings stem from evolutionary survival advantages experienced in unthreatening environments. He argued that these positive associations have been retained, stating: "humans' positive responses to natural settings in terms such as liking, restoration, and enhanced cognitive functioning might be influenced by biologically prepared learning".[13]





Ulrich's concept of "biologically prepared learning"[14] may help explain the increasing prevalence of anxiety, which prompted the World Health Organization to call stress "the health epidemic of the 21st century".[15] Brief experiences of nature have been shown to improve mental well-being, reinforcing concerns that urbanisation has contributed to rising mental illness levels.[16]

Humans instinctively prefer environments that support their basic needs and overall health.[17] Natural landscapes – where food, water, and shelter sustained human life for millennia – offer stress reduction and restoration. Biophilic design seeks to address the modern problem of nature alienation by reconnecting urban dwellers with natural environments to enhance well-being.

Stephen Kellert proposed 73 attributes for Biophilic Design,[18] and Cramer and Browning refined Biophilic Design into three core categories. Browning later co-developed the 14 Patterns of Biophilic Design with Terrapin Bright Green, integrating neuroscience and psychology to optimize individual and societal well-being.[19]

**Why should we explore Biophilic Acoustics?**

Despite its significance, sound has received limited attention in Biophilic Design literature, which has traditionally emphasized visual elements. This visual dominance likely stems from the assertion that "sight is the most valued sense".[20]

Kellert's attributes reference acoustics only within Natural Patterns and Processes, noting that "Human satisfaction and well-being continue to be reliant on perceiving and responding to *sensory variability*, especially when this occurs in structured, organized ways within the built environment".[21]

In Terrapin Bright Green's 14 Patterns of Biophilic Design, sound is mentioned within Nature in the Space, which includes "plant life, water, animals, breezes, *sounds*, scents, and other natural elements".[22] The Non-Visual Connection with Nature guideline defines spaces that "feel fresh and well-balanced; ambient conditions are perceived as complex and variable but also familiar and comfortable, with *sounds*, aromas, and textures reminiscent of being outdoors".[23]

Although biophilic design literature references natural sounds, acoustics as a broader discipline remains largely unexamined. Terrapin Bright Green suggests that biophilic strategies could improve traditional building challenges such as thermal comfort, *acoustics*, energy, and water management,[24] but further research is needed to explore biophilic acoustics beyond simply incorporating nature sounds.

Just as daylight exposure, air quality, and biomorphic shapes improve human health, the potential benefits of biophilic acoustics warrant further study. If we accept that "biophilia, like air quality, thermal comfort, and acoustics, is an essential component of environmental quality,"[25] then studying biophilic acoustics could expand discussions on environmental design and human well-being.

**Sound is vital to wellbeing**

Sounds go beyond their primary function and 'link together and connect with memory and emotion centres to trigger feelings and recollections'.[26] Office spaces, for example, can associate employees with negative mind states – stress, tiredness, pressure, irritation. Since natural sounds often connote tranquility, peace, and relaxation, incorporating them into office spaces could yield positive effects.

Two studies, including Jeon et al., suggest natural sounds influence emotional associations.[27] Focusing on water sounds for soundscape enhancement in urban spaces, Jeon et al. found that the sharpness of water sounds was significantly preferable, evoking feelings of 'freshness.' Similarly, Heriot-Watt University's study on water feature acoustics in office environments demonstrated that well-designed water features can mask unwanted noise, enhance concentration, and improve workplace well-being.[28]

Feeling safe is vital for emotional well-being, particularly in settings where safety relates to stress management and coping mechanisms. Andringa and Lanser (2013) concluded that the key characteristic of 'pleasant' environments is the freedom of mind-states they afford via safety indications. They assert that mismatching situational awareness – whether hearing or not hearing expected environmental sounds – can elicit negative emotions and disrupt cognitive functioning.[29] Another study examined the effects of sound masking on speech privacy and workplace acoustics, showing that while sound masking can reduce distractions, improper implementation may cause discomfort or reduced cognitive performance.[30]

Natural sounds like birdsong act as evolutionary safety cues. Hearing them signals an undisrupted environment, while their absence may indicate danger, such as a nearby predator. Evidence suggests that hearing birdsong can help people feel safe, even in unexpected locations like indoor environments. Krishna et al. placed participants in an underground car park and played birdsong. Results showed that participants felt a 'social presence' and thus safer when hearing natural sounds compared to silence or classical music.[31]

Interestingly, a study by Parise et al. (2014) explored auditory scene statistics and spatial hearing, particularly how frequency influences perceived elevation. The natural, outdoor auditory environment shaped human sound localisation capabilities. Their study showed a systematic mapping between pitch and landscape elevation.[32] In other words, human auditory systems are attuned to how sounds are arranged in natural landscapes, with higher frequency sounds associated with higher sources and lower frequency sounds linked to ground-level.

Throughout the day, biological sound cues also offer temporal context, such as the dawn chorus marking morning and crickets signalling sunset. While little research has examined how auditory stimuli influence human circadian rhythms, Goel (2005) suggests environmental sounds may affect sleep-wake cycles.[33]

### Sound human engagement and emotional connection

Human engagement relates to their emotional connection to an organization and its goals. People engage more with spaces that satisfy their needs. Workplaces must foster engagement to attract and retain employees while supporting communication and collaboration. Considering that 90% of business costs stem from employees, the case for prioritising staff engagement is clear.[34]

Stephen Kellert defines placemaking as 'the successful marriage of culture with ecology in a geographical context'.[35] Acoustics can support this connection to place by referencing local ecology – for example, incorporating regional birdsong or coastal wave sounds in offices.

Additionally, integrating soundscapes with the acoustic rhythms of natural landscapes—in the same way circadian lighting systems align with daylight cycles—could help building occupants feel more energized and engaged throughout the day.

### Restoration and sensory regulation

Natural soundscapes offer restorative benefits independent of visual stimuli. Benfield et al. found that exposure to natural sounds promoted mood recovery, which is crucial in high-stress workplace environments for sustaining positive relationships.[36]

While introducing sound can be beneficial, quiet spaces are critical for sensory stabilisation and are primarily found in outdoor environments. High levels of sound absorption inside mimics natural acoustic conditions by reducing reverberation (echoes), allowing sound to disperse rather than reflect. This minimises auditory distractions, creating a calming soundscape that supports focus and well-being.

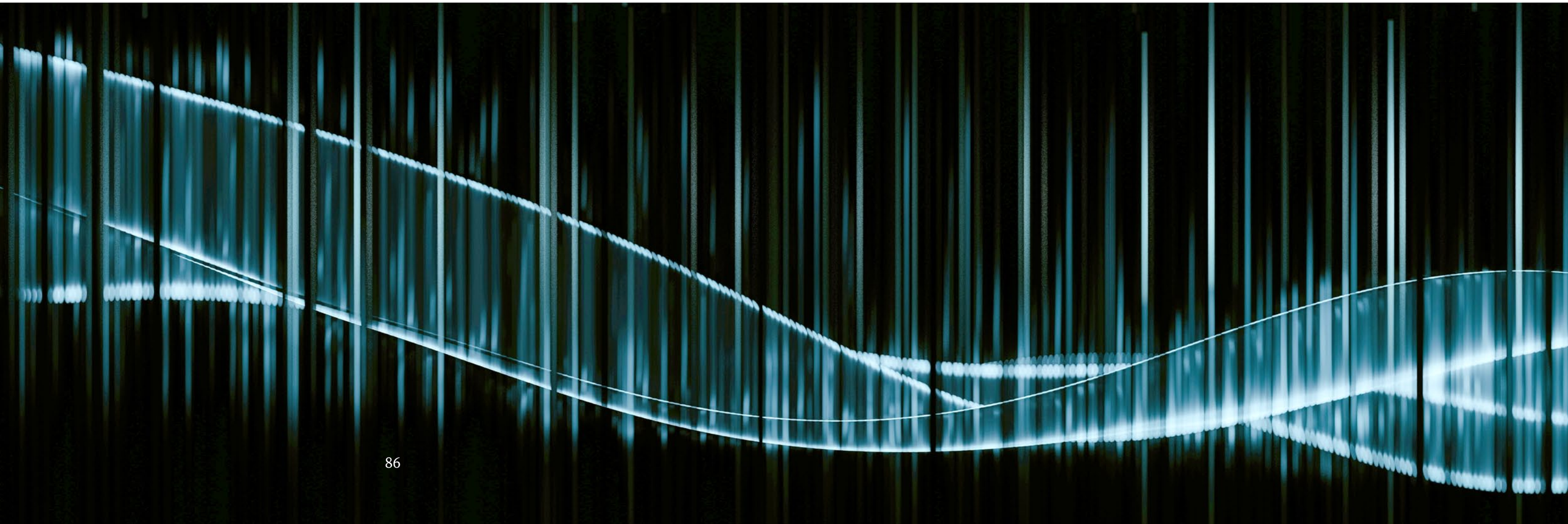
In our neurodiverse populations, sensory regulation is particularly important. Research into design preferences of neurodivergent individuals by Toar Sadia (2024) revealed that quiet spaces can help those with autism and ADHD manage sensory overload in office environments.[37]

Biophilic design reconnects people with nature, yet attention to the acoustic condition largely remains overlooked. We know that natural auditory environments influence well-being, engagement, and restoration with research highlighting how sounds like birdsong and water features are beneficial.

However, biophilic approaches can also entail creating quieter spaces that enhance focus and emotional stability while reinforcing sensory comfort particularly in workplace design.

Embracing biophilic acoustics would transform built environments, across all sectors, creating spaces that harmonise with innate human sensory preferences, enhancing both individual well-being and connection to others.

*This article is an updated and summarised version of the original paper: 'Biophilic Acoustics', V. Jackson, P. Hodsman, E. Goode, J. Tolkovsky and Oliver Heath Design, 2018.*



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# PLANTS

# Where Flowers Never Fade. The Timeless Allure of Botanical Art

*"From childhood collages to collectible fine art and design collaborations, we chat with Tricia Paoluccio who transforms fleeting floral beauty into lasting works that reconnect us with nature's quiet wonder."*

10 Questions with artist designers

**Tricia Paoluccio**

1. Tell us about what you do? … **I pick and press flowers, then create botanical collages from them. These works of art have become the foundation for an entire brand that spans multiple categories – fine art prints, wallcoverings, hand-knotted rugs, cashmere, a furniture collaboration, tabletop pieces, and soft accessories. Pressed flower imagery is the inspiration and base for it all.**

2. Why flowers, what is the appeal, what inspired you to start creating art with flowers? … **I grew up on a farm in Modesto, California, where flowers grow abundantly. I started pressing flowers as a child and became obsessed with making cards and collages. I sold those original pieces on the streets of NYC and through an Etsy shop.**

**A few years ago, advances in photography changed everything. I could finally capture the delicate details of my collages and make high-resolution prints that look almost indistinguishable from the real thing. That was a game changer – real pressed flower art fades, but printed versions last a lifetime. Now I can offer art that preserves the beauty of nature for generations.**

3. Where do you install your art/ who buys your art? … **In the past, I sold my work through a NYC gallery and on the luxury platform Moda Operandi. Now I sell my fine art prints through my website: www.domainoftheflowerings.com**

**My collectors span a wide range of backgrounds – mainly women – and include students I've taught to press flowers as well as style icons like Anna Wintour, who recently bought two pieces!**



4. Why do you think that people should connect more with nature? … **There's something deeply calming about gazing at real elements from nature. It grounds us, slows us down. With my art, I often play with scale – enlarging flowers to magnify their intricate details. It invites people to see things they might otherwise overlook. That sense of wonder and discovery brings joy, which is at the heart of biophilic design.**

5. And why do you think flowers bring such joy to people? … **I think we're wired to respond to the beauty and miracle of flowers. Their symmetry, colour, fragility – it all speaks to something ancient in us. Beauty has the power to uplift. And flowers might be one of the purest forms of that.**

6. There is a whole tradition of ceramics which bring flowers / nature onto the plate and into homes, why do you think this is? … **Is there another brand, maybe an antique one which inspires you, or which you love, or which you'd like to mention and why? Floral design in interiors is timeless – and for good reason. Artists have always been drawn to depicting nature's forms and flowers have always been hugely popular.**

**What I realised, though, is that making designs with imagery from real pressed flowers versus a watercolour painting or drawing of a flower, was truly new. This really excites me! Because they're naturally two-dimensional, pressed flowers lend themselves beautifully to wallpaper and fabric design.**

**For tabletop, I began developing a line with Royal Limoges in France. They told me that if I could pull it off, it could revolutionise the industry – because no one had ever created a line using high-resolution imagery of actual pressed flowers before.**

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7. How do you select the flowers for your designs? Do you have favourite ones? … **I love heading into our backyard on the farm, basket in hand, and seeing what catches my eye. I choose flowers at the peak of their beauty – and also at different stages of growth. I only ever pick one handful at a time, on a sunny day.**

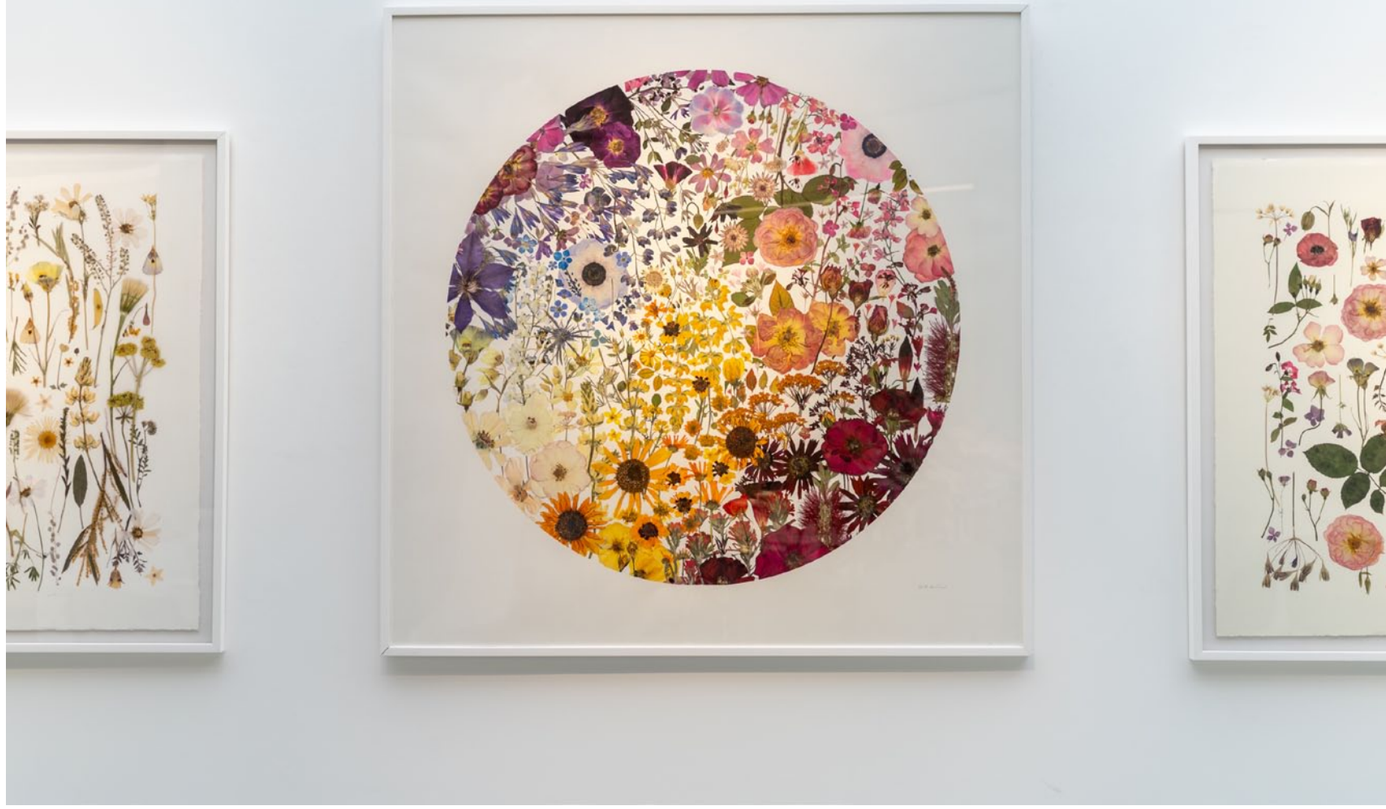
**My favourite flower is the Mariposa Lily – a wild, tulip-like bloom whose petals resemble butterfly wings. Sometimes the flowers have a pale grey hue with dots of yellow, purple and red. Very unique! It grows near our family's cabin in the California foothills and always feels like a rare treasure to find.**

8. Anything else you would like to add? … **I'm so thrilled that this old-fashioned pastime, often associated with pansies pressed in Bibles, has evolved into an exciting and modern art form. I'm deeply grateful that today's technology allows me to preserve and share my art in a way that stays beautiful over time**.


MODERN DESIGN
ART BOOK
ARCHITECTURE

9. Where can people find out more about you? Website URL, Instagram? … **My website for my Art and brand is www.domainoftheflowerings.com and my Instagram is @domainoftheflowerings**

**For those curious to learn how to press flowers themselves, I also run a site dedicated to inspiration and education: www.modernpressedflower.com. Here you can find links to recorded videos of my classes so you can learn how to press flowers so they don't turn brown. I'm passionate about teaching and am honored to have taught some in person workshops all over the world from Malibu to NYC, to Edinburgh, Mallorca, Italy, London and Dublin. It makes me very happy to see so many people interested in making beautiful things with pressed flowers.**



10. And a magic question (which is one I ask people on every podcast actually, but think it appropriate to ask here too!), if you could paint the world with a magic brush of Biophilia what would it look like? … **Oh, this one's easy – because I've already started creating a tiny fraction of it!**

**I've made a massive swirling mural of pressed flowers, currently about 60 meters long. My dream is to build a fully immersive space where people are completely surrounded – above, below, and all around – by these swirling botanicals in different scales.**

**It would be like walking through a blooming dreamscape. I've been developing it for years, but it's never been fully realised … yet. If anyone has the space, let's make it happen!**

https://domainoftheflowerings.com/fineartprints

or enrol in a course, visit https://www.modernpressedflower.com/recorded-classes

# Wish you were here!

As the excitement of National plants@work Week 2025 settles, we're taking a moment to reflect on the campaign's installation – the riverside postcard scene that formed the heart of this year's theme: 'Wish You Were Here'.

Every year, Plants@Work run a bonkers and very clever PR stunt with a lush display of plants somewhere random. The aim is to make a powerful visual statement to encourage the public to rethink the role of plants in enhancing office settings.

For this year's **National plants@work Week** campaign, themed "Wish You Were Here," the team selected a picturesque location by the River Thames in Windsor to create a striking visual moment. The setting – a desk by the water, complete with laptop and a lush selection of plants – was designed to replicate a working office environment, albeit in an unexpectedly green and tranquil location.

To delve deeper into the creative thinking behind this imaginative installation, we sat down with Ian Drummond, plants@work Ambassador and long-time creative force behind NPWW. Ian has played a key role in developing the themes since the very beginning of the campaign in 2013. His vision for this year's campaign, the striking riverside desk scene, was both playful and purposeful.

**We speak with him to find out more about why on earth he set up an office outside by a river . . .**


1. **Why did you choose a postcard theme with a catchy 'Wish you were here' statement?**
   As a PR stunt, the unreality of the situation enhances the appeal. People are more likely to take notice if it's unrealistic, if it stands out. So, a working office desk by the river fulfils those opportunities and makes people sit up and notice.

2. **Obviously it's not realistic to have a desk by the river to work from, so what was your idea when you suggested this?**
   The more unrealistic, the more people will take notice and ask questions – well that's the plan! This gives our members the opportunities – hopefully – to explain the benefits of a plant filled office/space to work in. We can promote the many benefits of having plants around you in an office space from softening any noise, to improving the air quality, from improving productivity and creativity to lowering stress levels and more.

3. **Do you hope other members of plants@work will copy this idea?**
   We hope it gives members an opportunity to discuss the benefits of having plants in the workplace. So, we hope that many of them take the opportunity to promote the **'Wish you were here'** theme . . . using their own offices as a base.

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4. **How successful as a PR stunt do you think this could be?**
   Imagine setting it up on a beach with the sea behind you? Or a replica by a river … if it creates a talking point then it's worked! You can explain how that can work in more obvious surroundings like an office!

5. **Any other comments:**
   'We'd like to think that members would use the **'Wish you were here…'** theme to surround themselves with nature in their own existing offices to create their own postcard moments! By planting up their own desk or a breakout area where the whole team can enjoy all the benefits that plants and nature offer us!'

6. **Some general comments about research into indoor plants and how they can help us:**
   - Plants improve the efficiency of the workplace
   - Plants reduce absenteeism by reducing the effects of "Sick Building Syndrome"
   - Plants improve the quality of air and the environment in general
   - Plants improve productivity and creativity
   - Plants reduce noise levels
   - Plants lower stress levels
   - Plants conserve energy by creating a micro-climate
   - Plants give structure to an office area and help to guide people around the space
   - Just one plant can make a difference

Ian was ably assisted with the **'Wish you were here…'** project by **Stephen Dieppe, MD of phs Greenleaf (sat at the desk), Craig Edser, Regional Manager at Nurture Landscapes Ltd and Shirley Smith, Director of Botanica Nurseries.**

If you missed it, you can still view the campaign highlights and get involved by creating your own #WishYouWereHere office. Let's continue promoting the value of plants at work – not just for a week, but all year round.

To find out more about Plants@Work visit:
www.plantsatwork.org.uk

# Favourite Office Plant of the Year 2025

**Every year, an interesting "green" delight pops up in my inbox from our friends over at Plants@Work. They seek votes for the industries favourite office plant of the year.**

A selection of people from the press, the wider industry and of course plants@work committee members who work with houseplants on a daily basis, are asked for their top three houseplants from the selected list.

**The selection**
The houseplants in the selection were:

1. Monstera Epipremnoides
2. Strelitzia Nicolai – the white Bird of Paradise
3. Scindapsus pictus 'Exotica'
4. Alocasia 'Frydek' aka Elephant Ears
5. Ficus benghalensis 'Audrey'

**And the top three were …**

Claiming first place was the striking **Strelitzia Nicolai.** The **Alocasia 'Frydek'** claimed a good second place. Bringing up the rear was the unusual **Monstera Epipremnoides** in third place.

## *Strelitzia Nicolai*

The **Strelitzia Nicolai** gained 1st place votes from **Shirley Ann Marshall from Ambius** and our joint vice chair. Her reasoning is "due to its large leaves and (how it's) amazing to watch them grow so large and thrive".

Committee members **Stephen Dieppe, MD at phs Greenleaf** and **Shirley Smith, Director of Botanica Nurseries** both chose **Strelitzia Nicolai** as their favourite too. Stephen commented, "It's a great plant because it adds instant tropical impact with its bold, architectural leaves and thrives in bright indoor or sheltered outdoor spaces."

**Shirley Smith of Botanica Nurseries** explained, "My favourite is Strelitzia as it's unusual and striking but also fairly tough."

It was also our Ambassador, **Ian Drummond's** favourite plant too.

While **Mr Plant Geek aka Michael Perry** chose Strelitzia as his second favourite and **Bethany Vann, editor of Pro Landscaper** and the well known award winning garden designer Claudia de Yong who both chose Strelitzia as their third choices.

## *Alocasia*

**Matthew Appleby Editor of Hort Week** chose the vibrant **Alocasia** for his second place. However, **Bethany Vann, Editor of Pro Landscaper** and garden designer **Claudia de Yong** chose the **Alocasia** as their top choices.

**Vanessa Champion of the Journal of Biophilic Design** chose the **Alocasia frydek aka elephant ears** as her second choice – because "*I love elephants and am off to Africa next week (at the time of writing)!*" she explained.

## *Monstera*

**Shirley Ann Marshall** chose the crowd-pleasing **Monstera** as her 2nd choice: "Monstera takes me back to my childhood days as it was a very popular plant at home and at my grandparents," she added.

**Vanessa Champion** chose Monstera as her first choice, "Reminds me of my favourite cheese: Emmental. I think it would be Wallace and Gromit's favourite too!"

**Mr Plant Geek aka Michael Perry** chose all three plants but put them in a different order – 1st Monstera, 2nd Strelitzia and 3rd Alocasia Frydek.

What would have been your favourite?

If you work in plants and workplace do consider membership with the lovely people over at Plants@Work, great networking and industry support too.

https://www.plantsatwork.org.uk/index.php

# ENVIRONMENT
# PEOPLE
# PLANET

# How Geospatial Data Show Us Our Real Environmental Crisis

*"We are not passive observers of Earth systems but active participants who should act on the best insights available."*

**Alexander Verbeek**

## The Palm-Sized Power of Precision Agriculture

The democratisation of geospatial technology means that a farm manager in Costa Rica can check the exact moisture levels of every hectare through a simple phone app like CropX or Climate FieldView, predict pest infestations weeks before they appear, and track exactly how much carbon her coffee trees are capturing. All from a device no larger than her palm.

These technologies represent a fundamental shift in understanding and protecting our environment as climate change accelerates environmental challenges. The gap between what we can see and what we can't has always shaped ecological decision-making, but now, as the climate crisis demands rapid action, that gap is closing at an unprecedented rate.

## My Journey from Dutch Dikes to Digital Maps

Growing up in the Netherlands, where a quarter of the land, home to over 60% of the population, lies below sea level, I learned that understanding geography wasn't optional; it was essential for survival – and today, as climate change poses existential threats to coastal communities worldwide, this understanding becomes even more critical.

Standing on the dike separating my island of Schouwen Duiveland from the surrounding waters, I overlook a dozen drowned villages; a 16th-century church tower is all that remains of Koudekerke, swallowed by the sea. Understanding how shifting currents invisibly undermined the dikes could have altered my island's troubled history. My studies in Utrecht taught me to read landscapes to see how water, land, and human activity create complex systems. But the tools we had were limited. During my cartography classes in the 1980s, I still had to draw maps on paper.



## Revealing Worlds within Worlds

Today's geospatial revolution recalls another transformative moment in human understanding: the invention of the microscope. Anton van Leeuwenhoek, a Dutch tradesman from Delft, crafted lenses that revealed an entire universe invisible to the naked eye. His "little animals" dancing in rainwater seemed as fantastic to 17th-century minds as today's ability to measure methane emissions from oil wells by satellite must seem to previous generations.

Just as microscopy opened worlds within worlds, geospatial technology reveals patterns and relationships that were always there but invisible to us. The Alberta oil sands remain unchanged, but new satellite technologies transform our ability to address their environmental impact. For example, satellites like GHGSat and TROPOMI now track methane plumes in near real-time, providing actionable data for regulators and the public.

## Canadian Challenges through a Geospatial Lens

I've spent the past four years living in Ottawa, watching Canada grapple with challenges that geographic information could illuminate: the retreating ice roads that connect northern communities, the westward march of forest pest invasions like the mountain pine beetle documented by Natural Resources Canada, the complex choreography of wildlife corridors disrupted by infrastructure. These problems affect real people's lives, livelihoods, and cultural practices.

I'm impressed by the possibilities of technology to transform conservation. Marine biologists off the coast of Nova Scotia now use acoustic buoys to track right whale migration patterns, combining these data with ship traffic monitoring to prevent deadly collisions. According to Oceana Canada, this technology has contributed to reducing whale-ship incidents. The technology's sophistication bridges the gap between immediate economic needs and long-term conservation goals.

## Diplomacy in the Satellite Age

This bridging function, connecting different stakeholders and needs, represents a powerful aspect of geospatial technology. In my diplomatic years, I often witnessed competing claims about resources. Whether it was river water allocation, pollution by extractive industries, or carbon sequestration credits, the disputes frequently stemmed from information asymmetry. Those with better data held better negotiating positions.

Consider the long-running softwood lumber dispute between Canada and the United States. For decades, these trading partners have wrangled over forest management practices, with the US claiming Canadian stumpage fees constitute illegal subsidies. Real-time satellite monitoring of harvest rates, carbon storage in standing timber, and detailed mapping of crown lands – technologies available through platforms like Global Forest Watch – could provide objective data for these negotiations. While the technology is available, its adoption in policy negotiations is still emerging. The dispute wouldn't disappear – economic interests would still compete – but discussions could proceed on shared facts rather than disputed claims.

The same principle applies to fisheries management. Today's satellite tracking of fishing vessels through Global Fishing Watch, combined with sonar mapping of fish populations and AI analysis of catch data, provides objective ground truth. These technologies offer unprecedented transparency in an area historically characterized by limited oversight. With verifiable data on fishing activities, nations can shift from arguing about what's happening on the water to developing sustainable management strategies based on shared ecological realities.

### Making the Invisible Visible

The environmental applications extend far beyond fishing rights. Consider groundwater, an invisible resource upon which millions depend. In the Prairies, farmers have traditionally relied on local observation and generational knowledge to understand aquifer levels. Now, satellite gravity measurements from NASA's GRACE mission can detect subsurface water changes across entire basins. What took decades of well-monitoring to understand can be mapped in months.

This enhanced visibility carries ethical responsibilities. The question becomes: Who controls the view? Who decides what gets mapped and what remains obscured? Canada's Indigenous communities have pioneered participatory mapping approaches incorporating traditional knowledge with satellite data. Projects like the Nunaliit Atlas Framework and the Mushkegowuk Mapping Initiative demonstrate how, when applied equitably, geospatial technology can amplify local voices rather than override them.

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### Balancing Access, Security, and Rights in the Age of Transparency

During my time in Ottawa, I observed how the Canadian government grapples with these questions. The promise to make environmental data openly accessible sits alongside concerns about national security and Indigenous intellectual property rights. It's a delicate balance that other nations will also need to navigate as geospatial capabilities expand.

The acceleration of these capabilities continues to astound. Machine learning algorithms now distinguish individual tree species from hyperspectral satellite imagery through projects like ESA's EnMAP satellite. Underwater drones map submerged archaeological sites while monitoring coral reef health. Citizen scientists contribute millions of data points through smartphone apps like iNaturalist and eBird, creating distributed sensing networks that supplement official monitoring. I contribute to insights on biodiversity by uploading data I collect via apps about birds and plants I encounter on my walks.

### Bridging the Knowledge-Action Gap

Yet technology alone doesn't save ecosystems. The Amazon rainforest is among Earth's most closely monitored ecosystems, with multiple satellites and thousands of sensors tracking its condition minute by minute through Brazil's INPE satellite system and Global Forest Watch. We can watch deforestation happen in real time, identify the perpetrators, and know precisely how much carbon is released. Still, the forest continues to shrink.

The gap between information and action remains the critical challenge in our race against climate change, and this is where Canada's experience offers valuable lessons. Many Canadian professionals bridge raw geospatial data with policy implementation. Whether it's urban planners integrating climate projections into infrastructure design or conservation biologists using movement tracking to create wildlife corridors, the focus is on translating visual information into tangible protection measures.

## The Future of Environmental Protection

Remember the Costa Rican farmer I mentioned in the opening? As documented by agricultural studies, she reduced usage by 40% while maintaining yields through precision agriculture techniques that achieve water savings. Small changes, precisely targeted, add up to significant impacts. Her story exemplifies what I believe is the future of environmental protection: decisions guided by "invisible-made-visible," actions calibrated to the scale of ecosystems, and outcomes verified by the same systems that guided the choices.

The philosopher Simone Weil once wrote that attention is the rarest and purest form of generosity. In their highest application, geographic information systems represent attention at scale, the capacity to notice what matters across vast territories and maintain that attention over time. They allow us to be generous with our care for environments too large or remote for individual stewardship.

## The Evolution of Environmental Awareness

The environmental challenges we face are measured in numbers almost too large to comprehend: billions of tons of carbon, millions of species, and thousands of waterways. Geospatial technology doesn't make these numbers smaller, but it makes them addressable. It reveals the places where interventions can have outsize impacts, the patterns that suggest solutions, and the connections that invite collaboration.

Not far from Rideau Hall is a place called Rockcliffe Lookout, a favourite spot of mine to enjoy the view over the Ottawa River as well as to feel the historical significance of that spot. Standing there, I often think about Samuel de Champlain's 1613 map of the Ottawa River – hand-drawn, imperfect, yet essential for those who came after. We are Champlain's heirs, still mapping waterways, still trying to understand our place in the landscape. Our tools have evolved from compass and sextant to radar and AI, but the fundamental task remains: to see clearly so we can act wisely.

## The Connected Web of Planetary Awareness

The coffee farmer's phone screen, revealing invisible moisture gradients in her soil, connects to a young Inuit hunter checking ice thickness on a smartphone app, to a flood manager in Winnipeg modelling levee scenarios, to a citizen scientist in Whitehorse photographing permafrost thaw. Each small act of geographic observation contributes to a growing capacity for planetary awareness.



This growing awareness carries a weight of responsibility. We cannot unsee what satellite imagery reveals about plastic accumulation in ocean gyres, methane leaks from abandoned wells documented by GHGSat, and habitat fragmentation dividing ecosystems. The privilege of visibility demands the burden of response.

**From Observation to Stewardship**

Yet within this responsibility lies tremendous opportunity. Geographic information systems don't just show us problems – they illuminate pathways to solutions. They reveal which wetlands most effectively filter urban runoff, which forest corridors enable species adaptation to changing climates, and which coastal areas can most cost-effectively accommodate sea level rise.

Canada's national geospatial leadership conference, GeoIgnite 2025, will gather again in Ottawa in May. We'll exchange stories of what we've made visible: the underwater forests of kelp that sequester carbon, the urban heat sinks that threaten vulnerable populations, and the migration patterns that cross national boundaries. Each revelation expands our capacity for informed care.

**The Responsibility of Vision**

The Dutch have a saying: "God created the Earth, but the Dutch created the Netherlands." It's meant as a joke about our endless reshaping of geography but points to a deeper truth about human agency in environmental matters. We are not passive observers of Earth systems but active participants who should act on the best insights available.

When we gather data, create visualizations, and share insights, we expand our capacity for environmental stewardship. We move from reaction to anticipation, from damage control to damage prevention, from protecting what remains to restoring what was lost.

Geographic intelligence gives us the vision to match the scale of our environmental responsibilities, which makes GeoIgnite highly relevant.

The future environment depends not on what we can't see coming but on what we choose to do with what we can finally see clearly. That's the responsibility and the opportunity that geospatial technology places in our hands. How we use it will shape the planet our children inherit.

**A good Planet is hard to find**

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# LAMDA
# Wool's heritage, re-engineered

*"Crafted from Welsh wool, this rigid insulation panel reimagines nature's heritage, delivering high performance and planet-friendly innovation while embracing natural comfort and deepening our bond with the natural world."*

**Dr. Vicente Orts Mercadillo** & **Ruth-Marie Mackrodt**

### Insulation inspired by nature

In the rugged mountains of Wales, hardy sheep have roamed for centuries, their thick fleeces evolving to withstand harsh elements. Yet today, this remarkable natural material; coarse Welsh wool, has effectively become a waste by-product of the meat industry. Farmers in the UK are losing money on every wool fleece sheared. Similar wool across Europe is often discarded, buried or burned. This disconnect represents our modern paradox; we've engineered sophisticated synthetic insulation materials while overlooking the ingenious solutions that nature has perfected over millennia.

Wull Technologies stands at this intersection of tradition and innovation. We've asked ourselves, what if the solution to better buildings has been grazing on Welsh hillsides all along?

Our answer is LAMDA, a fully circular, rigid wool insulation panel. Transforming Welsh mountain sheep wool into a performant and biophilic alternative to energy intensive and oil derived insulation.

### A heritage of innovation

The story of LAMDA traces ancient pathways across Welsh landscapes. For centuries, wool trade routes connected remote valleys in Wales to bustling markets, and eventually pioneering mills in the north of England. Today, we're writing a new chapter in this story.

Our journey began in Snowdonia, studying the remarkable properties of mountain sheep fleece – its natural resistance to moisture, fire, and temperature fluctuations. We brought together materials scientists from industrial Manchester with wool specialists from rural Wales, creating an unlikely collaboration that bridges laboratory precision with farming wisdom.

The result is transformative, what was once considered worthless wool can become a premium insulation material that outperforms conventional alternatives.



### Performance and beauty woven together

LAMDA panels convert traditionally coarse, overlooked wool into rigid insulation with remarkable properties. The thermal conductivity ($\lambda = 0.04$ W/m.K) rivals conventional mineral wool and synthetic insulation, but that's just the beginning of what makes LAMDA special.

Unlike synthetic materials that trap moisture and create perfect conditions for mould growth, LAMDA's wool fibres breathe with your building. They absorb excess humidity when the air is damp and release it when conditions dry, maintaining an optimal balance that synthetic materials simply cannot achieve. On a vapour resistance basis it is five times as breathable as mineral wool.

Wool's complex fibre structure excels at absorbing sound waves, particularly within human speech frequencies. Conversations become clearer, background noise fades away, and spaces naturally feel more intimate and comfortable.

Perhaps most remarkably, the wool in LAMDA panels could actively improve indoor air quality by absorbing and neutralising indoor pollutants like formaldehyde, a VOC which has often been used in mineral wool binders. While you sleep, work, or relax, the walls of your space are quietly cleaning the air you breathe.

Welsh wool's high nitrogen content creates a naturally flame-resistant material that forms a protective char on contact with fire and self-extinguishes without the need for chemical treatments. Unlike fibreglass or mineral wool, LAMDA panels can be handled comfortably without the itching, respiratory irritation, or protective equipment that other insulation materials require.

### Sustainability in every fibre

LAMDA represents a fundamentally different approach to building materials – one that considers the entire lifecycle from the very beginning.

The journey starts in the Welsh uplands, where farmers shear their hardy mountain sheep each spring. Through our procurement with British Wool, we ensure that farmers receive fair compensation for fleeces that would otherwise be worthless. Every panel can be traced back to specific Welsh farming communities, supporting rural economies that have struggled for generations.

Our manufacturing facility in Manchester uses a patent-pending process that transforms raw wool into rigid panels with minimal environmental impact. The process creates virtually no waste – even manufacturing scraps and offcuts can be completely reincorporated into new panels.

Unlike conventional insulation that will eventually clog landfills, LAMDA panels contain no plastics or synthetic binders. When their useful life in a building ends – likely decades in the future – they can be composted, returning valuable nutrients to the soil. This isn't just recycling; it's a true circular economy approach where materials flow in continuous, regenerative cycles.



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### Buildings that nurture

Humans have evolved with natural materials for thousands of years. Our bodies and minds respond differently to natural textures, patterns, and materials than to synthetic alternatives. LAMDA embraces this through biophilic design.

The cut face of each LAMDA panel reveals a beautiful cacophony of swirling patterns of wool fibres, each one unique like a fingerprint. These natural variations bring warmth and texture to spaces, creating interiors that feel alive rather than sterile. The visual connection to nature is immediate and intuitive.

More profoundly, LAMDA panels create a tangible link between buildings and the landscapes that produced their materials. A conference room in London can contain echoes of Snowdonia's windswept slopes. An apartment in Manchester can carry the essence of Welsh valleys. This connection to place gives spaces meaning beyond mere functionality.

### Scaling natural innovation

The path ahead isn't without challenges. Changing established building practices requires persistence, education, and compelling evidence. In a world increasingly disconnected from natural systems, LAMDA represents a return to balance – not by rejecting modern science, but by uniting it with natural capability. So buildings contribute to ecological health rather than compromising it, tradition and innovation strengthen rather than oppose each other, and every space nurtures human wellbeing.

LAMDA is rolling out to select partners across the globe. If you want to be a part of its early story, get in touch.

http://wulltechnologies.com
Ruth-Marie Mackrodt (Managing Director)
LinkedIn

Photographer: *Mark Waugh*

# Befriending Sound – The Pleasure of Journalling and Soundmapping

**Claire Francis**

*"Most of us surround ourselves with a personally curated bubble of sound from the moment we wake. From asking our smart speaker questions in the morning to instinctively popping our headphones in as soon as we leave the house, we have the luxury of our very own soundscape every day. But are we missing the bigger picture?"*

Blocking out our environmental sounds can cause a disconnection from our sense of place. They can muffle our ability to ground and orient ourselves. Environmental sounds give us important clues to our natural world. Our bodies can tell, in a half-sleep state, what time it is when we hear the birds in the morning. The rustle of the trees can give us gentle clues to the weather that day, and familiar, regular sounds such as church bells or the sea can provide a sense of familiarity and comfort. Natural sounds gently remind us that the world is bigger than our problems; no matter what happens, the waves will always hit the shore, and the breeze will always flow.

It's no coincidence that mindfulness and meditation apps use nature-based sounds in the background. This is because natural sounds have been shown to induce a sense of calm, reduce stress and promote relaxation. Studies have found that exposure to natural sounds can reduce anxiety and stress and increase mood.[1]

So, aside from just taking out our AirPods, how can we actively stop and tune into our environment? Here are a few ideas for getting started.



**Start with yourself**

This is a simple way of introducing attentive listening and can be done for just a couple of minutes at a time. Be still and quiet and listen for the sounds your own body is making. What can you hear? Which is the quietest sound of your body, and which is the loudest? Begin to move slowly, how do the sounds change? What can you hear now that you couldn't before? Listen to the sound of your footsteps changing every time you hit a different surface as you walk. What sounds are disappearing or getting louder?

**Make a sound map**

As a technique, sound maps couldn't be easier. They are simple and cheap to make; in fact, they look so simple that it can be hard for people to believe that they have the effect that they do.

- All you need is a circular piece of plain card and a pen or pencil. Simply draw yourself, or a dot to represent you, in the middle of the card.
- Find a spot and stand or sit still, ideally where you know you won't get disturbed.
- Stay still for a short while (try five minutes to start with, setting a timer helps) and listen to what is making noise around you.
- Mark on the card the sounds you can hear and where they are coming from, for example, there may be a stream behind you, road sounds in front of you, birds singing above and to your side. Be still and quiet and really focus on the sounds you can hear.
- You can draw, write or colour the sounds you can hear around you.

### Start a sound journal

Choose something in nature that you can hear, eg, the wind, water, birds or insects. For a whole month, listen out for your sound and record what you hear and when. As you hone in and befriend your sound, you should begin to notice subtle differences. You can start to explore how the sounds make you feel when you notice them more acutely, and notice when you find yourself tuning out. Think of this as a daily flashlight shining on your sense of listening and try to block everything else out. This technique can really help you connect with your environment on a deeper level and, in turn, induce a sense of calm within the nervous system.

Listening requires conscious effort, attention and patience, a bit like a muscle; the more you practice, the easier and more rewarding your efforts become. Let nature be your companion and see what you can hear next time you head out.




[1] Natural soundscapes enhance mood recovery amid anthropogenic noise pollution. https://pmc.ncbi.nlm.nih.gov/articles/PMC11602051



# Birdsong

*"From bird dialects to Passive Acoustic Monitoring, we take a breath outside for a moment among our winged friends to learn how, what and why, birds sing the way they do. Take a listen . . ."*

**RSPB's Louise Mahon**

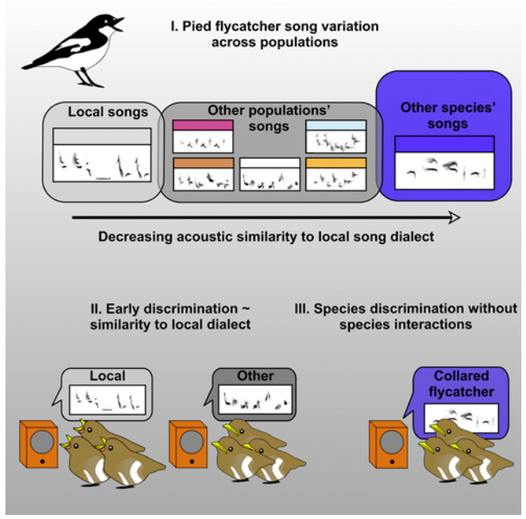
In any initial consideration of the interplay between birds and sound, your brain is likely to immediately land on birdsong. Catching a chirruped snippet is one of nature's best serotonin boosts – no matter if you'd struggle to distinguish a Chiffchaff from a Chaffinch, you'd be hard-pushed to not feel immediately buoyed by its sound.

Birds sing to communicate – it could be to defend their territory, to sound the alarm if their chicks or mates are in danger from a predator, or – in the case of the Dawn Chorus (usually peaking between March to May each year) – to pull out all the stops to attract a mate ahead of breeding season. The daybreak timing of this refrain is key, as research demonstrates that birdsong is carried 20 times further through the still, quiet air of the dawn.

Scientific research is also uncovering various specific adaptations within the sounds that individual species use to communicate with each other.

A studying Pied Flycatchers has found that species-specific song responses emerge as a by-product of young birds tuning into local dialects. By analysing the begging sounds that young nestlings make to communicate hunger to their parents, the research demonstrated that nestling begging was weaker in response to the songs of other populations of Pied Flycatchers and different species than to their own parents' songs. This distinction indicates that the young birds are well attuned to their own population's particular song dialect, an adaptation that prevents cross-species mating. For instance, Pied Flycatchers co-occur in Central Europe with Collared Flycatchers, with both species looking very similar to each other. The two species can sometimes crossbreed, with resulting hybrid birds being unable to reproduce. Therefore, the ability of flycatcher nestlings to discriminate between the two species' song dialects could play a part in maintaining species diversity.






Species-specific song responses emerge as a by-product of tuning to the local dialect – ScienceDirect

Oscine birds preferentially respond to certain sounds over others from an early age, which focuses subsequent learning onto sexually relevant songs.Songs vary both across species and, due to cultural evolution, among populations of the same species. As a result, early song responses are expected to be shaped by selection both to avoid the fitness costs of cross-species learning and to promote learning of population-typical songs. . . .

www.sciencedirect.com

Elsewhere, RSPB and other conservation organisations are exploring the potential of pre-recorded bird calls to support species which are facing population threats. Take Swifts, who uniquely rely on nesting sites in human-made structures and have been adversely affected by the loss of these nests through house renovations/building demolitions. The RSPB is encouraging people around the UK to install Swift nest boxes on their houses in order to turn a tide which has seen the species plummet by over 60% in the last 30 years. However, these birds can often need a little encouragement to discover and settle into a new, less familiar nesting site, which is where Swift call CDs and MP3s come in. Capturing the unmistakable screeching calls of nesting Swifts, these recordings can increase the likelihood of Swifts discovering new nests that they hopefully will subsequently return to every summer for many years to come.

For our native Barn Owls, precise detection of sound is integral to their nocturnal hunting techniques. A heart-shaped face collects sound much like the human ear, whilst the asymmetric placement of one ear higher on the head than the other allows them to pinpoint the location of prey even when completely undetectable to the eye. This highly evolved facility coupled with the near-silence of their flight gives them unrivalled stealth whilst hunting.

On the other side of the coin, however, conservation scientists both at RSPB and our wider international Bird Life (a global network of national conservation organisations) partners are exploring the potential of sounds emitted by wildlife to enhance techniques for monitoring species.





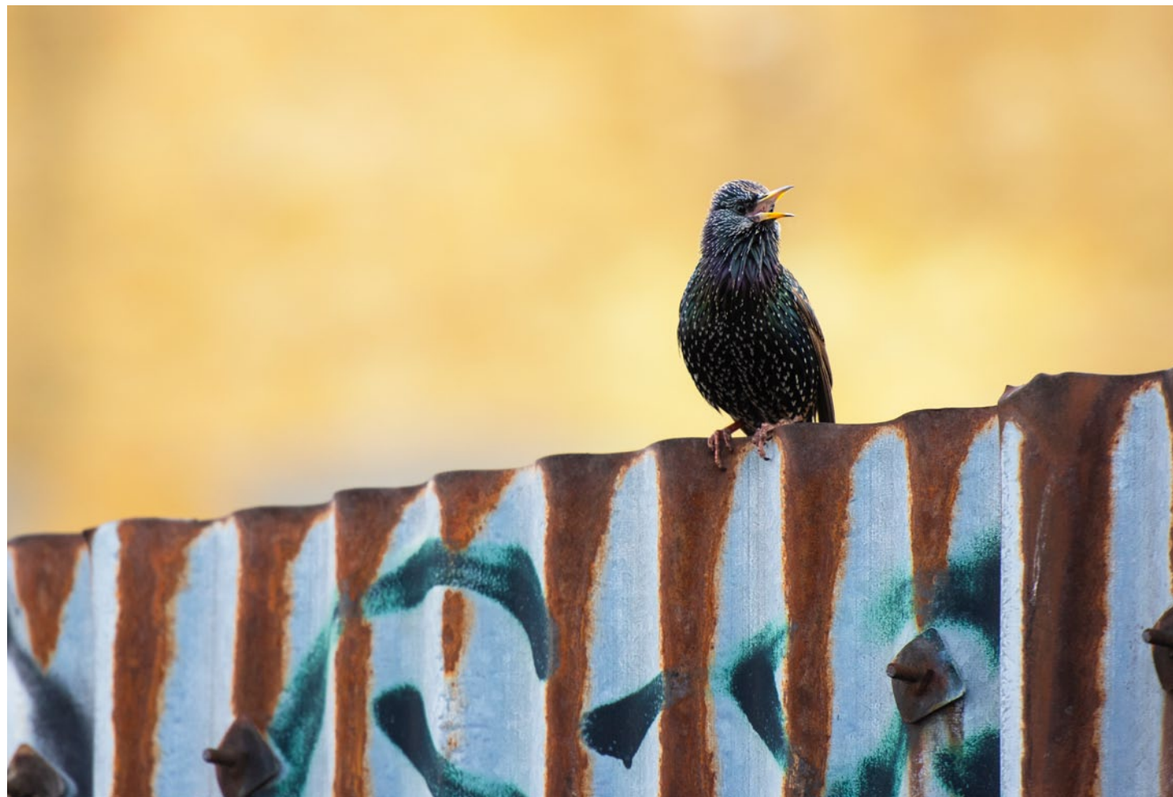
Passive Acoustic Monitoring (PAM) has already enabled our species monitoring teams to gather data for species which are particularly elusive or challenging to monitor visually. It can also assist monitoring over huge areas of land or in places which have restrictions on human access. This technology has proven integral to a big RSPB survey this spring on Willow Tits. This species, known for its shyness and preference for dense woody habitats, is hard to spot, so the birds were monitored in part using PAM to augment data gathered by sight. Besides this proven capability to monitor whole populations or communities which is integral to successful conservation work, PAM may also have the potential to track individuals, which could in future make it a replacement for current tagging procedures.

Finally – some thoughts on mimicry.

Besides their own distinguishing songs and calls, some of our most common and cherished bird species boast the ability to imitate a bewildering array of sounds, which span the natural world and far beyond.

With frequent reports of instances where species like Starlings and Blackbirds have produced renditions of phone ringtones or car alarms that are near indistinguishable from the real thing, our precious bird populations continue to remind us not just of the beauty of nature's sounds, but the vital necessity to consider how the natural and the human world can thrive alongside each other.

To find out more about the wonderful work and brilliant resources from the RSPB, Royal Society for the Protection of Birds, visit rspb.org.uk



# 10 Bio-Based Alternatives to Mineral Wool for Sound Insulation

*"Biophilic Design specifies good sound environments, there are no walls in nature which means the sound waves are allowed to expand, reducing pressure on our ears and reducing our cortisol level. Fast forward to today's modern offices, and we have to bring in artificial insulation to mimic the better acoustic environments we have in nature. But so many acoustic boards and solutions are harmful not just to our health but all to the environment. This article explores and highlights why we need sound insulation and highlights the bio-based alternatives every Biophilic Designer should know."*

**Marc Fuzellier-Hart** and **Simon Corbey**

**When you think "sound insulation," mineral wool probably springs to mind. It is everywhere – cheap, forgiving to install, and perfectly competent at silencing rooms.**

Yet those quarry-spun fibres come with baggage: high embodied carbon, scratchy handling, and (unless they are reclaimed or sent through one of the still-rare recycling streams) a one-way ticket to landfill once the building comes down.

Here is the good news: plant-, animal and recycled-based fibres can match mineral wool's acoustic properties, whilst having only a fraction of the carbon footprint and none of the itchiness.

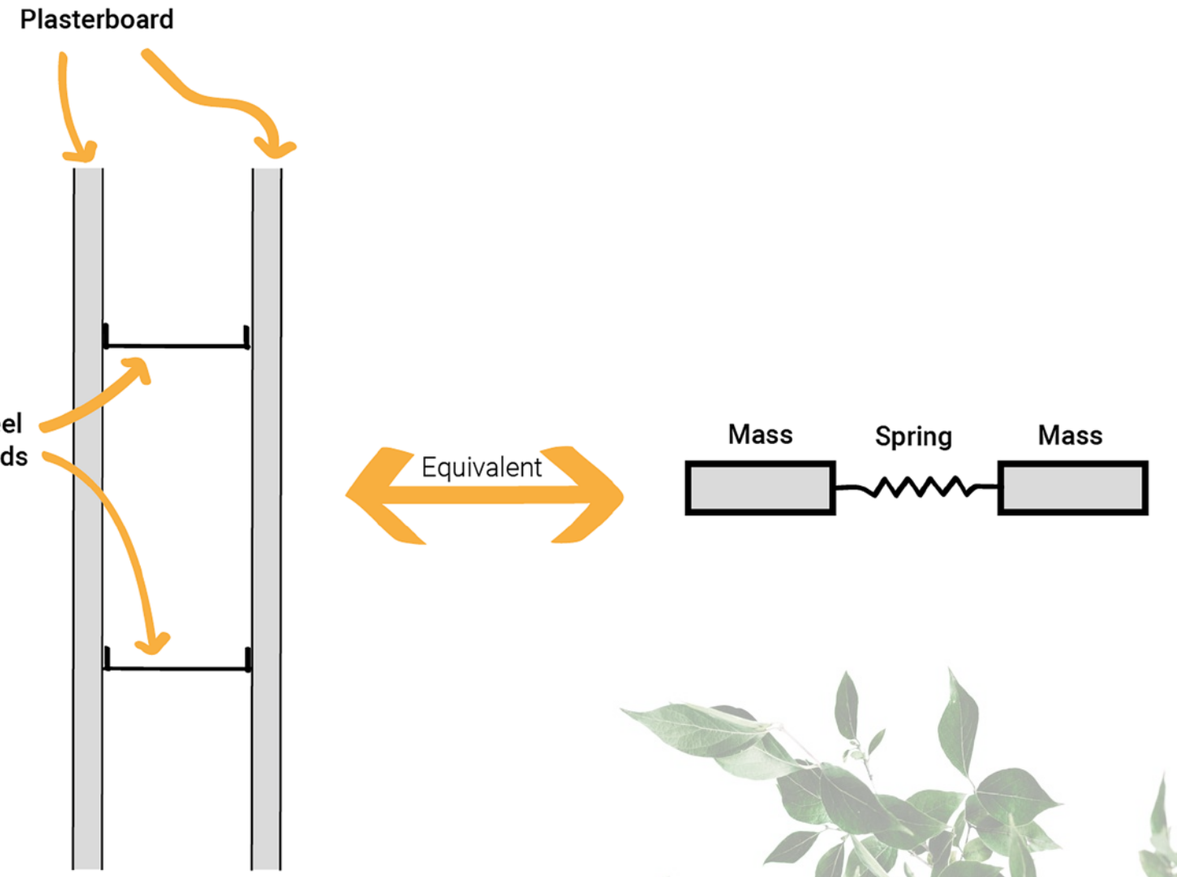
In this article, you will learn why most wall or floor cavities need a soft, fibrous or porous material in the first place, then discover 10 bio-based insulation fibres that could replace mineral wool (when the conditions are right for thickness, moisture control, and fire resistance).



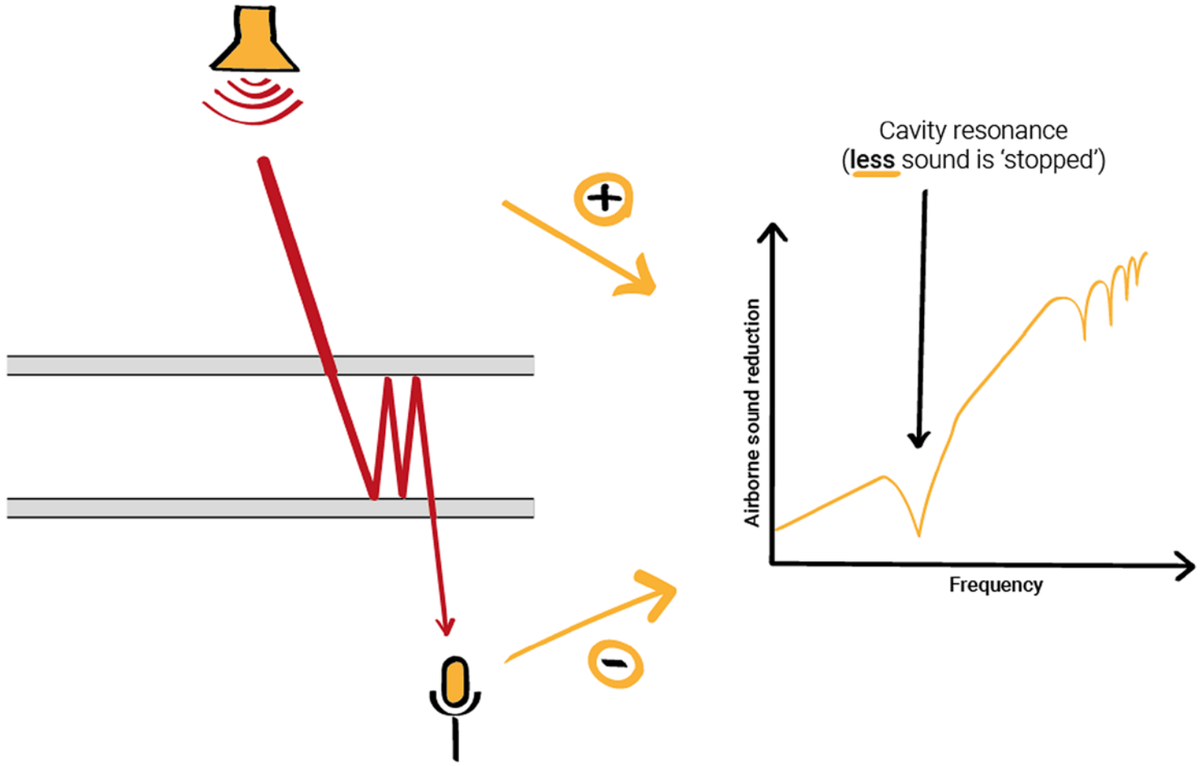
## Why do we need 'sound insulation'?

A stud wall or a sandwich panel behaves like a mass-spring-mass system.

The two boards (gypsum, timber, steel) are the masses. The air gap in between acts like a spring.



When sound enters the cavity inside a partition, it bounces back and forth between the layers. Those echoes grow strongest around a particular pitch (depending on the size of the cavity and the properties of the layers) – an effect engineers call cavity resonance, occurring at the resonance frequency.



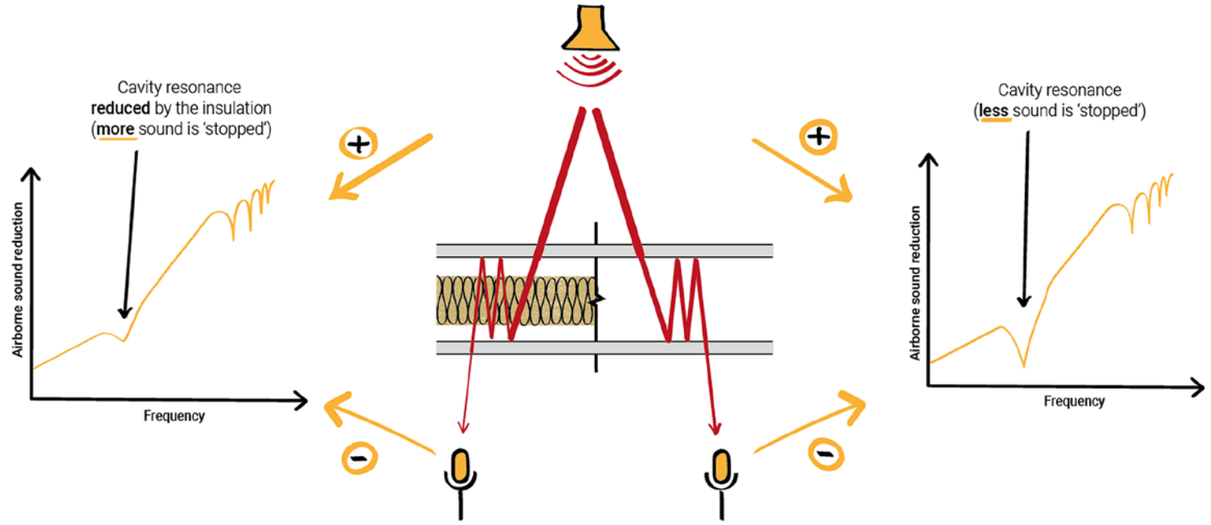

Engineers call this effect the cavity resonance. It usually happens around a very specific frequency, called the resonance frequency.





Push a fluffy, fibrous porous material into the gap and three things happen:

- Damping – Sound waves weave through millions of tiny passages and rub against the fibres. The rubbing turns vibration into a trace of heat, reducing the resonance effect.
- Tuning – For dense fibres, the extra mass lowers the natural frequency, moving it to a range where our ears are less sensitive and the mass of the wall mass blocks more energy.
- High-frequency absorption – Inside the cavity, flutter echoes vanish, reducing the chance for treble to leak through joints and sockets.




Soundproofing a cavity wall calls for more than just filling it, yet that added insulation still plays a part in raising its acoustic performance.

## What makes a good ‘sound insulation’ material?

Picture each fibre as a tiny brake pad.

As a sound wave pushes through, the air has to dodge and weave around those filaments.

The more twists and turns, the more energy dissipates as heat, and the quieter the wave becomes on the far side.

This is why the best acoustic infills share four key traits:

- Porous and fibrous – open cells or loose fibres give sound plenty of maze to run through.
- Light-to-mid density (20–50 kg /m$^3$) – heavy packs behave like solid mass and stop damping.
- Dry and stable – clumped, damp fibres lose their labyrinth and their hush.

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## 10 Bio-based alternatives to mineral wool, which are all available from the members of the ASBP Natural Fibre Group
https://asbp.org.uk/group/natural-fibre-insulation

1. **Hemp fibre**

Hemp grows taller than you in a single season and locks away carbon while it does.

Factories steam-explode the stalks, add a sliver of binder and press the fibres into springy batts.

At 50 mm thickness you can expect a sound absorption comparable to light mineral wool.

Treat the mats with borate salts and insects lose interest.

2. **Wood fibre**

Wood fibre insulation is the veteran of plant based soundproofing.

Supplied as airy, felt like wood wool batts around 50 kg/m$^3$ or as pressed, cocoa brown boards topping 280 kg/m$^3$, it also covers both damping (in floors and roofs) and mass.

Made from saw mill waste, widely stocked across Europe, it integrates naturally with timber frames and breathable façades, and suits retrofit projects seeking circularity.

3. **Sheep wool**

Sheep-wool batts bring farm to finished wall in the gentlest way.

At roughly 30–35 kg/m$^3$ they feel springy, friction-fit snugly between studs and absorb sound at a fairly broad range of frequencies.

Keratin fibres trade moisture with the air, buffering humidity without sagging.

Fire-safe borate salts deter moths and sparks, and installation is itch-free – cut with a long knife and enjoy the faint lanolin scent.



4. **Recycled denim**

Recycled denim batts give cast-off jeans a second life inside your walls.

Composed of roughly eighty-five percent post-consumer cotton, the mats sit around 50 kg/m$^3$, which is enough to absorb sound a large range of frequencies as well.

The fibres are long and soft, so you avoid the itching that comes with glass or rock.

They cut best with a bread knife and cost a little more than commodity wool, but many installers call them a joy to handle.

5. **Bamboo fibre**

Fast-growing bamboo culms are soda-pulped, air-laid and needle-punched into springy felts of about 40–45 kg/m$^3$.

The long, hollow fibres scatter sound as effectively as mineral wool of equal thickness, while their natural silica lends a modest fire edge.

Mats cut cleanly with shears, give off no itch and carry a short carbon pay-back.

6. **Expanded cork**

Steam pops cork granules like popcorn; their own suberin resin then glues them into dark, friable blocks. Densities hover around 100 kg/m$^3$.

Expanded cork is prized for quieting footfall in floors, yet – when the conditions are right for thickness, moisture control, and fire rating – it can also perform well as a wall-cavity infill.

7. **Cellulose loose-fill or dense pack**

Old newspapers grind into fluffy cellulose, treated with borate for flame and insect resistance.

It is usually blown into walls at 45–60 kg/m$^3$.

Because fibres knit together, settling risk is minimal if installers hit target density.

Cellulose is vapour-open yet moisture-sensitive: you must keep bulk water out with rainscreen gaps and smart membranes.



8. **Coconut (coir) fibre**

Coir comes from husks discarded by the coconut industry.

After washing and needle-punching, the fibres form mats roughly 50 kg/m$^3$ – stiff enough to self-support yet open enough to breathe.

Their curved, lignin-rich strands deliver some good sound absorption and shrug off tropical humidity.

Fire performance depends on borate impregnation, and the high salt content demands stainless or coated fixings to prevent corrosion in marine climates.

9. **Mycelium panels**

Fungal mycelium colonises chopped straw or hemp, weaving a lightweight 70–80 kg/m$^3$ composite that bakes hard when cured.

The porous, chitinous network absorb a broad range of frequencies and early acoustic tests show performances rivalling polyurethane foams of equal thickness.

10. **Flax/linen fibre**

Short flax tow – the off-cut from linen yarn – blends with a bio-binder and presses into batts around 40 kg/m$^3$.

The straw-like fibres form a springy maze that absorb sound, while their natural waxes keep moisture at bay.

Harvested across Northern Europe, flax carries very low VOCs and a short transport chain.

Fire performance still relies on borate salts, but installers appreciate the itch-free, clean-cut finish.

Marc Fuzellier- Hart is an Acoustic Consultant and Simon Corbey is CEO for the Alliance for Sustainable Building Products.

www.ateliercrescendo.ac

https://asbp.org.uk

Check out the podcast I did with Simon on the podcast page of the Journal of Biophilic Design, or Spotify, Audible, iTunes or wherever you get your podcasts from, search "Journal of Biophilic Design" and scroll to the one with Simon Corbey. "Building Hope with Sustainable and Biophilic Construction" https://journalofbiophilicdesign.com/podcast-journal-of-biophilic-design/building-hope-with-sustainable-construction

# WELLBEING

# Soundscapes of Memory

*"Sound can transport us across time, stirring powerful memories and reconnecting us with forgotten parts of ourselves – but for people living with PTSD and complex trauma, it can also trigger hypervigilance and distress. Thoughtful, biophilic design and carefully chosen natural sounds can help soothe the nervous system, offering moments of calm and agency in spaces shaped to support mental health and healing."*

**Chintamani Bird**

**It's 2025, and I am eagerly awaiting her entrance on stage. I'm with two newly found friends, and I feel a renewed sense of freedom. No more shrinking back or making excuses – just pure, unadulterated acceptance that lifts my spirits. I recall a time in my life filled with pivotal moments.**

The lights dim, the music begins to play, and there she is. Her wildly coloured hair and distinctive voice. I become transfixed and the wide-eyed girl in me feels the freedom of her youth. This woman, in her seventies, is still someone I find incredibly inspiring and incomparable. She is the artist behind many of the songs that carried me through my youth.

I wait for that particular song – the one that breathes truth into my spirit and brings back memories of when I was sixteen. It was a time in life when we were all just trying to find ourselves. My hand rests on my heart, tears welling in my eyes as the 55-year-old me listens to that song that has meant everything to me. It feels like I am a time traveller, simultaneously experiencing the essence of my 16-year-old self and the 55-year-old I am today. It's as if I was traversing multiple dimensions as I stand in that stadium. The joy and memories welled up inside of me. There have been countless moments when a song has allowed me to become that time traveller again traversing time and space.



**Sound memories are so powerful**

Have you ever had a sound or song that brought back memories of time long forgotten? The crackle of the fire, the rustling in the bush (maybe it's a snake) or a song that vibrates through your cells and makes you either cry or celebrate and compels you to get down on that dance floor or in the lounge because you just need to move, shake and boogie. Or maybe there are memories of thunder and lightning, and you remember that all might crack of lightning that struck the street light a few metres in front of you while waiting for the traffic lights to change.

Some sounds enliven us; some sounds bring back memories of a long time ago, and some are like sonic booms that make us wide-eyed and slightly frightened or downright terrified.

Sound is created by vibration and energy waves, and we can perceive approximately 340,000 tones. Sounds can directly affect your hippocampus, which is directly connected to memory.

New research has found that when music is played for individuals with Alzheimer's disease who have severe mobility and memory issues, become mobile and move around for a brief time, recalling who they are and conversing with family members. However, it's not just any music; it's the music that moves you to tears or to boogie, so it's determined by the individual's life and lifestyle. I'm sure that The Beatles and Simon and Garfunkel are equally mesmerising as Beethoven and Dolly Parton. Still, it would not bring me to the edge of sweet surrender that Cyndi Lauper's 'True Colours' or 'Walking on Sunshine' by Katrina and the Waves giving my spirit a giddy up and spin. Recognising that life has many transformative moments and linking these memories allows us to traverse multidimensional spaces and become time travellers; it is a glorious opportunity that can be experienced through the sense of sound.

It's a lovely thought that sound can make this happen, but with every light-filled moment, there is an equal dimension that shrieks in from the dark.

That clap of thunder and lightning and the rustle in the bushes, or maybe it's the shrill of my mother's voice when she is angry, that says hide because there is danger.

All a child knows of the world is the family unit. Still, what happens if that child is emotionally deprived of warmth and affection, and the primary caregiver revels in the fear and pain of the young and innocent? The significant and psychological harm of living in an uncertain and volatile environment becomes the cornerstone of a lifelong battle of anxiety and mental health, which is undeniable.

How does one comprehend the impact of sound on people with trauma and mental health? Is acoustic panelling enough?





What happens when life has given us more than our fair share of not-so-nostalgic moments and anxiety stampedes through our lives and derails any sense of calm or normality. How do I relate to sound with Complex Post Traumatic Stress Disorder? What has happened to my brain? What happens when, as a child, teenager, and adult, has trauma. Your brain rewires itself to be hyper-vigilant for your very survival? This adds a complex dimension to solving the problem of designing for trauma, mental health and other forms of hypersensitivities to sound.

How does that child grow and survive? How does an individual's brain with mental health or trauma like PTSD or, like me, with Complex Post Traumatic Stress Disorder (CPTSD) function?

The brain rewires itself. My brain is not and has never been 'normal' due to the events in my life. My brain has adapted to recognise micro-facial expressions and is constantly scanning, listening, and watching. Imagine living on a razor's edge that never stops.

So, how does biophilic design support such extensive mental health issues?

In a brain that has experienced extensive and lifelong trauma, the auditory nerve alters its processing of sound, thereby enhancing its ability to evaluate the predictability of survival in a given space. It is always prepared, in conjunction with the autonomic nervous system, to be engaged, ready to respond with fight, flight, freeze, or fawn.

The auditory nerve function changes and an individual's propensity to sound could become hypersensitive to any vibration. This can cause an individual to become acutely aware of any change in inflection or tone in someone's voice, or seemingly mundane noises like the hum of a hard drive or bathroom fan can be perceived as loud or disturbing, disrupting an overall sense of wellbeing and potentially causing agitation.

An exaggerated reaction to sound also occurs due to the nature of the hyperarousal and startle response because the amygdala, which processes emotions and memories, is hyperactive in individuals with PTSD, mental health or trauma.

Living with trauma doesn't always mean that an individual will know what their needs are. The chronic stress caused by trauma and mental health issues significantly reduces the function of the prefrontal cortex, the part of the brain responsible for problem-solving.

How can biophilic design be effectively implemented to support individuals with Complex Post Traumatic Stress Disorder? What specific sounds are most beneficial for those recovering from trauma? In what ways can we better understand the long-term effects of sound on mental health and wellbeing?

I believe that with thoughtful biophilic design choices, we can positively impact those living with trauma and mental health challenges.

It's more about what sounds are added to a space and how they are placed in it. I have heard that prospect and refuge are commonly used in conjunction with acoustic panelling. Still, we can stretch this further by weaving spaces in and through, allowing for nooks while maintaining clear pathways for a quick and easy exit with wayfinding.

Adjusting the height of chairs and seating and ensuring the use of soft materials to help with acoustic sensitivities. Allow for focal points that are a source of sounds, such as water features, birdsong, or meditation baths, at a low vibrational level, all the while allowing an individual to withdraw if necessary. It is important to understand that each individual has different forms of coping mechanisms which can oscillate between hyperarousal and hypo arousal, imagine switching between being a volcano and an iceberg.






The soft door closing is an important aspect, remembering that seeing the danger before I hear it allows for me to respond appropriately. I need to know that I can move and escape quickly with clear wayfinding. I need to see the pattern changes in the flooring, which divides the space with carpet that resembles grass, stone and timber. Avoid timber panelling with strong right angles. Create large windows that allow light and shadow, helping to establish a sense with the patina of time for effective circadian rhythm regulation.

Designing for trauma and those hypersensitive to sound doesn't always mean that we need it to be quiet. What we need to recognise is that some people are trying to find the quiet part of themselves on the inside. They need the noises in their head to reduce and soften.

When you are designing with sound here is my final note: I don't need to be alone and shut away; I just want to find peace.

www.studiochintamani.com

# What noise annoys?

*Patient perspective of sound and noise*

**Andrea Harman**

**What does the word "Sound" mean to you?**

For many of us it is what we can hear. It is useful for communication and language, awareness of danger, change and events. It is usually in context with other factors and sound often enhances our experiences (Try watching a film without the soundtrack to quickly notice the effect sound has).

But what about the word "Noise"?

Often this has more negative connotations and is used to refer to unwanted or disruptive sound. Those that interfere and affect our experience or appreciation of something. Ones that are random and interrupt our concentration or ones that are loud or harsh and physically affect us.

When we have control of our sound environment, we often choose not to have noise; we move away from the nosy table of guests in a restaurant, turn off an alarm or change a music channel. With this control we tend to be happier about what we hear.

But what about for patients in hospitals?

For patients sound and noise is a 24-hour constant and whilst we like to think of patients having a therapeutic, calm, restful environment to help enable sleep and recovery the reality is often different. Patients don't have control, they cannot usually more away or stop the noise that annoys.

As hospital monitoring and treatment has become more medicalised and machine driven, and procedure and culture has changed hospitals have become more noisy and this is known to have an effect on patient sleep, medication, recovery, interactions and perception of their hospital stay.

A recent study on a multi-bed ward in a London hospital has looked to monitor sound levels to see how noisy the spaces are and whether this can be changed, but also to find out which noises annoy patients the most.

They have found that patients over the age of 75 living with presbycusis (age related hearing loss) were more likely to report disrupted sleep from noise and more likely to have negative feelings towards the sound environment.

Throughout different stages of the study many sounds were reported to affect people including equipment beeps, phones ringing, clattering trolleys, squeaky wheels, beds, footsteps, snoring, coughing, and doors.

Other people's speech was reported as most annoying. This reflects other research our brains are tuned towards processing speech in a language we understand and so often find it intrusive and can have difficulty switching off from this to concentrate on something else or to relax and sleep.



Sounds of people in pain or distress was also being commonly reported as impactful. This is reflected in our capacity for empathy where we share the feelings of others or contagion where similar emotions can spread throughout a space. This may also be linked to memories and previous experiences

Not all sound responses are negative and positive feelings around sounds were reported across patients of all ages and with and without hearing loss. Key here is friendly interactions, including laughter, conversations with other patients, reassurance from staff, family visits (although for those without family visiting time could engender feelings of loss) and the all-important food trolley.

Many people found music helpful; however, some did not want the noise level added to, and so headphones were felt to be a viable solution. Headphones also enabled the use of apps for meditation which was felt to help. Headphones would also help with personalisation and give an element of control; whilst we often find music calming and restful and it has been shown to aid memory what suits one person often does not suit another or someone may want a drama or spoken book. Headphones also enable someone to listen to what they want when they want, so not being as set to hospital routines.

Asked about change people reported many things that could have a positive impact physical including headphones, earplugs ad repairing faulty equipment, behavioural with a request for staff being able to exert more influence over people to adapt behaviour, stricter visiting times and staff adapted behaviour, but also design aspects such as reducing the noises from equipment and the size of bays.

Whilst these are early stage results it is interesting to note that what is shown here reflects previous research and whilst the drive towards single bedrooms should positively affect many of the findings, consideration should be given to how the positive impacts of shared conversation and laughter are maintained in a single bedroom environment.

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# THE LOST ART OF LISTENING

**Corinne Courtney**

**Somewhere along the way, we stopped listening . . . Not entirely – but deeply, meaningfully, with presence.**

We live in a world built to capture attention, but rarely does it encourage us to attend. Every alert, every stream, every hum in the background chips away at our attention span. We've adapted by filtering, tuning out as a form of survival. But in tuning out, what else are we losing?

This shift is subtle but seismic. Sound and noise have become one.

Listening is one of our most primal senses and it relies on tuning in. That is how we are wired. Before there were written words, there was sound. Through sound, we learned to read the world. Tone before text. Silence before speech. We attuned to breath, to the crunch of footsteps, to the shift in wind patterns. Sound warned us, like the breaking of twigs in a dense forest as much as it comforted us to the sweep of birdsong along that same dense forest. It was never optional. It was how we survived.

Now? We mistake hearing for listening as we are constantly editing. Hearing and listening are not the same.

From the buzz of an alarm clock to the blare of traffic, our soundscape has shifted. It's grown louder and more fragmented. And true listening – active, embodied listening – requires more than just ears. It demands attention. Intention. A willingness to experience.

In a noisy world, the signal gets buried. And with it, so do our connections.

There's a cognitive toll to this constant filtering. Open-plan offices. Algorithm-driven playlists. The nonstop drip of notifications. We're exposed to more sound than ever but often stripped of context or care. The result? Auditory fatigue. Subtle, numbing. We start filtering out not just the noise, but the nuance. Not just distraction – but connection.






And this isn't just about sound. It's about relationships. Memory. Thought. Identity. Emotion. Mood. Listening shapes how we understand the world and our place in it. It's how we connect. How we trust. How we understand who we are.

Language surrounds us – talking to us . . . at us – but it all comes down to how we listen.

And still, silence grows rarer. Real presence, even rarer. Even natural sounds – once just part of our everyday world – are now downloaded, looped, sold back to us in the name of "wellness."

This estrangement from authentic sound reflects something deeper: a broader disconnection. From one another. From our environment. From life's rhythms. As we filter

out, we flatten. Texture fades. Complexity dulls. Yet sound waits. Always.

The rustle of leaves. The low murmur of nearby voices. Footsteps fading down the hallway. These are invitations. To come back and be together. It's together that our most human sounds are heard . . . laughter and tears, it's time to tune back into it.

What if we let ourselves listen again – not just to sound but to each other?

https://www.biofiliate.com

# BIOPHILIC CITIES

# Coming Back Home

## *Reclaiming Awe and Connection Through Nature in the Digital Age*

**Alexandra Bowen**

**In an era dominated by screens and constant digital stimulation, our innate connection to nature is fading, along with the profound sense of awe it can evoke. The feeling of awe – a deep, transcendent wonder that makes us feel small yet connected to something greater – is increasingly hard to come by. We move through life at an accelerated pace, distant from nature and natural processes, distracted by notifications, our devices burning in our pockets, compelling us to capture moments rather than fully experience them. I know I am not the only one who immediately thinks about taking out their phone to capture a beautiful moment instead of sitting in the experience.**

As a new mother, I find myself thinking deeply about the world my daughter will grow up in. Unlike my own childhood in Hawaii, where my days were spent immersed in nature rather than glued to a screen, today's children are growing up in a world where even their outdoor experiences are mediated by smartphones. I want something different for my daughter. I want her to feel the earth beneath her feet, to be captivated by the play of sunlight on water, to wonder what kind of bird made that chirping noise, to experience the quiet yet profound connection to life that only nature can offer. This desire – to recapture the spirit and connection of nature that shaped my own childhood – is what led me to biophilic design, a field dedicated to integrating natural elements into the built environment to restore our relationship with the natural world.

I've always been drawn to nature, but over the years, I realised that I wasn't truly *seeing* it. My walks outside had become just another moment to multitask – listening to a podcast, checking my phone, filling every quiet space with digital noise. One day, I made a deliberate choice to change that. I put my phone on silent, removed my AirPods, and took a slow walk through a park, focusing only on what was around me. It was early spring, and the buds were starting to bloom. For the first time in years, I allowed myself to sit on a bench and just watch – watch the petals drifting in the breeze, the way the sunlight flickered through the trees, the effortless rhythm of life moving around me. It was a moment of pure presence, and it felt like waking up.

That experience left me wanting more. I began making a habit of these "awe walks," each time discovering something new. A few weeks later, I found myself standing by a small lake near my house. The sunlight danced on the surface, scattering reflections like tiny, shimmering stars. It was nothing extraordinary – just a simple, everyday moment – but it felt deeply moving in a way I hadn't experienced in a long time. I almost reflexively reached for my phone to frame the perfect shot and then I shuddered thinking how easily I could have lost and not experienced this moment, and how many of these moments I lose in a day.

I've caught myself doing this countless times. Standing on a trail, overlooking a breathtaking view, my first thought isn't always to *take it in* – it's to take a photo. And while there's nothing wrong with capturing memories, I've noticed that the more I focus on documenting the experience, the less I actually *experience* it. These moments reminded me of my childhood in Hawaii, where nature wasn't something I had to *seek out* – it was simply part of my world. I spent my days outside, exploring tide pools, listening to the ocean waves, smelling the waft of plumerias in the wind. There was no urge to capture these moments; they were simply *lived*. As an adult, I had unknowingly lost that connection. Moving to the "mainland" and being surrounded by impermeable surfaces in cities where nature was manicured and bare didn't help either.

Technology isn't inherently bad – it can inspire and inform – but it cannot replace direct experience. True awe lingers. It rewires us. It invites us to step beyond ourselves and into something greater. For many, these kinds of awe-inspiring experiences in nature are rare because our environments are increasingly designed without nature in mind. Most of us live in cities dominated by concrete, glass, and steel, where access to green spaces is limited. We have designed the natural world out of our daily lives, making it harder to experience the quiet moments of connection that nourish us.

This is where biophilic design becomes essential. It is not just about aesthetics – it is about survival, about mental and emotional well-being, about restoring something we have lost. By integrating elements of nature into our cities, workplaces, schools, and homes, we create more opportunities for awe, wonder, and connection.

Consider the impact of a well-designed urban park, a rooftop garden, or a tree-lined street. Studies have shown that exposure to natural elements – plants, water features, natural light – can reduce stress, increase creativity, and improve focus. Hospitals with views of greenery see faster patient recovery rates. Schools with outdoor learning spaces improve student engagement. Even small integrations, like vertical gardens on building facades or indoor water features, can transform sterile environments into places that invite calm and curiosity.

Frederick Law Olmsted, the visionary behind Central Park, understood this deeply. He designed the park to mimic natural landscapes – open fields, wooded groves, reflective lakes – because he knew that urban dwellers needed more than just access to green spaces; they needed spaces that evoked something deeper, that invited contemplation, connection, and awe.





The beauty of biophilic design is that it acknowledges our biological need for nature. E.O. Wilson's *Biophilia Hypothesis* suggests that humans have an innate desire to connect with other living things. This explains why we feel drawn to forests, oceans, and even simple houseplants. Our ancestors thrived in environments with trees, water, and open spaces; these landscapes are wired into us. When we bring elements of these landscapes into our urban environments, we are not just improving design – we are restoring balance to our lives.

If we want awe and natural beauty to play a larger role in our lives, we must make deliberate efforts to create space for it. As I raise my daughter, I am reminded that children do not naturally resist nature – they are drawn to it. But if we do not give them the opportunity to engage with it fully, they may never experience its full power. We need to ensure that nature is not something we visit occasionally but something we live with daily. Whether it's advocating for more urban green spaces, bringing our children to parks without their phones, or simply setting aside time to be in nature without distraction, we must reclaim the connection. Awe is not lost.

Alexandra is founder of the Biophilic Design Community

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# Natural England promotes outdoor healthcare in Sussex

*Novel partnership takes treatment into green spaces, with a level 3 qualification available*

**Less than half the population say they've been to the countryside or a local park recently**[i]

**But the NHS is turning to places like that to help with certain treatments.**

Natural England is funding courses aimed at nurses, therapists and other healthcare professionals from across Sussex to make more use of outdoor settings in treating those with poor mental health.

The training builds on evidence being outside can help lead to lower blood pressure and a reduced risk of heart attacks and strokes[ii].

Course-goers learn a variety of skills, from being able to adapt treatments to new surroundings to using their experience and training from many years inside, outside.

By the end of the sessions, which are spread over 5 months, those attending should have the confidence and competence to work with groups in a range of outdoor settings.

The course, which carries a formal training accreditation, is suited to professionals who support children, young people and adults, including, from psychiatrists and psychologists to social and youth workers, therapists and those working in family support.

Healthcare staff have reported feeling more relaxed when outside, when not necessarily working, as well as refreshed and re-energised. It's hoped these benefits can transfer themselves to the care they give patients.

The training is delivered by Circle of Life Rediscovery, a community interest company based in Laughton, near Lewes. Through the workshops, the partnership between Natural England and CLR is already highlighting the need to use green spaces where we live and work to improve health and wellbeing.

According to Sarah Davies, Natural England's principal adviser for partnerships in Sussex and Kent "the importance of open spaces cannot be underestimated. Nature can relax us, educate us, and help reduce anxiety and depression. We know there are countless benefits to connecting with nature – it makes us feel better, physically and mentally."

Some 36 NHS staff in Sussex have done the course since 2023. It offers an ITC level 3 qualification, providing students with the necessary skills to work with individuals and groups of all ages. A senior nurse from Sussex who took part in the training said: "My experience doing this course has really transformed my thinking regarding nature-based practice. I have managed to apply parts of what I learnt within my work environment and have full backing from colleagues regarding trying to utilise what I learnt. I never realised the true impact outdoors can have on an individual and team level and hope to see it being prescribed in the future as a treatment for certain health problems."

"To be able to sustainably bring the benefits of nature-based practice into the NHS and provide access to nature for physical and mental health, training NHS staff is a sensible way forward for teams and their service-users," said Marina Robb, director and founder of Circle of Life Rediscovery.

This year's sessions are underway, with bookings open for the 2026 courses, taking place at Laughton from late June: https://circleoflifediscovery.com/certificate-in-nature-based-practice

This nature-based training for NHS staff coincides with a wide-ranging survey into how exposure to natural spaces positively affects people's health, behaviour and attitude to the environment over an extended period of time.

The three-year study will involve a sample of approximately 18,000 adults across the country, in a partnership between Natural England, the University of Exeter and the Natural Environment Research Council, and developed by organisations from a range of sectors.

Natural England are the government's adviser for the natural environment in England. "We help to protect and restore our natural world."

[i] The People and Nature Survey for England 2024: https://www.gov.uk/government/statistics/the-people-and-nature-surveys-for-england-adults-data-y5q3-october-2024-december-2024

[ii] Blog by Dr Sue Williams, Natural Resources Wales: Mending minds – the benefits of a 'dose of nature' for mental health

# Rewilding Our Ears

*How Biophilic Design can transform urban acoustics and mental health*

**Dr Vanessa Champion**

**Walk through almost any city today and you're surrounded by an invisible architecture of sound: engines, sirens, HVAC systems, and the low mechanical hum of urban life. These sounds don't just shape our days – they shape our health. Chronic exposure to noise pollution is linked to elevated stress hormones, cardiovascular disease, impaired cognitive function, and even shortened lifespans. But imagine instead walking through a city cooled by shade, softened by birdsong, the gentle rustle of leaves, and the burble of water. This isn't utopian fantasy: it's a design strategy grounded in biophilia.**

**Biophilic design** – the practice of connecting people to nature through architecture and planning – offers tools to rebalance urban soundscapes, encouraging biodiversity and water features that bring calming natural sounds to city life. And, crucially, these same strategies help mitigate heat, enhance resilience, and nurture mental wellbeing.

## The case for natural soundscapes

Why does sound matter so much? Beyond irritation, noise pollution is a silent public health risk. The World Health Organization estimates that long-term exposure to environmental noise contributes to thousands of premature deaths annually in Europe alone. In contrast, natural sounds – birds, flowing water, wind in trees – activate the parasympathetic nervous system, slowing heart rate and lowering blood pressure. They support what psychologists Rachel and Stephen Kaplan call "soft fascination," gently holding attention while allowing the mind to recover from directed, task-focused effort.

Even small shifts matter. Research shows that natural soundscapes embedded into urban parks significantly reduce perceived stress. It's not only what we see, but what we hear, that determines whether a space feels restorative.

## Designing for biodiversity: more than aesthetics

Cities often approach green space as decoration, but biodiversity is what makes these spaces acoustically rich and emotionally engaging. Birds, pollinators, amphibians – all contribute layers of sound that shift through the seasons and times of day, offering variety and delight.



Encouraging these voices means thinking in layers. Instead of flat lawns, designing parks and streetscapes with tree canopies, shrubs, tall grasses, and groundcover creates richer habitat diversity and softens noise through natural acoustic absorption. Choosing native species and pollinator-friendly planting ensures local birds and insects find the food and shelter they need, while also ensuring the sounds residents hear feel familiar and seasonally dynamic.

Green roofs and living walls can bring these natural sounds closer to where people live and work, transforming rooftops, courtyards, and façades into living, humming ecosystems. Even small-scale interventions like rain gardens, pocket parks, and planted laneways help stitch fragmented habitats together, adding surprise moments of birdsong and insect buzz to the urban fabric.

Beyond their acoustic benefits, these biodiverse spaces sequester carbon, filter air, and create daily, casual contact with nature – one of the strongest predictors of urban wellbeing.

**The power of water: blue spaces for cooling and calm**

Water features in cities can feel like aesthetic flourishes, but they deliver measurable benefits for both climate and mind. The sound of moving water helps mask urban noise through what designers call “acoustic masking,” gently blurring harsh sounds like traffic and construction so they fade into the background. This makes plazas, courtyards, and walking routes feel calmer and more welcoming, even in the heart of the city.



*“Chronic noise is a silent public health risk linked to stress, cardiovascular disease, and even shortened lifespans.”*

Biophilic water features can take many forms. Rain-fed rills and seasonal cascades use harvested stormwater, turning rainfall into both spectacle and sound. Reflecting pools and ponds create slower, meditative soundscapes while cooling the surrounding air through evaporation. Constructed wetlands and bioswales manage stormwater while bringing the croak of frogs, the rustle of reeds, and the hum of insects back into the urban mix. Even interactive fountains designed for children add layers of playful sound that invite social connection.

These blue spaces are more than pleasant – they act as urban coolers, reducing temperatures in hot months, and as gathering places that naturally draw people together.

**Acoustic design meets biophilia**

While bringing more nature into cities transforms soundscapes, the materials and forms we use matter too. Hard, reflective surfaces – like glass and concrete – bounce and amplify noise, while softer, porous materials help absorb and diffuse it.

*"Layered planting, native biodiversity, and water features are more than aesthetic, they are tools to heal the urban mind."*

Designers are finding creative ways to blend form and function. Vegetated berms and planted earth mounds can shield parks from busy roads, creating sheltered pockets of quiet. Wooden façades, trellises, and porous paving surfaces reduce reflected sound energy, softening the edges of the built environment. Vertical gardens do more than look beautiful – they absorb and scatter mid-to-high frequency noise, adding both visual and acoustic texture. Even water walls can be designed to reflect and direct pleasant water sounds into busy courtyards, masking traffic noise with something far more soothing. These design strategies work together to create "quiet zones" within dense urban areas – places where people can pause, breathe, and feel briefly removed from the city's relentless energy.

## Cooling, calming, and connecting

Biophilic acoustics aren't isolated gestures – they're part of an interconnected urban ecosystem. Trees and plants shade streets and squares, lowering ground temperatures and filtering air. Water features cool the air, manage stormwater, and enrich soundscapes. Biodiverse habitats attract wildlife, whose calls add variety, rhythm, and calm to daily life. Together, these elements help cities adapt to rising temperatures, ease the health impacts of noise and heat, and make urban spaces more inviting.

Beyond individual wellbeing, these spaces also build community. When places feel cooler, quieter, and more comfortable, people stay longer: talking, playing, resting. Social bonds grow, and neighbourhoods feel safer and more alive.

## From vision to reality

To bring these ideas to life, cities can begin by carrying out soundscape assessments alongside biodiversity and air quality studies. Urban planners can prioritise native, layered planting in every new development, from public parks to private courtyards. Water features can be designed to use recycled or harvested rainwater, ensuring sustainability alongside sensory pleasure. Protecting and restoring natural wetlands brings back entire ecosystems, cooling and calming entire districts. And in the heart of dense urban areas, creating "quiet routes" and sheltered courtyards gives everyone access to moments of respite.

Residents too have a part to play, from supporting community gardens and local planting projects to advocating for city policies that value health, ecology, and the sensory quality of daily life – not just efficiency and growth.




*"By rewilding our ears, we soften the city – and soothe the human spirit."*

## Listening forward

Cities of the future won't be defined only by their skylines, but by what we choose to hear within them. By designing with soundscapes in mind – bringing birdsong, rustling leaves, and the sound of water back to daily life – we can transform cities from places of noise and stress into places of restoration and wonder. In doing so, we don't just quieten the city: we make it truly alive.

## Further reading

*Biophilic Cities* – Timothy Beatley

*The Soundscape: Our Sonic Environment and the Tuning of the World* – R. Murray Schafer

*Blue Urbanism* – Timothy Beatley

*Nature by Design* – Stephen R. Kellert

*The Experience of Nature* – Rachel Kaplan & Stephen Kaplan

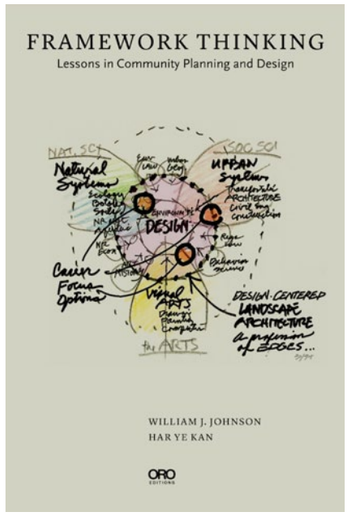
*Designing with Nature* – Ken Yeang

*Wild Urban Plants* – Peter Del Tredici

# Bookshelf

*Books sitting on my bookshelf and finding themselves in my hands this month*

Reviewed by our editor,
Dr Vanessa Champion




**Framework Thinking – Lessons in Community Planning and Design.**

William J. Johnson and Har Ye Kan, ORO Editions 2025

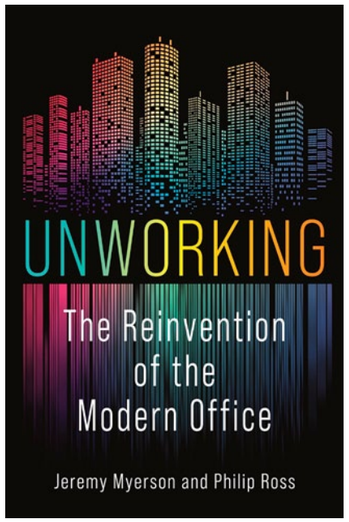
Long term visionary thinking is often a luxury when faced with more immediate challenges or asks. This is as much true for a straightforward house build as it is for localised urban planning. But as we are aiming to highlight in the journal, longer term thinking can have such a profound benefit, not just for the sustainability of the community you are designing for but also the environment, economy and all life and living systems.

For me the application of the biophilia hypothesis to every decision we make is vital. Will my actions support life and living systems (biophilia effect)? Yes, then do it. Versus will it destroy or harm life or living systems? Then don't do it. While in effect it is such a simple methodology weaving this into existing contexts of commercial and societal planning, as well as stakeholder briefs and ambitions, is a challenge. We need to make better action easier to understand and implement for all parties.

It was with this mindset that I was keen to review this book, which not only deals with framework thinking and the shaping of communities, but also has the wider context of landscape architecture. The book explains and builds on the work of landscape architect Bill Johnson, who was also awarded the highest accolade from the American Society of Landscape Architects, their medal. The book, like Bill's work, advocates debate and to think and act holistically. It encourages us to get involved early in the game and to think and plan long term, and importantly helps us devise a roadmap to do so.

The text can be used as a handbook to a project. It helps guide us through the steps we need to ensure every turn of the process, from start to finish, is with reference to the larger picture, creatively blending long-terms views with short-term concerns. The authors look at "Visioning as a process" along with a handy infographic visual on page 59, they reflect on how it is essential to know the "playing field" – the learning and working context of how landscape architecture relates to allied fields and professions, and they also look at workplace, understandings, process, discovery, and resolution. Each step is graphically presented by one of Bill's hand drawn sequences which further help translate the concepts visually.

Essentially, and I think this is my main take away, we need to be using guidance such as this book provides, to help us make every decision in the context of the bigger picture, the long term plan, the ultimate goal. It can only be in this way that we will make the changes we need for society, health and ultimately our planet. I recommend you get a copy to help you draft a framework for your own projects to help design for better futures.




**Unworking – The Reinvention of the Modern Office.**

Jeremy Myerson and Philip Ross, Reaktion Books 2022

The authors of this book seem like a dream team of talent and experience. Jeremy Myerson is a design writer and Professor Emeritus in the Helen Hamlyn Centre for Design at the Royal College of Art, London and Philip Roth is a futurist and advisor on the impact of emerging technology on ways of working. But before you turn the page and assume the book is all about tech in the office, it is far far beyond that, it is a hybrid of looking at workplace and business behaviours, how environments impact us, how data can help us inform better choices for staff and planet, and how we should be looking for answers with the mould-breakers.

In fact, the book kicks off by taking us back to 1920s Chicago, New York and London, looking at rapid urbanisation, industrial technologies, how improved transport systems impacted where and when we worked and much more. For me I was intrigued that a book on the modern workplace began by placing workplace in an historical context, and it kick-started my thought processes and a questioning of how things are. The fact that that this first chapter is called "unlearning" compounds how we view what comes next, it prompts us to start unravelling the decisions made as the modern workplace developed.

Just to linger on this first chapter, because if you only buy the book for the first chapter you will learn a lot which will help put your own design work in context. They discuss how furniture changed, for instance how chairs were altered. Quoting design historian Adrian Forty, the privacy afforded by the high-backed chair was removed when chair backs were lowered so the "the clerk no longer worked in a private space: the chief clerk or supervisor was able to see whether he or she was working at maximum efficiency." Time and motion, speed of work, productivity. One of my favourite quotes in the whole book is : "By the 1920s, efficiency shone through the office like letters through a stick of rock." The design of the office reflected the "emergence of the modern clerical workplace as an administrative adjunct of the factory and harking back to the dawn of the Industrial Revolution".

Fast-forward to the pandemic, I think their presentation and discussion of how Covid-19 has impacted how, where and when we work is one of the best I've read. I love how they've woven in the challenges of businesses, cultural changes, how people wanted more choice, health, design, how the nature of work has shifted. In chapter 7, they explore "space" and how with all the real estate standing empty "What is workspace for?" and they look at the redistribution of office space, flex-space to co-working agile workplaces to how our modern offices will morph.

It is an incredibly readable book, well researched and with brilliant sub-divisions of chapters making it easily digestible, there is even a chapter on urbanism. But before I sign off this review, I just wanted to call your attention to chapter 4, which is all about "experience", and very relevant to those of us working in Biophilic Design. They explore new realms for Workplace Experience and have a simple infographic on page 67 which shows how Clarity, Empathy, Optimisation and Intrigue cross over Wellbeing, Innovation, Learning and Efficiency revealing where the sweet spot is. I'm going to leave you to buy the book and see for yourself if you agree.

In short, I know this is a book I have already been signposting colleagues to, and I'll be dipping into regularly to spark thoughts, debate and ideas. The more we think about how the modern workplace needs to be, the more informed us as biophilic designers can align our practice and our design pitches to show that we understand how we help shape workplaces that align not only with health, wellbeing, sustainability, biodiversity and regenerative design, but also with the heartbeat and living systems of the modern workplace.

Check out the interview I did the Jeremy Myerson recently: "Unworking, a biophilic reinvention of the modern office"
https://journalofbiophilicdesign.com/podcast-journal-of-biophilic-design/unworking-a-biophilic-reinvention-of-the-modern-office

# FINAL WORD

**Dr Vanessa Champion**
*Editor*

Close your eyes. What is the first thing you sense? You hear things. Your ears immediately start scanning for things recognisable. People who meditate, and I include myself in that happy bunch of chill out folk, are 99 times out of 100 asked to close their eyes, breathe and focus on the breath. We listen to what we can hear, and tune out our vision.

There is a reason for this. We are constantly scanning, although we are reading this, our periphery vision is also "seeing" what's either side of the laptop, mobile, tablet, physical book or whatever device or material you are reading this from.

When we are walking, driving or even having a conversation, our eyes are constantly looking beyond what we think we are focused on. Our brains are amazing things.

Our senses process all this information in nanoseconds. Constantly. When we tune out that "noisy" vision, we start focusing on what we can hear. Actually, when we block that too, we go for smell, touch and taste. All of our senses work together to inform our brain of what is friend or foe, threat or treat. Constantly. I know I've repeated that, but it's true. It's constant.

When we design, we need to be taking this into consideration. Our entire living system our body, depends on signals it receives through our senses. This living system is what biophilic design aims to restore to an equilibrium, a balance or even better, a flourishing.

There is a reason we chose to have a whole issue dedicated to Sound, just like our previous issue was focused on Light. As designers we affect the environment we are specifying into, every single time.

We are not perfect, but we can arm ourselves with as much knowledge as we can so that we don't destroy or harm anyone or any living being with our legacy.

Landscape architects, architects, urban designers, planners, healthcare consultants, teachers, education specialists, home designers, and all of us, can use our influencing muscle to help advise clients and businesses to "listen" to their workplace or space and ask the users how they feel about the place. Where is noise coming from, what can we do to mitigate it with biophilic interventions?

There is so much to learn, but once we've learnt it, we can't unlearn it.

Once we know something might harm life, we have a choice to then switch it out for something else. Sound affects us, let's try and make it nice.

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