forum acusticum 2026
8-12 September · Graz, Austria

DISCOVER: AN EXHIBITION EXPLORING ACOUSTICS THROUGH REIMAGINED ICONIC VINYL ALBUM COVERS.

Manuel Melon[1], Pierrick Lotton[1], Alice Dinsenmeyer[1], Félix Foucart[1], Mathieu Gaborit[1], Pierre-Arnaud Lecomte[1], Stéphane Letourneur[1], Antonin Novak[1], Alann Renault[1]

[1] *Laboratoire d'Acoustique de l'Université du Mans (LAUM), UMR 6613, Institut d'Acoustique - Graduate School (IA-GS), CNRS, Le Mans Université, France*

Abstract

Discover is an exhibition that aims to introduce the general public to acoustics through iconic vinyl album covers. Each of the 25 panels in the exhibition features the original cover, the cover redesigned to illustrate a particular acoustic phenomenon, and scientific explanations. Each panel comes with an interactive module offering an experience, an audio clip, a video, or an object to observe. The exhibition was presented in Le Mans (France) from January 17 to February 7, 2026, as part of the Le Mans Sonore sound biennial, and welcomed 800 visitors. This article presents the process of creating the exhibition by describing the general concept, the various choices made, the different stages of development, and the working methods. Finally, the public's reception will be analyzed through feedback obtained during visits or written testimonials left by visitors.

Keywords: *General public, exhibition, acoustics, scientific outreach*

1. Introduction

Le Mans Sonore is a two-year festival dedicated to sound, which offers, for each edition, concerts, sound installations, conferences, exhibitions, etc. For the 2026 edition, the Acoustics Laboratory of Le Mans University (LAUM) proposed to the organizing committee to set up an exhibition on acoustics aimed at the general public. There are many challenges involved in carrying out this task. One of them particularly caught our attention: how to attract the public to a scientific exhibition? This task must be done while keeping in mind that university science programs are experiencing a decline in popularity [1].

***Corresponding author**: manuel.melon@univ-lemans.fr.*

Engaging diverse audiences to science exhibitions remains a major challenge for organizers. Studies show that visitor engagement and lasting interest depend not only on the quality of the content, but also on interactivity, emotional resonance, narrative framework, and multisensory activities [2], [3]. Interactive exhibits have been shown to enhance cognitive and affective engagement, yet their impact varies according to visitors' prior interest, social context, and spatial configuration [4]. Furthermore, interdisciplinary approaches combining art and science can broaden audience reach and foster deeper engagement by lowering perceived barriers to scientific content [5], [6].

Taking into account the recommendations from the literature cited above, it was decided to combine acoustics and art and to provide interactive devices to encourage visitor engagement. To achieve this, we decided to use iconic vinyl record covers, which were redesigned to explain a particular acoustic phenomenon, in the hope that the link with an image well anchored in popular culture would help visitors to better remember the concepts presented. Thus, the name of the exhibition was chosen to make a pun related to its conceptual theme and the discovery of acoustics: Discover.

The second section of this article presents the concept of the Discover exhibition. Its conception is then detailed in Section 3 while its installation is described in Section 4. The public's reception is then discussed in the Section 5 before concluding.

2. Concept

One of the difficulties with the chosen concept is finding covers that are both popular and that could be linked to an acoustic concept to explain. Indeed, a large number of album covers feature a photograph of the artist/band, with a percentage (25 to 75 %) depending on the musical genre [7]. Such record jackets are difficult to use for our purpose. Thus, it seems difficult to explain all the concepts in the pedagog-

ical order typically found in textbooks.We therefore decided to present a kind of record collection, with restricted choices, the result of which more closely resembles a cabinet of curiosities than the educational progression of a student textbook.
Our first selection was Pink Floyd's Dark Side of the Moon. This choice was rather obvious, as the shift from white light diffracted by a prism to pink noise scattered into its various frequency components seemed natural (see Fig. 1).

In practice, the original cover and its reworked version are inserted into a 1 m^2 panel. Scientific explanations are printed on the panel to describe the related physical phenomenon. The text is divided into two parts: the first one is adapted for the general public and while the second one presents lesser-known information, anecdotes, or additional information. Illustrations may be added to facilitate understanding. For each panel, an additional interactive part is added to promote engagement, understanding, and knowledge retention.

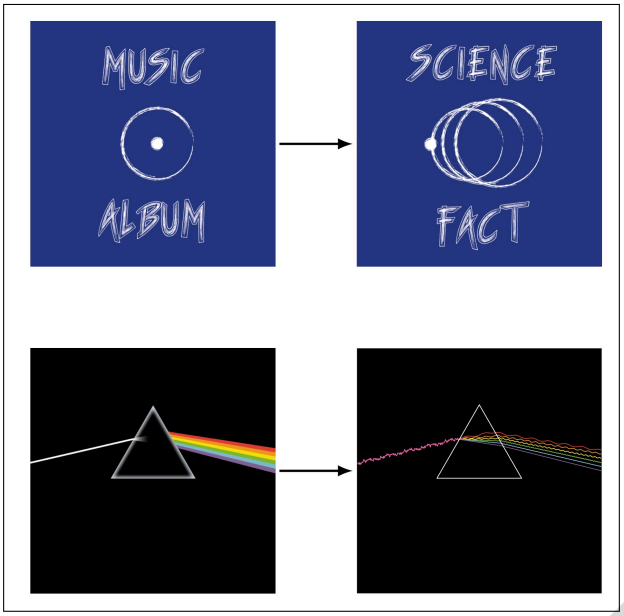

Figure 1: The images above show the general concept of repurposing an existing cover to create a redesigned cover that presents an acoustic concept. The images below provide an example of applications for the the album Dark Side of the Moon.

As an example, let's describe what was done for the cover of Dark Side of the Moon. The panel title, "Pink Noise," was chosen to echo the band's name. The text first describes what white and pink noises are. The opening introduces gray noise, created to take into account the shape of the ear's frequency response. The spectra of the three noises are also represented. A preview of the panel is shown in Fig. 2. The interactive part took the form of a quiz, in which participants had to listen to three sounds and guess whether they were white, pink, or gray. The sounds could be listened to through headphones using a module specifically built for the exhibition, or by scanning the QR code printed on the panel (requiring the use of a smartphone and personal headphones).

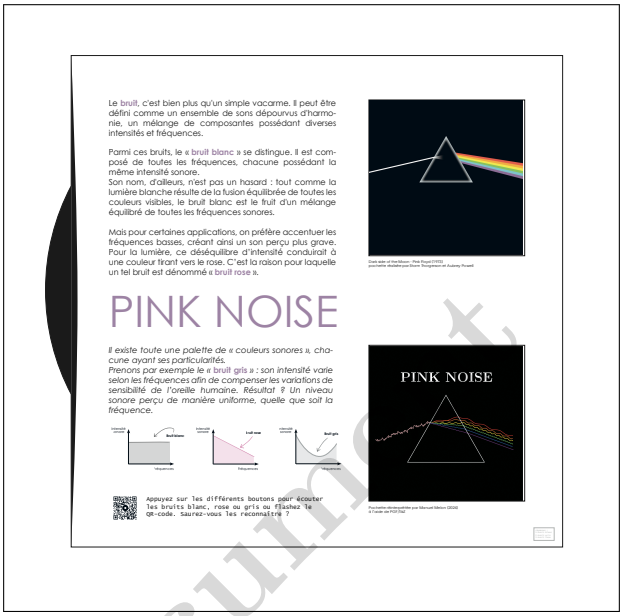

Figure 2: Final rendering of the Pink Noise panel (text in French).

3. Exhibition conception

Once the concept of Discover has been explained, this section will focus on design methods, starting with the working method. As almost all parts of the exhibition were completely new, a large team with complementary and varied skills had to be put together. The various skills required were as follows: artistic (for the adaptation of the covers), acoustic (for choosing and explaining the concepts), electronic and mechanical for the manufacture of the interactive modules, editorial for producing texts adapted to the target audience, graphic design for the panels and the exhibition visual identity, and project management for the smooth running of the project. After discussions with members of the laboratory, a team of nine motivated individuals was formed, covering most of the requirements. Although this project was led by LAUM, it was decided to invite other actors in the city of Le Mans involved in sound to produce a panel on one of their activities related to acoustics. Six organizations responded positively: a technology transfer center (Almacoustic), an art school specialized in sound design (ESAD-TALM), a school for crafts related to instrument making and sound (ITEMM), two other laboratories at our university in computer science (LIUM) and history (TEMOS) and an association dedicated to contemporary popular music (Superforma). A final partner in Rennes was chosen to create a panel on one of their speciality: augmented reality (Noisemakers). This means that in addition to the nine main members,

who worked on the project for almost two years, 26 other people were involved on a more or less occasional basis in specific tasks.
An important task involved choosing acoustic concepts and finding a vinyl jacket to match. There was no single method; sometimes the choice of cover came first, and sometimes we had to find a cover for a particular concept. In the latter case, we were able to find a solution by consulting books compiling famous record covers [8], [9] or using search tools and online databases such as Discogs. Using the 2025 free version of ChatGPT was not very helpful, as it sometimes provided false descriptions of covers.
Three different methods were chosen for redesigning the chosen vinyl covers. The PGF/TikZ language was used when the designs contained more or less geometric drawings. For more complicated jackets, a combination of artificial intelligence and editing software was used (DALL · E 3 and Affinity Photo). Finally, an artist and illustrator, Louis Lotton, also produced covers using traditional methods (drawing, painting, photography) and editing software (Photoshop). Redesigned covers examples are provided in Fig. 3 for the three methods.

Particular care has been taken in writing the

Figure 3: Resigned covers: Blue Lines by Massive Attack reworked with PGF/TikZ, Piece of Mind by Iron Maiden reworked with DALL · E 3 and Affinity Photo, Origin of Symmetry by Muse drawing reworked on Photoshop and Licence to ill - Beastie Boys, drawing reworked on Photoshop.

explanatory texts: trying to remain scientifically accurate while using a minimum of terms unfamiliar to the general public or taking care to define them in an accessible way.
Each panel is accompanied with an interactive part which can be videos, sounds, experiment, etc. Eight interactive modules have been specifically designed for the exhibition. They include a Teensy microcomputer that manages inputs (buttons or potentiometers) and outputs (headphones), play sounds, and manage interactivity. They were programmed using the C language. The structure of the modules (legs, aluminum cover, wooden frame) was also manufactured entirely (see Fig. 4). Some modules offered simple listening exercises or asked participants to identify sounds by listening to them (the answer was given in small print in the lower right corner of the panels). Others offered more advanced tasks: creating your own mix by panning three sources, or discovering how many dB correspond to a doubling of the perceived sound intensity.

Other modules without electronics were also

Figure 4: Top left: welding of module feet, top right: welded feet, bottom left: engraved and folded casing and bottom right: finished module.

designed. A very long tube wound on a spool allows visitors to feel the speed of sound. A toy piano was modified to excite five tuning forks of multiple frequencies in order to build a more or less complex sound depending on the number of keys played. Two aluminium bars with slightly different resonance frequencies, when excited simultaneously, illustrate the concept of beat frequency. A stand with three tubes of equal length, one straight and one curved copper tube and one straight PVC tube, allows you to experiment with the sounds produced by the structure (as in tubular bells) or resulting from the resonance of the air column inside the tube (as in flutes). A thermoacoustic demonstrator was

also built to produce electricity from a heat source generating sound into a resonator. An augmented reality experience was also offered using a Meta Quest 3 headset. Users could move four sound sources, symbolized by speakers, modify the reverb, and hear the result in real time while being able to locate the virtual sources in space using HRTF-based filtering. The rest of the activities consisted of videos to watch or objects to look at or manipulate.

As only one headphone was available per panel, custom webpages were also provided through a QR code. Visitors were able to listen to the sounds, watch videos or do some activities using their smartphones. An example which uses the JavaScript library is provided in Fig. 5.
In the end, the team managed to create 25 panels, a complete list of which is summarized in Table 1.

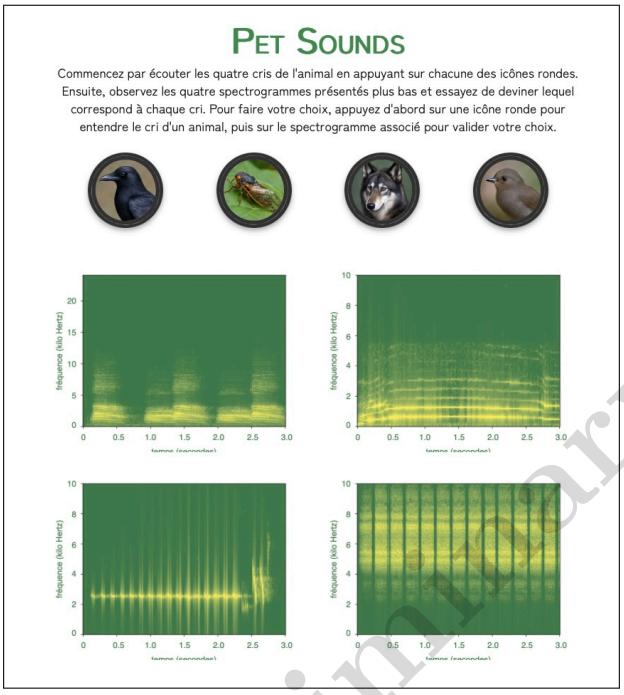

Figure 5: Web page offering the "pet sounds" panel activity: identify which spectrogram corresponds to the sound of each animal.

4. Installation

The exhibition was installed in "La Fabrique – Rêves de ville," a venue in the city of Le Mans dedicated to the city of tomorrow, which, among other missions, hosts exhibitions. Discover began on January 17, 2025, the first day of the "Le Mans Sonore" biennial, and ended on February 7, 2025, for a total of three weeks (and four weekends). For the installation, panels dedicated to the simplest concepts were placed at the beginning of the tour as it was important to define the concepts of frequency, sound levels, and speed of sound before moving on to more complicated subjects. The panels dedicated to acoustic applications and to research topics were placed in the final part of the tour. The most impressive panel, which dealt with augmented reality, was placed at the end of the exhibition, like the cherry on top. The installation map and the recommended itinerary for the visit are shown in Fig. 6 while Fig. 7 shows a photograph of the installed exhibition. It is worth noting that the panels, printed on cardboard—a material that is highly recyclable—are suspended by metal cables. This creates an open, airy installation without overly partitioning the exhibition space.

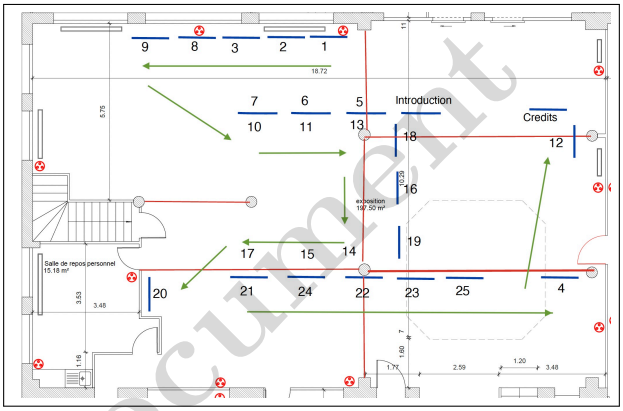

Figure 6: Installation plan. The numbers correspond to the list in table 1. The green arrows indicate the recommended itinerary for the visit.

Figure 7: Picture of the installed exhibition.

5. Visitor reception

In three weeks, Discover welcomed 800 visitors (Fig. 8). This number is quite satisfactory, considering that the venue was closed on Sundays and Saturday mornings. Most of them came from Le Mans and neighboring towns (in the Sarthe department), although about a hundred came from other French departments of France and from abroad. The direct feedback we received was very positive, but it was

Table 1: List of the 25 panels.

#	Theme	Album	Alternative title	Interaction
1	Sound level	Multi artists	dB Scale	Sounds
2		Confusion - New Order	94 dB	Sounds
3		Blue Lines - Massive Attack	Hearing Attack	Earplugs to take away and information for protecting ears
4		Piece of Mind - Iron Maiden	Piece of Silence	Photobooth
5	Frequency	AM - Artic Monkeys	Amplitude Modulation	Experiment
6		Origin of Symmetry - Muse	Amusing Fork	Experiment
7		Dark side of the moon - Pink Floyd	Pink noise	Sounds
8	Spectrogram	Pet sounds - beach boys	Spectrograms of pet sounds	Sound experiment
9	Propagation medium	For those about to rock - AC/DC	For those around the clock	Sound experiment
10		From Mars to Sirius - Gojira	Sounds from Mars	Sounds
11	Spatial sound	Eskimo - The residents	Stereo	Sound experiment
12		Random Access Memory - Daft Punk	Audio Augmented reality	Interactive augmented reality setup
13	Musical Acoustics	Tubular Bells - Mike Oldfield	Tubular Sounds	Experiment
14		Harmonium - Harmonium	Instrumentarium	Video
15	Applications	The wall - Pink Floyd	Through the wall	Sounds
16		Licence to ill - Beastie Boys	Air Flow	Object on display
17		Who's next - The Who	US Test	Object on display
18		Autobahn - Kraftwerk	Elektrofahrzeuge auf der autobahn	Sounds
19		In the court of the crimson King - King crimson	Crimson Queen	Experiment
20	Research	Help - The Beatles	LAUM	Video
21		Unknown Pleasures - Joy Division	Unknown soliton	Video
22		Harvest - Neil Young	Energy Harvesting	Experiment
23		The Velvet Underground and Nico - The Velvet Underground	Apple quake	Video
24		Uzumaki - Colin Stetson	Spiral diffuser	Object on display
25		The Black hole - John Barry	Acoustic black hole	Video

certainly biased, as it can be difficult to give negative feedback to the exhibition's creators. Another way to share one's opinion was to write a comment in the guestbook provided at the end of the exhibition. Even though the comments left in the guestbook are biased—only a small fraction of visitors write, and they are often the most enthusiastic ones—the comments are mostly positive. They remain a source of exploratory qualitative data, useful for understanding emotions and feelings, identifying the most challenging parts, and pinpointing recurring themes (interactivity, aesthetics, comprehension, etc.) and illustrating results with direct quotes. To do so a word cloud was created using the 60 messages left in the guestbook (see Fig. 9). The comments were very positive, with words great (super in French) appearing 19 times and interesting (intéressant) 13 times. Vistors were also grateful: thanks (merci) was written 17 times. These initial conclusions will need to be supplemented by a more in-depth study when the exhibition is presented again in the future.

6. Conclusion

The Discover exhibition was developed with the aim of offering a unique take on acoustics. The use of iconic vinyl album covers and their graphic reinterpretation was chosen to attract an audience that might not otherwise have come to see a science exhibition. The extensive use of interactive displays allowed visitors to experiment for themselves or play with various scientific concepts. The exhibition appears to have achieved its goal: word-of-mouth re-

Figure 8: A visitor enjoying the apple quake panel.

Figure 9: Word cloud from the guestbook.

views and enthusiastic comments left in the guestbook certainly point in that direction, even though results should be interpreted cautiously and complemented by more systematic evaluation methods. The creators are now looking to bring the exhibition to other venues, both French-speaking and non-French-speaking. Short-term plans therefore include improving certain interactive devices to make them more robust and translating the panels.

7. Acknowledgments

The authors would like to thank the city of Le Mans for funding part of the exhibition and La Fabrique – Rêves de Ville for hosting Discover. The authors would also like to extend their heartfelt thanks to all the colleagues who contributed to the project from time to time. This project was funded by the Pays de la Loire region through the Proof of Concept Call issued by the "Institut d'Acoustique Graduate School (IAGS)" at Le Mans University.

References

[1] S. Khan, M. Shiraz, G. Shah, and M. Muzamil, "Understanding the factors contributing to low enrollment of science students in undergraduate programs," *Cogent Education*, vol. 10, no. 2, p. 2 277 032, 2023.

[2] J. H. Falk and L. D. Dierking, *The museum experience revisited*. Routledge, 2016.

[3] S. Allen, "Designs for learning: Studying science museum exhibits that do more than entertain," *Science Education*, vol. 88, no. S1, S17–S33, 2004.

[4] S. Schaller, C. Schumann, and J. Wolling, "Public engagement by strategic science communication: An evaluation study on the impact of an interactive science exhibition on the german energy transition," *Frontiers in Communication*, vol. Volume 10 - 2025, 2025.

[5] A. Johansen, "Imagining the brain, engaging the body: Designing visitor engagement in science exhibition experiments with art," *Museum Society*, vol. 20, no. 2, pp. 153–171, Nov. 2022.

[6] C. J. Duckett *et al.*, "Nights at the museum: Integrated arts and microbiology public engagement events enhance understanding of science whilst increasing community diversity and inclusion," *Access Microbiology*, vol. 3, no. 5, p. 000 231, 2021.

[7] N. Fracaro, S. Cecconello, M. Conti, N. D. Marco, and A. Galeazzi, "Disc-cover complexity trends in music illustrations from sinatra to swift," 2025. arXiv: 2510.00990 [cs.CY].

[8] M. Evans, *Vinyles : les tubes, les pochettes, les labels*. Grund, 2016.

[9] J.-D. Beauvallet, O. Cachin, C. Conte, and J.-E. Perrin, *Pochette Mythique*. GM editions, 2023.