Kinetic Sound Mobile

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1. Program Notes

Kinetic Sound Mobile is a site-responsive sonic installation that reinterprets Japanese wind chimes "*furin*" by integrating them with the spatial and kinetic properties of hanging mobiles.

This work emerged from critical reflection on the presence and function of sound in contemporary Japanese architecture, highlighting how the environmental conditions essential for traditional furin are gradually disappearing. As urban housing becomes more standardized and compact, priorities such as efficiency, functionality, and security have led windows to be kept increasingly closed. This separates the indoor space from the vitality and sensory rhythms of the outside world, and silences a cultural instrument that once connected people to the seasons.

Kinetic Sound Mobile seeks to restore this lost function by adapting the furin to the subtle kinetic energy residing in the modern interior: the artificial airflows of climate control systems and human movement. Functioning as a musical interface for sealed interior spaces, the work translates indoor airflows into visible motion and sound. Unlike conventional wind chimes that rely on the unpredictable fluctuations of outdoor wind, this work utilizes the rotational properties of a mobile structure to manifest environmental responsiveness and indeterminacy indoors.

Kinetic Sound Mobile consists of multiple wind chime elements suspended as part of a mobile structure. As the mobile rotates and shifts, the chimes occasionally approach one another. When collisions occur, the chimes strike each other, producing layered harmonies. This structure introduces two key experiential qualities: anticipation arising from near-contact, and emergent sonic complexity generated through accidental collisions. Sound is thus perceived not only at the moment it is produced, but also through the visual and kinetic cues that foreshadow the acoustic event, inducing a heightened sense of sonic expectation.

Rather than presenting sound as a fixed composition, *Kinetic Sound Mobile* functions as an ever-changing musical environment that invites attentive listening. Acting as an interface between indoor airflow and sound, the work offers a dynamic sensory presence that encourages reflection on the invisible motion that exists within enclosed spaces, and proposes a uniquely interior, chance-based auditory experience.

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Fig. 1. Kinetic Sound Mobiles

2. Project Description

Kinetic Sound Mobile is designed to respond to the directional airflow and human movement and induce rotation and interaction among multiple sounding elements. The work explores the forms of an interface that translates the invisible motions of an interior space into unpredictable yet physically-grounded forms of sound. The designs are optimized to achieve the ideal levels of environmental sensitivity in the indoor space, functioning as an ever-changing composition with a refined balance between stillness and motion.

The Japanese wind chime furin has existed in Japan long before the introduction of air conditioning, with its origins dating back to the mid-sixth century. Traditionally, furin are hung under the eaves of houses, where their wind-driven sounds evoke a sense of coolness and tranquility in the summertime[2]. They are made of materials such as glass or cast iron, each producing a distinct and unique timbre. The traditional design relies on a suspended wind-catching vane "*tanzaku*" to activate an internal clapper "*zetsu*" against a resonant bowl "*sotomi*". When the wind hits the tanzaku, it moves the zetsu to strike the sotomi, producing a single, clear note. This system is tuned for the high-energy, stochastic airflow of the outdoors. As a quintessential symbol of summer, they were a common and essential item. The furin is a part of Japanese culture that appreciates the sense of healing and elegance provided through the sounds of nature.

However, in modern indoor urban spaces across Japan, the frequency of opening windows is declining due to climate change and the improved performance of HVAC systems. As a result, the intermediate zone between the indoors and outdoors where the furin was traditionally hung is disappearing, and the furin is beginning to lose its original function. This has led to fewer opportunities to hear the irregular, unpredictable sounds of the natural world.

In light of this situation, *Kinetic Sound Mobile* was designed as a sound mobile that combines the incidental resonance of traditional Japanese furin with the fluid, kinetic behaviour of mobiles, to create a soundscape that enhances a sense of tranquility in the enclosed space. By using light materials and

incorporating the role of the wind catching element tanzaku into the structure of the mobile itself, the aerodynamic efficiency is enhanced to respond to low velocity indoor HVAC currents. Incorporating multiple rotation layers to diversify the mobile's trajectory, the wind chime elements collide incidentally to create a resonant sound. *Kinetic Sound Mobile* frames this physical structure itself as the composition. Through a mechanism in which the motion of the mobile causes wind chime elements to collide and trigger sound, parameters such as balance, arm length, and collision points directly shape the resulting sonic behavior. This process of visual 'tension and release' during intervals between collisions fosters an anticipation of sound, transforming the auditory experience into a more active engagement. Rooted in a Japanese concept of negative space "*Ma*"[1], this work treats the intervals and moments of absence in sound as an essential part of the composition, and the frequency of sound occurrence is structurally tuned.

Kinetic Sound Mobile is a unified kinetic-acoustic synthesis where every sound is an immediate form of physical sonification of the space's invisible motion. This work leverages the specific geometry and mass of the wind chime elements, allowing their physical and material properties to directly shape the resulting sound and translate indoor airflow into a tangible acoustic presence. By forgoing electronic sensors and speakers, Kinetic Sound Mobile maintains a direct, physical relationship between the environment's kinetic state and the resulting soundscape.

Development Process:

The project was developed through an iterative, practice-based design process. Initial studies involved creating wind chimes and furins using various materials to examine their acoustic characteristics. The frequency characteristics of various materials and the optimal frequency of sound occurrences was studied to achieve an ideal acoustic design. They were then selected and incorporated in a conceptual model to showcase the potential in the dynamics of combining wind chimes with mobiles (Fig. 2). Key design principles were extracted and formalized through schematic models (Fig. 3). Subsequent experiments focused on how different orientations and intensities of indoor airflow affect motion and sound production. Acoustic studies examined the length, pitch and weight of aluminum pipes, informing the tuning and arrangement of the sounding elements. Prototyping progressed alongside these studies, leading to the development of three variations, collectively constructing the ensemble of *Kinetic Sound Mobile*.

The Furin Mobile (Fig. 4) acts as a dual-action interface, where sound is generated both by airflow acting on individual furins and by collisions triggered through the rotation of the entire structure.
The Tuning Fork Mobile (Fig. 5) integrates the tanzaku, the wind catching element of furin, directly into the mobile's mechanics, navigating the transition of airflow into rotation. By replacing the furin body with tuning forks, this version allows multiple precise pitches to overlap, forming harmonies that emerge from the stochastic movement of the system.

The Aluminium Pipe Mobile (Fig. 6) combined the two schematic models, distributing multiple rotational axes to diversify its kinetic movement. The pitches of the aluminum pipes were adjusted by varying their lengths, ensuring that the resultant harmonies were an intentional element of the structural design (Fig. 7).

Fig. 2. Conceptual model

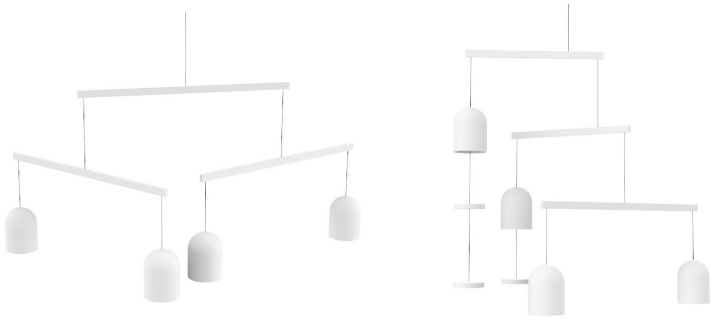

Fig. 3. Schematic models

Fig. 4. Furin Mobile

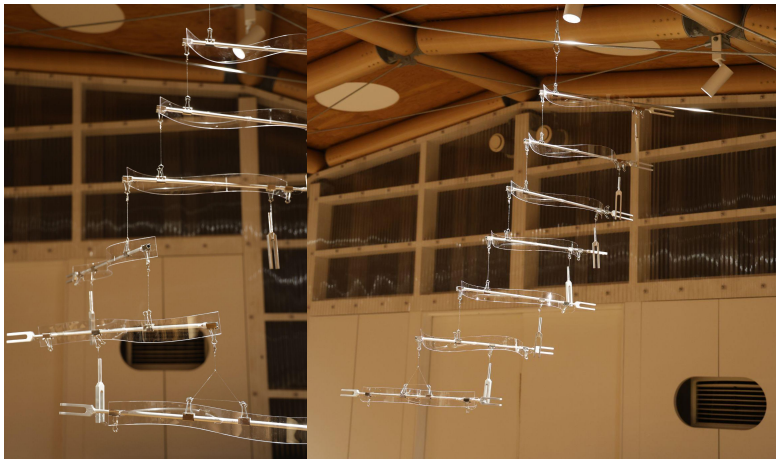

Fig. 5. Tuning Fork Mobile

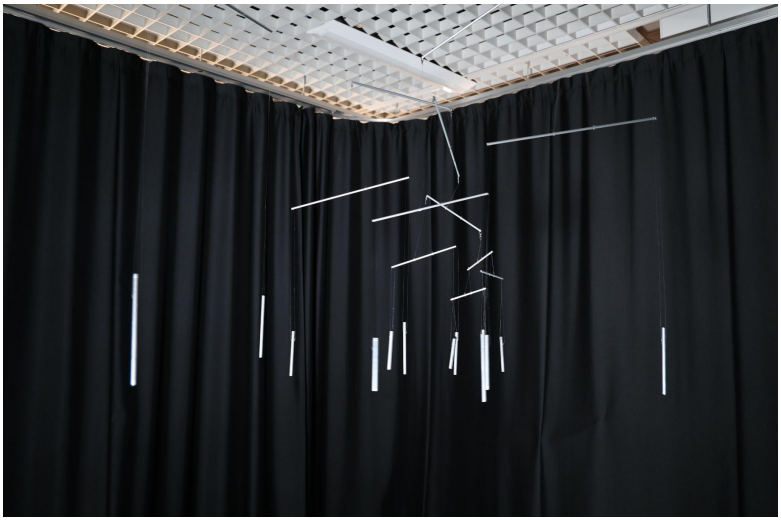

Fig. 6. Aluminium Pipe Mobile

Aluminium pipe
Outer diameter: 10mm, Inner diameter: 8mm

Pitch Notation	(Hz)	(mm)	(g)
G♯ 8	6644	89.8	7
F♯ 8	5919	96	8
E 8	5274	102	8
C♯ 8	4434	112	9
B 7	3951	119	9
A 7	3520	127	10
G♯ 7	3322	135	10
F♯ 7	2959	137	11
E 7	2637	146	11
C♯ 7	2217	160	13
B 6	1975	170	13
A 6	1760	180	14
G♯ 6	1661	184	14
F♯ 6	1479	195.6	15

Fig. 7. Aluminum pipe length and pitch

3. Technical Notes

The installation consists of wind chime elements suspended from kinetic mobile structures. This installation does not require speakers, extension cables, power strips or adapters. The installation is intended to be suspended from above, allowing visitors to walk freely around and beneath the work and experience the sound and motion from multiple perspectives. Since ceiling suspension is said to be not feasible on site at NIME2026, this installation will be hung from a custom built frame structure. Access to a stepladder on site is requested, if available. The ideal exhibition space for this work measures approximately 4m in depth by 4m in width. A ceiling height of approximately 4m is optimal. A location with a HVAC system is essential. However, the spatial dimensions can be adjusted according to the exhibition venue.

The setup will require 4-5 hours, while dismantling will require 2-3 hours.

Alternative installation methods can be considered to ensure a realistic and effective exhibition setup.

4. Media Links

- Video: https://youtu.be/DHhVIze4_Lw
- Audio: https://drive.google.com/file/d/1pls21S7vn6PwahhCPaWAFqJOD6A7FqSS/view?usp=sharing

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Ethical Standards

This project is a physical installation and does not involve any research with human participants or animals.

References

[1] Donna Canning. n.d. *Ma: The Japanese Concept of Ma*. Unique Japan. Retrieved February 12, 2026 from https://new.uniquejapan.com/ikebana/ma/

[2] Cath Lealand. 2021.*What are Furin? All About Japanese Wind Chimes*. Japan Objects. Retrieved February 12, 2026 from https://japanobjects.com/features/furin-wind-chimes